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# Human Computer Interaction and Usability in the New Participative Methodology for Marketing Websites

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## **Abstract**

*Technological devices and information and communications technology (ICT) have become the new tactic for communication, collaboration, and the exchange of knowledge and innovation between organizations and users. These devices include websites, system and application software, and mobile and portable devices. Nevertheless, it has been noted that these devices, including websites, still lack important functionalities and utilities, i.e. Human Computer Interaction (HCI) and usability. HCI and usability are essential in any device to allow the user to complete his/her task(s) in less time and with high-quality performance. The absence of HCI and usability aspects in technology devices and ICT will lead users to become frustrated and dissatisfied, and their loyalty will be reduced. A new coherent methodology called the New Participative Methodology for Marketing Websites (NPMMW) was developed to prevent this problem. The HCI and usability aspects are combined in the design stage, in the NPMMW, to increase user acceptance of the website, and to reduce users' dissatisfaction. This study employment an online survey (N=210) from an Australian information technology industry that allowed the collection of both quantitative and qualitative data. The study provided theoretically and practical significance contribution; that HCI and usability integration in the NPMMW would enhance users' acceptance, satisfaction, trust, and loyalty, and would minimize users' frustration and aggravation, likewise; the NPMMW methodology will assist designers and users to create an effective website that meet the requirements of users and designers. Finally, an overview of the NPMMW methodology is provided, together with proposals for further research.*

**Keywords:** Human Computer Interaction, Usability, Participative and Integrated Methodology, 'contingency-based' approach

## **Introduction**

The Internet has become a very successful tool to enhance business marketing and interaction with users locally and globally. Via the Internet, businesses can market, communicate, collaborate, interact, engage with stakeholders, and obtain innovative knowledge and skills. Internet usage by business can increase profit, reduce costs, and improve marketing activities. Donahue (cited in (McCracken & Wolfe, 2004)) confirms that Internet usage provides several advantages to business: gaining a competitive edge; reducing development and maintenance costs; improving productivity; and lowering support costs. E-marketing is “the strategy that the agency or organization uses the modern communication technical methods to exchange the potential market into reality market” (Meng, 2010, p. 547).

To be successful, an online marketer should first establish the basics of the marketing process: “needs assessment, market research, product development, pricing, distribution, advertising, public relations, promotions and sales” (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 and from any device. The buyers can interact with their suppliers in two-way, not one-way, communication. It is obvious now that there are various advantages to businesses 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, 1999). Baier (2010, p.173) contends that using the Internet will realize the potential “for the seller to demonstrate the solidity and the capabilities of the products and the sales organizations”, which are important since “trust and content play an important role in the shoppers’ selection and buying process”.

For on-line marketing to be successful, a website should be developed to match the requirements of business and users. Successful websites are designed, built, and equipped to meet users’ needs and to assist users to locate the content quickly and in readable format (Følstad, Anda, & Sjøberg, 2010; Lee & Koubek, 2010; Silberman & Tomlinson, 2010).

Therefore, to create an effective website, designers need to work with an appropriate methodology, which details the techniques and tools (i.e. Usability and HCI) for evaluating and satisfying users’ requirements. Moreover, users should feel comfortable, confident, and satisfied while working with the website, without any frustration or aggravation. To increase users’ loyalty to websites and reduce their frustration particularly in website design, existing methodologies from various disciplines and integration techniques were examined and assessed; as the most effective stages and steps was combined into a new coherent methodology called the New Participative Methodology for Marketing Websites (NPMMW).

Furthermore, it was argued that assimilating HCI and usability tools and techniques are essential in the website methodology to increase users’ satisfaction and loyalty and reduce users’ frustration. Therefore, under the NPMMW methodology the HCI and usability aspects were combined under the design stage to increase user acceptance of the website, and to reduce users’ dissatisfaction.

The current studies (Hertzum & Clemmensen, 2012; Koehne & Redmiles, 2012; Leung & Law, 2012; Nicolson, Knapp, Gardner, & Raynor, 2011; Oztekin, 2011) state that Usability and HCI are essential in the website development process, and despite this call, until now, some websites are still missing usability and HCI guidelines in websites. This study aims to bestow the usability and HCI tools and techniques for developing a successful website by utilizing NPMMW stages, especially the design

stage, which contains usability and HCI tools and techniques and other steps, i.e. navigation, and prototyping.

This study contributes to the theoretical understanding of integrating HCI and usability in the website methodology especially the marketing websites. First, it assesses the influence of HCI and usability tools and techniques in the website development. Second, it assesses the implementation of the NPMMW methodology, especially the HCI and Usability in the design stage, and will assist the designers to meet users' requirements. Finally, an overview of the NPMMW methodology is provided, together with proposals for further research.

The outcomes of this study will add a highly significance contribution from the theoretical and practical to 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 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. The practicality of this study will be assessed through online survey by web developers and information technology (IT) professionals in Australia. This study is organized as follows: 1) background information about HCI and usability; 2) methodology and research question(s); 3) discussion, results; 4) significance contribution from this study: theoretical and practical; 5) Limitations; 6) conclusion and further research directions.

## HCI and Usability

The current informal and formal website development methodologies usually contain the following stages: establish the need; gather information; design and develop the website; implement, maintain, and test usability (Abels, Domas White, & Hahn, 1998; Cunliffe, 2000; IBM, n.d; Vora, 1998). It was noted that the current methodologies are either not used in practice in the industry or are inadequate. As a result, "users have had bad experiences on-line with sloppy websites that are confusing, have dead ends or just do not work, sites that waste precious time and cause irritation" (Smith & Zook, 2011, p.7). Often users are frustrated and confused when using websites, especially in relation to navigation, interactivity, and downloading, because of an inability to find information, disorganized pages, disconnected links, lack of support and other problems (Borges, Morales, & Rodriguez, 2008; Cappel & Huang, 2007; Nathan & Yeow, 2009; Nicolson, Knapp, Gardner, & Raynor, 2011; Shackel, 2009). Such problems negatively influence users' confidence in the site and their desire to explore it: "the barriers imposed in the poorly designed interface and the user's lack of trust or faith in the site will discourage further exploration of the site" (Borges et al., 2008, p.1). The current formal and informal methodologies do not adequately support participative design processes for content and presentation (Issa 2008). To understand the concepts behind the website development process, designers and users must understand the four key principles - User Participation, Usability, Real Interaction, and Iteration - as these principles are the essential elements of website success.

A key aspect of the website development process is the user's participation from the beginning to the last stage (Harbich & Hassenzahl, 2011; Kotamraju, 2011; Nies & Pelayo, 2010). It is necessary to involve users in the design process, in order to enhance the product, increase acceptance

among users and reduce learning time. Users should be involved especially in the requirements determination and design stages and in the testing and implementation stages (Lee & Koubek, 2010; Pan, 2010; Rogers, Sharp, & Preece, 2011; Shneiderman & Plaisant, 2010). Mumford stresses the importance of user participation to enable 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, 1995,15-16). Several studies (Holzinger, 2005; Hope & Amdahl, 2011; Van-Duyne, Landay, & Hong, 2003) confirm that user participation is essential in the web development process to improve the system’s functioning and performance’ as users are a vital source of information. Similarly, Maceli & Atwood (2011) and Shi (2011) confirm that users must participate in the design process, mainly because of the need to understand their current perceptions and their evolving demands.

As for Human Computer Interaction (HCI), Olson and Olson (2003,491) define it as “a multidisciplinary field in which psychology and other social sciences unite with computer science and related technical fields with the goal of making computing systems that are both useful and usable”.

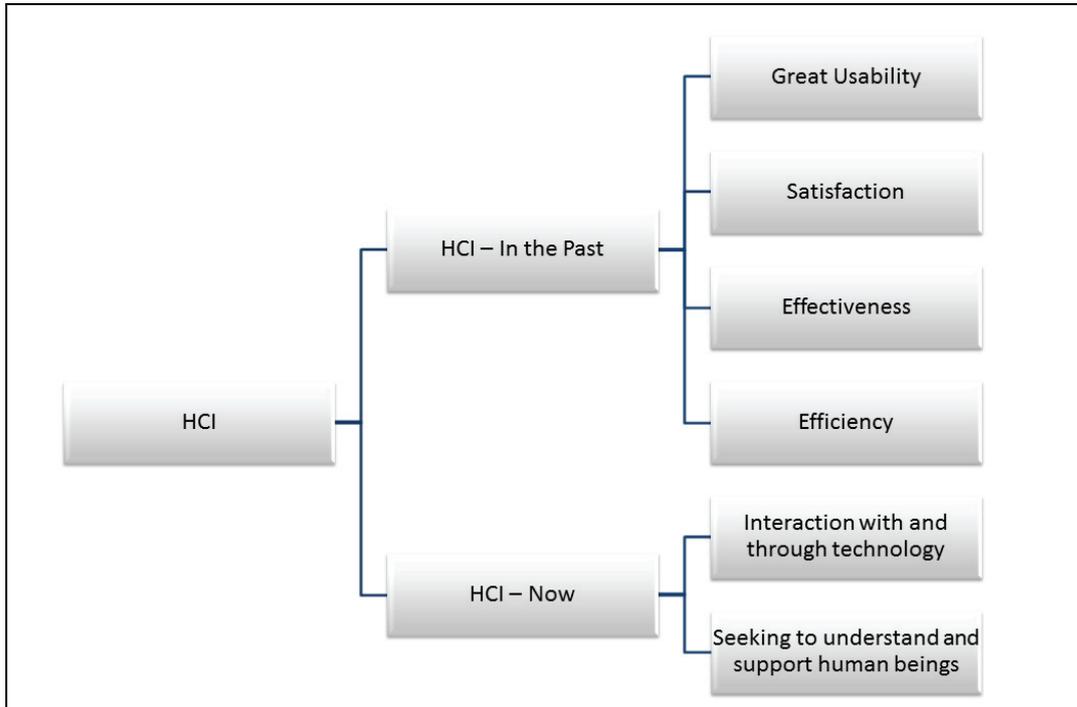
Therefore, the reason for studying HCI in the development process is to create interactive computer systems that are practical and easy to use (Head, 1999). HCI is specifically relevant to several stages in the development process, including the design, implementation and evaluation of interactive systems, in the “context of the user’s task and work” (Dix, Finlay, Abowd, & Beale, 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 the 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, 1997).

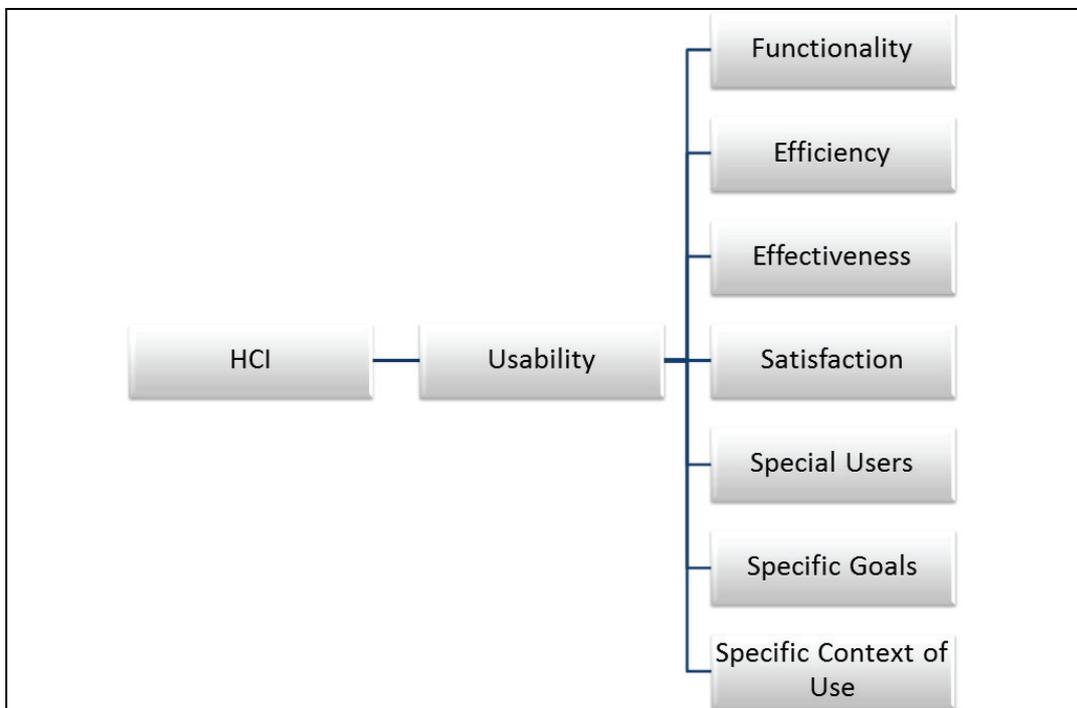
In the past, Human Computer Interaction has mainly focused on interface design with regard to specific criteria: safety, efficiency, and effectiveness and user satisfaction. More recently, HCI has sought to understand more broadly how best to support human beings by allowing more effective interaction with and through technology (Harbich & Hassenzahl, 2011; Joshi, Sarda, & Tripathi, 2010; Kotamraju, 2011; Te’eni, Carey, & Zhang, 2007). Figures 1 and 2 illustrate the evolving relationship between HCI and usability.

Usability refers to the “capability in human functional terms to be used easily and effectively by the specified range of users, given specified training and user support, to fulfill the specified range of tasks, within the specified range of environmental scenarios” (Shackel, 2009,340). 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, 2003).

From the user’s perspective, usability (see Figure 2) is essential in the website development process, as, via adherence to usability principles, the interface will have appropriate functionality, efficiency, effectiveness, satisfaction, features for special users within the website’s defined specific goals, and contexts of use (Biel, Grill, & Gruhn, 2010; Følstad et al., 2010; Joshi et al., 2010; Kanis, 2011; Sauer, Seibel, & Rüttinger, 2010; Te’eni et al., 2007). Alternatively, if usability is not highlighted in website design, users will become frustrated when working with the website. For example, according to Nielsen (2003), people will leave the website if: (a)



**Figure 1 - Human Computer Interaction (HCI) – Prepared by the authors**



**Figure 2 - Usability – Prepared by the authors**

it is difficult to use; (b) the users get lost on a website; (c) the information is hard to read; (d) it does not answer users' key questions; and, lastly, (e) if the home page 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" (Nielsen, 2000, p.9). Several studies (Cyr, Bonanni, Bowes, & Ilsever, 2005; Cyr, Head, & Larios, 2010; Ficarra, Nichol, Cripolla-Ficarra, & Richardson, 2011; Shi, 2011) confirm that usability provides key benefits: increased user satisfaction, trust, and loyalty.

Another aspect that needs to be addressed in website design is real interaction: that is, the actual way in which real users interact with the website. Several studies (Chen & Macredie, 2010; Ficarra et al., 2011; Haklay, 2010; Harbich & Hassenzahl, 2011; Lopatovska & Arapakis, 2010; Pan, 2010; Rogers et al., 2011; Shneiderman & Plaisant, 2010; Szameitat, Rummel, Szameitat, & Sterr, 2009) indicate that real interaction can track the website visitors' performance, either at the prototype stage or after initial implementation. The aim behind real interaction is to measure and monitor users' performance in relation to various aspects: 1) dates and times of transactions; 2) number of hits and number of page views; 3) amount of time spent on each page; 4) search terms used to hit the website pages; 5) search terms used to search within the website; 6) most frequent paths through the site; 7) the most and least frequently visited pages and the IP addresses (translated into domain names and/or countries of origin). This information will assist designers to enhance the design of the website to meet users' requirements more effectively. The final aspect that needs to be addressed in website design is iteration. This aspect will allow for effectiveness and self-correction, as it will

assist designers to build up the new website and ensure that the project will be tested repeatedly until it meets users' requirements (Issa 2008).

Finally, the four key principles (user participation, usability, real interaction, iteration) are identified as fundamental in developing systems in an effective manner by involving users from the beginning. The four key principles were considered the main foundation for developing the New Participative Methodology for Marketing Websites so as to produce websites with high usability, by 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; and winning the trust of the site visitors by meeting users' requirements.

## **Research Questions**

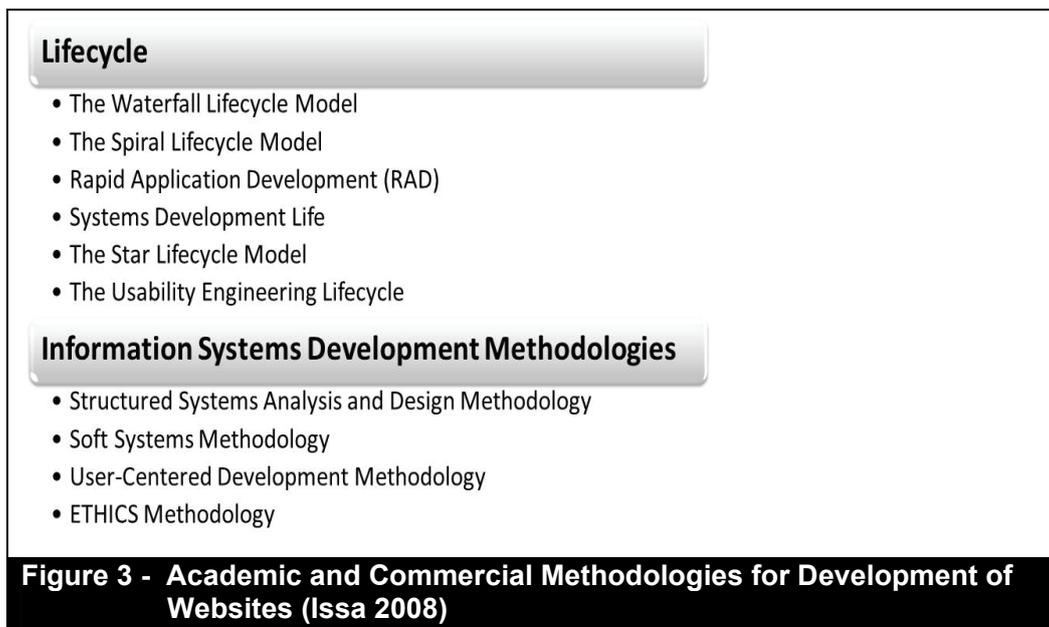
This study will present a New Participative Methodology for Marketing Websites and examine and assess the importance of HCI and usability in the web development process, and whether the new methodology is matching users' and designers' requirements in Australia. The main research questions for this study are the following: How crucial are HCI and usability tools and techniques in the development of marketing websites?; "How can the New Participative Methodology for Marketing Websites assist designers and users to create effective websites, which meet the requirements of users and designers?" The new methodology was developed through the first author's PhD work and evaluated via interviews and a questionnaire survey of website developers and information technology (IT) Professionals in Western Australia.

## **NEW PARTICIPATIVE METHODOLOGY FOR MARKETING WEBSITES (NPMMW)**

In order for systems (or websites) to be widely accepted and used effectively, they need to be well designed. To achieve this, designers need to use a specific methodology to produce the system (or website). 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). This indicates that each methodology should have a set of stages and steps that need to be followed if the work is to be done successfully. ‘Stage’ is a “convenient breakdown of the totality of the information system’s life cycle activity”, while ‘step’ is “the smallest part of a design process” (Olle et al., 1988,p 21). Each stage consists of a set of steps. The sequence of the stages may not always be fixed. In some projects, iteration between stages will occur and this may have a different impact on the methodology (Olle et al., 1988). According to Avison & Fitzgerald (1993, p.264), the main requirement is for methodologies that can lead to improvements in the following three aspects: “A better end product; a better development

process; and a standardized process”. For these reasons, a designer needs to understand users’ requirements for the project before choosing the most appropriate methodology; this is a ‘contingency-based’ approach. After investigations of academic and commercial methodologies for development of websites, the authors deduced that most of these methodologies have similar approaches regarding aspects of requirements determination, page design, implementation, and iteration.

However, it was also noted that most of these methodologies are either not used by industry or inadequate, so most users are still frustrated and confused when working with websites. To develop the New Participative Methodology for Marketing Websites, various existing models of system development and methodologies were analyzed, including lifecycle models, information systems development methodologies, methodologies for developing websites, marketing methodologies, and additional detailed techniques (see Figures 3 and 4).





There are numerous similarities with respect to the stages between methodologies for developing information systems, websites, or marketing strategies; however, integrating stages from information systems methodologies into a 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.

Two aspects are common in the above methodologies: 1) the stages needed for the system development process; and 2) the utilization of four key principles (user participation, usability, iteration, and real interaction (i.e. the monitoring of user interaction with a prototype site). These principles were chosen to address the main deficits identified in existing website development methodologies, and to produce a new methodology, which will assist in the development of websites with high usability.

After reviewing the information systems development methodologies and methodologies for developing websites, the authors identified the strongest stages. The five major stages are planning, analysis, design, testing, and implementation. The extra minor steps are promotion, prototyping, budgeting, ROI (return on investment), and measurement. The main purposes of these extra steps are to identify the 4Ps (product, pricing, place and promotion) for e-marketing; identify the time frame to accomplish the job; define the expected returns from investment; produce the first trial of the system; and learn about the audience by tracking their visits and the purpose behind each visit. In order to develop the new methodology the authors studied additional detailed techniques to understand the website structure – that is, the connection between the front and back ends of the website (i.e. the interface and the database and analysis structures). The additional stages are task analysis, navigation design, staff training, prototyping, promotion, and measurement of outcomes.

These extra stages were added to the methodology.

Two techniques were used for combining stages from different methodologies: grafting and embedding (Miles, 1992). The stages in the new methodology were constructed from the strongest stages of the various methodologies with a view to combining approaches with minimal epistemological damage to their philosophical foundations. Figure 5 illustrates the stages and steps for the New Participative Methodology for Marketing Websites. The most important aspect of this new methodology is that, before the process moves on to the next stage, each completed stage must be evaluated and tested to ensure that the users' requirements are being met. If they are met, the designers can move to the next stage; if not, they need to return to the previous stage. This process continues until the last stage in the new methodology.

Figure 5 summarizes the New Participative Methodology for Marketing Websites (NPMW) (Issa 2008). The major stages of the methodology may be described as follows:

**Usability Evaluation (SA0):** this stage is located at the center of the new methodology, as, before the process moves on 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 goals set for it.

**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 it functions effectively from the technical perspective.

**Planning (SA2):** this stage will allow designers and users to address various

project-scoping issues: 1) the requirements for developing a website; 2) the nature of the product and the buyers; 3) the firm's competitors; 4) 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.

**Analysis (SA3):** in this stage, users, analysts, and designers expand their findings in enough detail to indicate 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 type of users, the type of work users will do with the website, users' goals, and their activities.

**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 - Usability Goals (SE4.1):* this step will allow users (end-users and client-customer users), analysts, and designers (internal and external) to confirm that the website design is efficient, effective, safe, useful, easy to learn, easy to remember, easy to use and to evaluate, practical, and visible, and that it provides job satisfaction.
- 4.2 *Design - HCI (SE4.2):* this step will allow users (end-users and client-customer users), analysts, and designers (internal and external) to identify that the website design is practical. 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.

- 4.3 *Design – Navigation (SE4.3)*: this step will define the specific navigation paths through the website among the entities to establish the communication between the interface and navigation in the hypermedia application.
- 4.4 *Design – Prototyping (SE4.4)*: this step is essential in the website design process, to allow users and management to interact with a prototype of the new website, to suggest changes, and to gain some experience in using it. This step will allow the management to reduce cost and increase quality through early testing.

**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.
- 5.2 *Implementation – Training Staff (SE5.2)*: this step will give the 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 engines, directory listing campaigns, and traditional marketing methods (e.g. Newspapers, radio and TV) to promote the website.

**Maintenance (SA6)**: this stage involves ongoing maintenance of the website, including updating changes and the correction of errors in the website.

- 6.1 *Maintenance – Real Interaction and Feedback Tools (SE6.1)*: During the maintenance stage, real interaction needs to be tracked by using the server log file. This information is very useful to the

designers for improving and enhancing the structure and the functionality of the website in order to encourage more users to visit it. In addition, feedback tools should be available on the website to enable the users to contact the website owner for information or personal communication and to provide feedback about the website. For example, forms, surveys, discussion forum, contact form, telephone number, and a prize should be available on the website to encourage the users to provide feedback about the website. The authors 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 user's needs and requirements. One example of a tool that can be used for the project review is a checklist for the goals and objectives, usability and technical requirements.

**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 in order 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.

**Iteration (SA8)**: this occurs between each stage and step in the New Participative Methodology for Marketing Websites, to check that the website does indeed meet users' (end users' and client-customer

users') requirements and company objectives before moving to another stage.

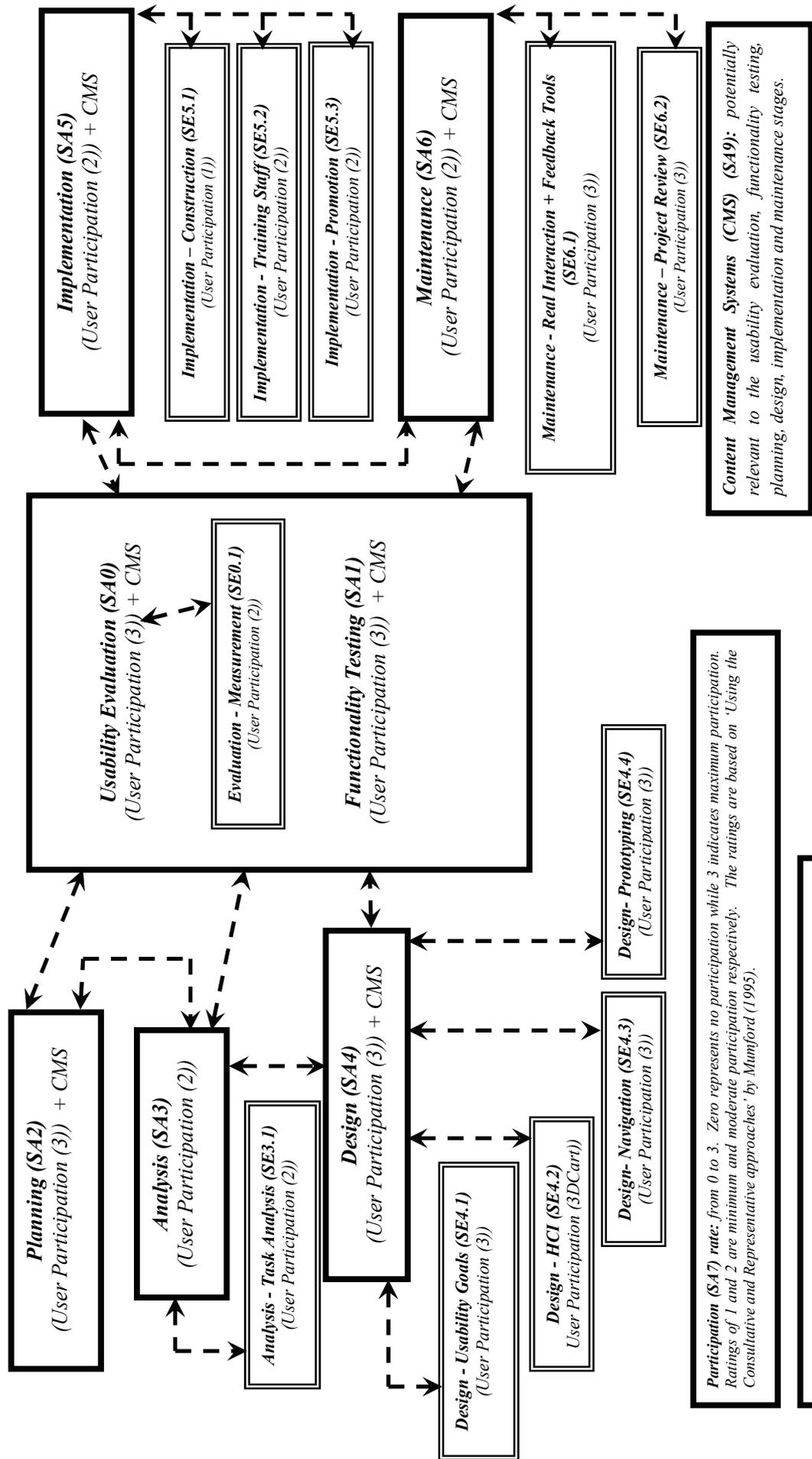
**Content Management Systems (CMS) (SA9):** this aspect is relevant to the usability evaluation, functionality testing, planning, design, implementation, and maintenance stages in the New Participative Methodology for Marketing Websites. This tool will allow the users to manage the web contents by allowing them to add, edit, remove, and submit information by using various templates and workflows without needing any previous knowledge of the website editing tools.

This study created an integrated methodology NPMMW for developing marketing 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. The NPMMW produced in this study 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 & Fitzgerald, 2003, p. 28). 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 from the marketing perspective has a different goal and objectives. To meet these objectives, the development of the website requires particular experience and skills to develop the website. The NPMMW methodology is limited to developing a marketing website.

## RESEARCH METHODOLOGY AND PARTICIPANTS

An online survey was employed to assess the New Participative Methodology for Marketing Websites (NPMMW) as well as Usability and HCI aspects. Online surveys are "powerful tools for maintaining respondent interest in the survey and for encouraging completion of the instrument" (Couper, Traugott, & Lamias, 2001, p. 251). This technique is self-administered over the Internet, by asking the users to respond to the survey by clicking on radio buttons to answer the survey questions and to add additional comments. Couper et al. (2001, p. 246) state "radio buttons are preferred because this allows mouse-only entry", and "a 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-saving and speedy with a high response rate compared with the previous techniques (McBurney & White, 2007), 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). Data downloaded from the online survey are ready for immediate analysis in SPSS or other statistical programs, and presentation of the outcomes in various ways, such as tables, charts, and calculations of mean and standard deviation, according to the authors' requirements (Dillman, 2007; Dillman et al., 2009; Dillman, Reipus, & Matzat, 2010 ; Fan & Yan, 2010; O'Brien & Toms, 2010).



**Figure 5 - The New Participative Methodology for Marketing Websites (NPMMW)**  
(Issa 2008)

Fleming and Bowden (2009, p.285) indicate that the most commonly cited disadvantages of web-based surveys are "sample frame and non-response bias." Another disadvantage of online surveys is potential technical failures, computer viruses, Internet crime, and hacking of the web-based survey. These aspects can lead to a decrease in the response rate, according to Fan and Yan (2010). In addition, online surveys will miss potential respondents who do not have knowledge of and access to the Internet, although this constraint does not apply in the current case.

The participants for this study were 210 industry professionals from across Australia: 104 involved in web development and 106 from information technology. The two industry professionals are selected based on their knowledge and skills in web development process, programming, network applications that are run over HTTP. On the other hand, information technology industry professional are selected based on their knowledge in computer programming, web development, technical support and network administration. Therefore, both professional industries are the main contributor in developing and creating websites.

The participants are selected by employing an outside agency to recruit the needed sample for this study, since it was very hard to locate the required sample of experienced Australian industry professionals. Their fields of post-secondary study were a mixture of information systems (41%), communications technology (11%), computer science (30%), multimedia (5%), and graphics (2%), while the rest (10%) studied various related fields such as marketing and advertising, physics, psychology, and natural science. The majority of participants (49%) had completed a Bachelor level degree, with 14% having completed a Master's degree and 5% a postgraduate diploma. In this study, the response validity was 99%.

A formal letter and information sheet were emailed to the respondents with the survey link. All pages of the survey contained instructions at the top of the page and a progress bar along the bottom to provide feedback to users about their proximity to completion. Pages 1-9 presented the survey items with three questions per page to minimize scrolling, and the concluding page thanked respondents for their participation. The survey was distributed to the participants through the Qualtrics website ([www.qualtrics.com](http://www.qualtrics.com)). Qualtrics is an online survey tool that has a reliable reputation to develop and summarizing survey results, it permits users to accomplish online data collection and analysis (Boas & Hidalgo, 2013).

The web-based survey is developed based on the literature review as well NPMMW methodology, to confirm the importance and significance of each stage and step in the NPMMW method and to endorse the reliability and feasibility of NPMMW method. The web-based survey was divided into seven parts, each of which discussed one key principle for this research. A description of each part was provided to the participants to explain its purpose (see Appendix A).

## RESULTS AND DISCUSSION

IBM SPSS software v.19 was used to analyze the results. The SPSS report included descriptive statistics (mean and standard deviation), independent samples t-test, degree of freedom, and p-value. These statistics assisted the authors to assess the similarities and dissimilarities between Australian web developers' and information technology professionals' perspectives toward the new methodology (see Tables 1, 2, 3, and 4). To raise users and suppliers' awareness behind usability, HCI in the website development and particularly in the NPMMW methodology, we will discuss the results from the online survey, especially Part Three (3) – Human Computer Interaction (HCI) and Usability – and Part Five (5) - New Participative Methodology for

Marketing Websites (Integrated and Contingent),

### **Importance of Human Computer Interaction (HCI) and Usability**

This part aims to examine the participants' perspective toward HCI and usability significance and importance in the NPMMW. This part contains seven questions four questions mainly focus on usability, two questions examining HCI, and one question aims to examine if usability and human computer interaction aspects should be part of website development process to improve the structure and functionality of a website.

Question 1 examined whether "Usability is a very important aspect of the website development process." The results indicated (see Tables 1 and 2) that usability is a very important aspect in the website development process, especially in the design stage, with high average results (out of a maximum value of 5) for both sets of Australian participants (web developers:  $M=4.33$ ,  $SD=0.806$ ; information technology professionals:  $M=4.28$ ,  $SD=0.765$ ) (comparison:  $t=0.405$ ;  $df=208$ ;  $p=0.686$ ). There was a statistically insignificant difference between web developers and information technologists as the  $p$ -value was above the nominal 0.05 value. Both sets of industry participants confirmed that usability is a very important aspect of the website development process, as the web interface will be more acceptable, attractive, and easy to use by both internal and external website users if it integrates usability in the website development process. These results confirmed the conclusion from the literature review (Lavie, Oron-Gilad, & Meyer, 2011; Leung & Law, 2012; Shackel, 2009) that usability is an essential concept in the website development process for increasing users' satisfaction and loyalty toward the website, and, on the other hand, for minimizing users' frustration.

Question 2 examined whether "usability issues are very hard to work with, especially with inexperienced clients, since it takes

time and money to learn about the concepts behind them." Web developers and information technology professionals from Australia have different perspectives (web developers:  $M=4.08$ ,  $SD=0.856$ ; IT professionals:  $M=3.62$ ,  $SD=0.810$ ) (comparison:  $t=3.952$ ;  $df=208$ ;  $p=0.000$ ). From the SPSS results, there was a statistically significant difference between web developers and IT professionals as the  $p$ -value was less than the nominal 0.05 value. The information technology professionals confirmed that including usability in the web development process is costly, especially with inexperienced clients or novice practitioners, as training, guidance, and skills can be beyond the organization's budget. This agrees with Nies and Pelayo (2010) who posited that usability integration in real projects, especially for inexperienced clients, is costly, because of limited time and a lack of expert resources on usability in the market. On the contrary, some authors (Cowan & Jack, 2011; Howarth, Smith-Jackson, & Hartson, 2009) confirm that novice practitioners may fail to recognize the importance of usability without the correct guidance and training. Instead, the web developers presented a different perspective toward usability integration in the web development process. It was confirmed that web developers are encouraging their clients to understand the meaning and benefits of including usability in their website, and how usability will assist them to achieve specified goals with "effectiveness, efficiency, and satisfaction to specified context of use" (McNamara & Kirakowski, 2011, p.376). For the same reason, web developers confirmed, "usability is the main purpose for every development, and it is a very important aspect for the website development."

Question 3 examined whether "adopting usability principles in the website development process will increase the clients' profit." The survey results indicated that web developers and information technology professionals have differing opinions regarding this concept, since the

means are dissimilar for the two sets of participants (web developers: M=4.08, SD=0.809; IT professionals: M=3.75, SD=0.754) (comparison: t=2.988; df=208; p=0.003). From the SPSS results, there was a statistically significant difference between web developers and IT professionals as the p-value was 0.003. These results confirmed that web developers agreed with employing usability tools and techniques in the web development process, especially for marketing websites, as survey respondents commented: "usability would help more in the profits". Incorporating usability in the

web development process in the design stage will assist users and designers simultaneously to recognize the website needs in order to improve user satisfaction, attract more users to the website, increase their loyalty, and minimize maintenance costs. Furthermore, usability integration can assist businesses to increase their profit and increase the hit rates as more customers will visit their website(s) (Lee & Koubek, 2010; Molina & Toval, 2009; Oztekin, 2011; Propp, Buchholz, & Forbrig, 2009).

**Table 1 - HCI and Usability – Likert Scale**

| Questions   | Current Job | Strongly Disagree % | Disagree % | Neutral % | Agree % | Strongly Agree % | Responses |
|---|-------------|---------------------|------------|-----------|---------|------------------|-----------|
| Usability is a very important aspect of the website development process."   | Web Dev.    | 0                   | 0          | 10        | 38      | 52               | 104       |
|   | IT          | 0                   | 0          | 20        | 36      | 50               | 106       |
| Usability issues are very hard to work with, especially with inexperienced clients, since it takes time and money to learn about the concepts behind them                                       | Web Dev.    | 0                   | 8          | 10        | 52      | 34               | 104       |
|   | IT          | 2                   | 2          | 44        | 44      | 14               | 106       |
| Adopting usability principles in the website development process will increase the clients' profit.   | Web Dev.    | 2                   | 4          | 6         | 64      | 28               | 104       |
|   | IT          | 0                   | 2          | 40        | 46      | 18               | 106       |
| Adopting usability principles in the website development process will encourage client-customer users (external) to revisit the website   | Web Dev.    | 2                   | 0          | 10        | 54      | 38               | 104       |
|   | IT          | 0                   | 2          | 22        | 60      | 22               | 106       |
| 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 | Web Dev.    | 0                   | 2          | 10        | 56      | 36               | 104       |
|   | IT          | 0                   | 2          | 28        | 54      | 22               | 106       |
| By adopting Human Computer Interaction aspects in the website development process the client's profit will be increased   | Web Dev.    | 2                   | 4          | 26        | 44      | 28               | 104       |
|   | IT          | 0                   | 8          | 38        | 44      | 16               | 106       |
| Usability and human computer interaction aspects should be part of website development process to improve the structure and functionality of a website.   | Web Dev.    | 0                   | 4          | 8         | 58      | 34               | 104       |
|   | IT          | 0                   | 2          | 26        | 58      | 29               | 106       |

| Table 2 - HCI and Usability – Independent T-test  |             |           |      |       |                        |     |         |
|---|-------------|-----------|------|-------|------------------------|-----|---------|
| Questions   | Current Job | Responses | Mean | SD    | Mean Comparison t-Test |     |         |
|   |             |           |      |       | T-Test                 | DF  | P-Value |
| Usability is a very important aspect of the website development process   | Web Dev.    | 104       | 4.33 | 0.806 | 0.405                  | 208 | 0.686   |
|   | IT          | 106       | 4.28 | 0.765 |                        |     |         |
| Usability issues are very hard to work with, especially with inexperienced clients, since it takes time and money to learn about the concepts behind them                                       | Web Dev.    | 104       | 4.08 | 0.856 | 3.952                  | 208 | 0.000   |
|   | IT          | 106       | 3.62 | 0.810 |                        |     |         |
| Adopting usability principles in the website development process will increase the clients' profit  | Web Dev.    | 104       | 4.08 | 0.809 | 2.988                  | 208 | 0.003   |
|   | IT          | 106       | 3.75 | 0.754 |                        |     |         |
| Adopting usability principles in the website development process will encourage client-customer users (external) to revisit the website   | Web Dev.    | 104       | 4.21 | 0.772 | 2.448                  | 208 | 0.015   |
|   | IT          | 106       | 3.96 | 0.703 |                        |     |         |
| 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 | Web Dev.    | 104       | 4.21 | 0.692 | 3.099                  | 208 | 0.002   |
|   | IT          | 106       | 3.91 | 0.737 |                        |     |         |
| By adopting Human Computer Interaction aspects in the website development process the client's profit will be increased   | Web Dev.    | 104       | 3.88 | 0.917 | 2.015                  | 208 | 0.045   |
|   | IT          | 106       | 3.64 | 0.830 |                        |     |         |
| Usability and human computer interaction aspects should be part of website development process to improve the structure and functionality of a website.   | Web Dev.    | 104       | 4.17 | 0.730 | 2.690                  | 208 | 0.008   |
|   | IT          | 106       | 3.91 | 0.711 |                        |     |         |

Question 4 examined whether “adopting usability principles in the website development process will encourage client-customer users (external) to revisit the website.” From the SPSS results, there was a statistically significant difference between web developers and information technology professionals as the p-value was 0.015.

Web developers agreed that usability principles and guidelines are essential in the web development process to encourage more users to visit and revisit these websites (web developers: M=4.21; SD=0.772; information technology professionals: M=3.96; SD=0.703). This result agrees with the view of the current

literature (Abrahão, Juristo, Law, & Stage, 2010; Fernandez, Insfran, & Abrahão, 2011; Hertzum & Clemmensen, 2012; Leung & Law, 2012; Oztekin, 2011; Peijl, Klein, Grass, & Freudenthal, In Press) that usability principles and guidelines should be applied in the website environment to allow users to achieve specified goals with effectiveness, efficiency, and satisfaction. In e-business, effectiveness is represented by accuracy, fewer errors, high-quality functionality, and achieving users' needs by searching for information or purchasing from the website. Efficiency is mainly related to the ability of users to achieve goals by browsing the website pages with less effort and time spent in learning how the website works, and making the pages easy to read and learn. Finally, satisfaction is essentially related to users and website interaction. If the website supports the users by providing privacy, security, and outstanding service, and is approachable, friendly, and interesting, users' satisfaction can increase, and the website will win the trust of the site visitors by meeting their requirements. The survey respondents commented: "A website is a medium for the user to interact with the stored information on the server. This information can be of any kind but the comfortable man-machine interface makes the website easy to use and operate."

Question 5 examined whether "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." The results indicated that there was a statistically significant difference (at the  $\alpha = 0.05$  level) in the scores between web developers and information technology professionals in Australia (web developers:  $M=4.21$ ,  $SD=.0.692$ ; information technology professionals:  $M=3.91$ ,  $SD=0,737$ ) (comparison:  $t=3.099$ ;  $df=208$ ;  $p=0.002$ ). It was noted that web developers agreed that HCI techniques should be part of the website development process in order to improve the website and to identify that the

website design is practical. 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 (Issa 2008). It was noted that HCI is essential in the web development process to ensure the website interface is efficient and effective, and that it satisfies users' requirements (Bevan, 2001; Bodker, 2006; Dillahunt, Mankoff, & Forlizzi, 2010; Isomursu, Ervasti, Kinnula, & Isomursu, 2011; Joshi et al., 2010; Maceli & Atwood, 2011; Shi, 2011). Furthermore, several studies (Preece, Rogers, & Sharp, 2002; Rogers et al., 2011) have indicated that HCI is mainly concerned with the design, evaluation and implementation of interactive computing systems/interfaces/websites, and, most importantly, with studying the purposes and goals behind developing them. However, the information technology professionals had a different perspective to that of the web developers, as they indicated: "Definitely, usability is very important and hard to get right. HCI is a bit ambiguous though. Different people/products use it to mean different things."

Question six examined whether "by adopting Human Computer Interaction aspects in the website development process the client's profit will be increased". The SPSS results indicated statistically significant differences between web developers and information technology professionals in Australia, in relation to the relationship between HCI and client's profit (web developers:  $M=3.88$ ,  $SD=0.830$ ; information technology professionals:  $M=3.64$ ,  $SD=0.830$ ) (comparison:  $t=-2.015$ ;  $df=208$ ;  $p=0.045$ ). According to this result, the web developers agreed that clients and businesses would witness the benefits of HCI adoption in the web development process. Clients will increase their visits to the website because of its efficiency, effectiveness, functionality, and safety, and this can lead to users' satisfaction and loyalty to the website. Alternatively, businesses will increase their profit and win

the customers' trust. By the same token, the literature review (DePaula, 2003; Issa 2008; Merrick, 2001; Minocha, Dawson, Blandford, & Millard, 2005; Peslak, 2005) confirmed that HCI integration in the web development process would support several groups, both users and designers, to attain their goals by perusing the website interface; in addition, users' satisfaction will be increased and frustration will be decreased. In addition, businesses will increase their profits on the basis of their website structure and layout. Furthermore, it is important to reach online users since these users "are generally the most profitable" (Merrick, 2001).

A two-sample independent t-test (see Table 2) was used to determine whether usability and HCI should be part of the website development process to improve the structure and functionality of a website (Question 7). This revealed a significant difference between web developers and information technology professionals ( $t=2.690$ ;  $df=208$ ;  $p=0.008$ ), whereby web developers had significantly higher mean scores ( $M=4.17$ ,  $SD=0.730$ ) than information technology professionals ( $M=3.91$ ,  $SD=0.711$ ). This result confirmed that Australian web developers have more knowledge and skills regarding the implementation of HCI and usability tools and techniques in the web development process than the Australian information technology professionals. Despite the mean difference among the Australian industry professionals, the web developers and the literature review (Abrahão et al., 2010; Andrzejczak & Liu, 2010; Belda-Lois et al., 2010; Benbunan-Fich, 2001; Biel et al., 2010; Cowan & Jack, 2011) confirm that HCI and usability become very important in developing websites/interfaces, to make these websites/interfaces more acceptable and appealing to users and thereby to reduce users' frustration and dissatisfaction.

### **Developer Acceptability of NPMW**

The SPSS results confirmed and corroborated that the New Participative Methodology for Marketing Websites was

acceptable to both web developers and IT professionals (see Tables 3 and 4). The SPSS results noted that the "new methodology has all the necessary stages and steps which are needed to develop a website" (Question 1), as both web developers and IT professional agreed, with a high mean result (out of 5). There was a non-significant difference in the scores between web developers ( $M=3.87$ ,  $SD=0.904$ ) and IT professionals ( $M=3.74$ ,  $SD=0.652$ ) (comparison:  $t=-1.193$ ;  $df=208$ ;  $p=0.25$ ). Respondents added their comments regarding the new methodology: "Each completed stage must be evaluated and tested to ensure that the users' requirements are being met. Sounds better than many of the methodologies being used at my work; I think this is suitable for very large marketing websites where you have a long timeline and many resources. New Participative Methodology for Marketing Websites is important for developing websites; it is comprehensively inclusive. It helps designers and users complete each stage and step in sequence."

As for Question 2, we would like to examine if "the new methodology is very much a user-centered methodology." By using the new methodology, designers and users have the ability to evaluate and test the results of each stage before moving to another stage. If the results do not meet users' and designers' requirements, the designers can go back to solve the problem before moving on to the new stage. This process continues until the last stage in the new methodology. Both web developers and IT professionals agreed that the new methodology is user-centred. There was a non-significant difference in the scores between web developers ( $M=3.81$ ,  $SD=0.925$ ) and IT professionals ( $M=3.75$ ,  $SD=0.701$ ) (comparison:  $t=-0.468$ ;  $df=208$ ;  $p=0.64$ ). Both sets of respondents concluded: "The new methodology looks like the agile methodology, which I like; being user-centered the end product should be easier to market and in some cases the users may do all the marketing required."

| <b>Table 3 - New Participative Methodology for Marketing Websites from the Marketing Perspective – Likert scale</b>  |                     |                            |                   |                  |                |                         |                    |
|--|---------------------|----------------------------|-------------------|------------------|----------------|-------------------------|--------------------|
| <b>Q#</b>  | <b>Job Function</b> | <b>Strongly Disagree %</b> | <b>Disagree %</b> | <b>Neutral %</b> | <b>Agree %</b> | <b>Strongly Agree %</b> | <b>Responses #</b> |
| The New methodology has all the necessary stages and steps which are needed to develop a website.  | Web Developer       | 2                          | 6                 | 20               | 52             | 24                      | 104                |
|  | IT Professional     | 0                          | 2                 | 34               | 60             | 10                      | 106                |
| The New methodology is very much a user-centered methodology.  | Web Developer       | 2                          | 8                 | 20               | 52             | 22                      | 104                |
|  | IT Professional     | 2                          | 0                 | 30               | 64             | 10                      | 106                |
| The New methodology specifies sufficiently all the stages and steps required   | Web Developer       | 6                          | 2                 | 18               | 56             | 22                      | 104                |
|  | IT Professional     | 2                          | 6                 | 44               | 44             | 10                      | 106                |
| The New methodology would help you to develop a website successfully   | Web Developer       | 6                          | 2                 | 18               | 56             | 22                      | 104                |
|  | IT Professional     | 2                          | 6                 | 44               | 44             | 10                      | 106                |
| The 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 | Web Developer       | 2                          | 4                 | 24               | 46             | 28                      | 104                |
|  | IT Professional     | 2                          | 2                 | 54               | 38             | 10                      | 106                |
| The appropriate website development methodology will depend on the particular type of project website, budget and client   | Web Developer       | 0                          | 2                 | 20               | 42             | 40                      | 104                |
|  | IT Professional     | 0                          | 0                 | 42               | 50             | 14                      | 106                |

**Table 4 - New Participative Methodology for Marketing Websites from the Marketing Perspective – Independent samples t-test**

| Q#   | Job Function    | Responses | Mean | SD    | Mean Comparison t-Test |     |         |
|--|-----------------|-----------|------|-------|------------------------|-----|---------|
|  |                 |           |      |       | T-Test                 | DF  | P-Value |
| The New methodology has all the necessary stages and steps which are needed to develop a website.  | Web Developer   | 104       | 3.87 | 0.904 | -1.193                 | 208 | 0.25    |
|  | IT Professional | 106       | 3.74 | 0.652 |                        |     |         |
| The New methodology is very much a user-centered methodology   | Web Developer   | 104       | 3.81 | 0.925 | -0.468                 | 208 | 0.64    |
|  | IT Professional | 106       | 3.75 | 0.701 |                        |     |         |
| The New methodology specifies sufficiently all the stages and steps required   | Web Developer   | 104       | 3.71 | 0.910 | -1.597                 | 208 | 0.112   |
|  | IT Professional | 106       | 3.53 | 0.746 |                        |     |         |
| The New methodology would help you to develop a website successfully   | Web Developer   | 104       | 3.83 | 0.980 | 0.943                  | 208 | 0.012   |
|  | IT Professional | 106       | 3.51 | 0.819 |                        |     |         |
| The 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 | Web Developer   | 104       | 3.90 | 0.909 | 0.723                  | 208 | 0.000   |
|  | IT Professional | 106       | 3.49 | 0.771 |                        |     |         |
| The appropriate website development methodology will depend on the particular type of project website, budget and client   | Web Developer   | 104       | 4.15 | 0.798 | 0.226                  | 208 | 0.000   |
|  | IT Professional | 106       | 3.74 | 0.680 |                        |     |         |

Very user-centric and allows for proper strategy and scoping before development begins, without wallowing in it. Using this method allows for a seamless and relevant site experience that will back up any related marketing claims as well as giving the marketer a thorough grounding for their marketing material.”

Question 3 examined whether “the new methodology specifies sufficiently all the stages and steps required.” Both web developers and IT professionals agreed with this proposition. There was a non-significant difference in the scores between web developers ( $M=3.71$ ,  $SD=0.910$ ) and IT professionals ( $M=3.53$ ,  $SD=0.746$ ) (comparison:  $t=-1.597$ ,  $df=208$ ,  $p=0.112$ ). Respondents’ comments indicated that this methodology is very robust since all the stages and steps are available to develop a fruitful marketing website. Our respondents were very generous in sharing their perspective toward the new methodology: “It seems a very solid methodology; using this method allows for a seamless and relevant site experience that will back up any related marketing claims as well as giving the marketer a thorough grounding for their marketing material; the functionality is still the most important part; good strategy! Furthermore, it will enhance communication between users and between software applications via open web standards and web interfaces.”

An independent sample t-test was conducted to examine whether web developers and IT professionals felt that “the new methodology would help designers and users to develop a website successfully” (Question 4). There was a statistically significant difference in the scores between web developers ( $M=3.83$ ,  $SD=0.980$ ) and IT professionals ( $M=3.51$ ,  $SD=0.746$ ) (comparison:  $t=0.943$ ,  $df=208$ ,  $p=0.012$ ). This result indicated that web developers corroborated and confirmed that adopting the new methodology would help designers and users to develop a website successfully. Here are some comments from our respondents: “Comprehensively

inclusive; early participation; encouraging greater interest from users; it is an ideal world methodology; I think the user participation at each level will work well; it looks a good design; Users basically get to have an input into the end result. This means that the client will more closely provide what the user is actually after, meaning that the client’s profits should increase; it appears to bring a lot of structure to an unstructured process.”

Question 5 examined whether “the new methodology is contingent”, which means that designers and users can select specific tools and techniques that suit their problem situation, as each project has different requirements and needs. There was a very statistically significant difference in the scores on the ‘contingent’ term between web developers ( $M=3.90$ ,  $SD=0.909$ ) and IT professionals ( $M=3.49$ ,  $SD=0.771$ ) (comparison:  $t=0.723$ ,  $df=208$ ,  $p=0.000$ ). The result indicates that the word ‘contingent’ is known and recognized among web developers compared with the IT professionals. The respondents were very considerable to add their perspectives on ‘contingency’: “Analyst and clients can choose particular techniques to suit the problem situation. Contingency planning is important everywhere; contingency and maintenance can go hand-in-hand; looks great and believable; contingency helps deal with problems and techniques; contingency is fundamental to the success of a website.”

Lastly, we examined whether an “appropriate website development methodology will depend on the particular type of website project, budget, and client” (Question 6). There was a very significant difference in the scores between web developers ( $M=4.15$ ,  $SD=0.798$ ) and IT professionals ( $M=3.74$ ,  $SD=0.680$ ) (comparison:  $t=0.226$ ,  $df=208$ ,  $p=0.000$ ). It was noted that web developers verified and demonstrated that developing a website depended on three aspects: type of project, budget, and client. Respondents kindly shared their perspectives with us: “any

project depends on specific needs and budget of individual clients; and these should be considered throughout the planning stage.” This result confirmed the finding that the appropriate website development methodology will depend on the particular type of website project, budget and client, which supports the contingency approach (Issa 2008).

To conclude, this study gave positive answers to the research questions, as both web developers and IT professionals agreed and confirmed that HCI and usability are essential and crucial in the web development process. Our findings indicated that desegregating HCI and usability tools and techniques in the web development process will serve the needs of both users and business, as website functionality and structure will increase users’ satisfaction and productivity and reduce their frustration and infirmation, while businesses will increase their profit and improve their product performance, and maintenance and development costs will be reduced (Davis & Shipman, 2011; Hornbaek, 2006; Leung & Law, 2012; Propp et al., 2009; Seffah, Mohamed, Habieb-Mammar, & Abran, 2008). On the other hand, the New Participative Methodology will assist designers and users to create effective websites that meet the requirements of users and designers. From the results, it was noted that the new methodology contained the necessary stages and steps that are required to develop successful websites, and it was confirmed that it is a user-centered methodology, and that user participation from the beginning will make the implementation and training much easier, compared with other methodologies. Both groups concluded and confirmed that this new methodology will save costs and gain profits for clients. These outcomes confirmed that the new methodology is convenient, contingent, and beneficial for the successful development of websites (Issa 2008; Issa and Turk 2012).

## **SIGNIFICANCE CONTRIBUTION FROM THIS STUDY: THEORETICAL AND PRACTICAL**

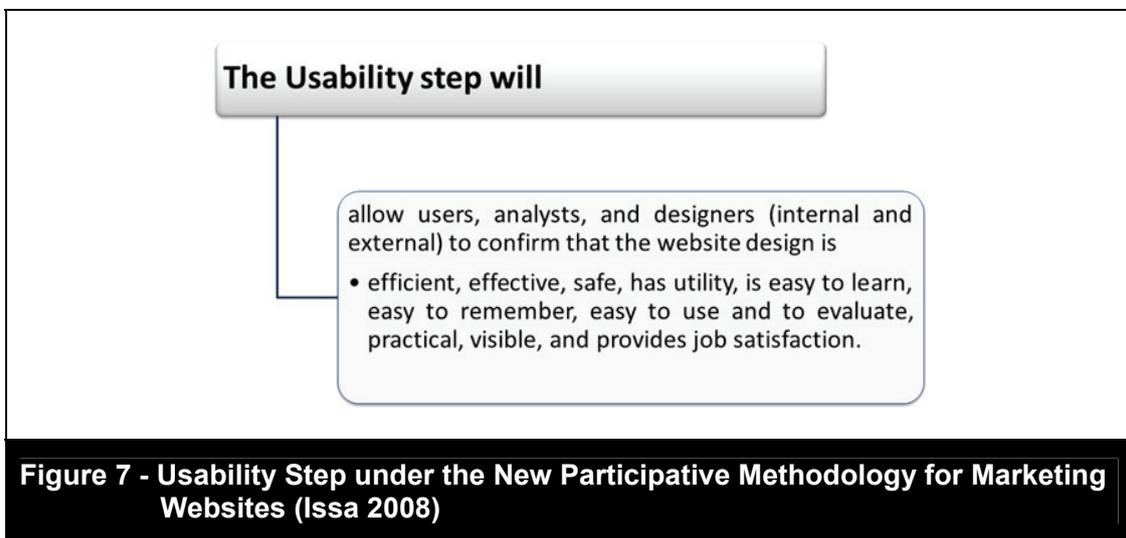
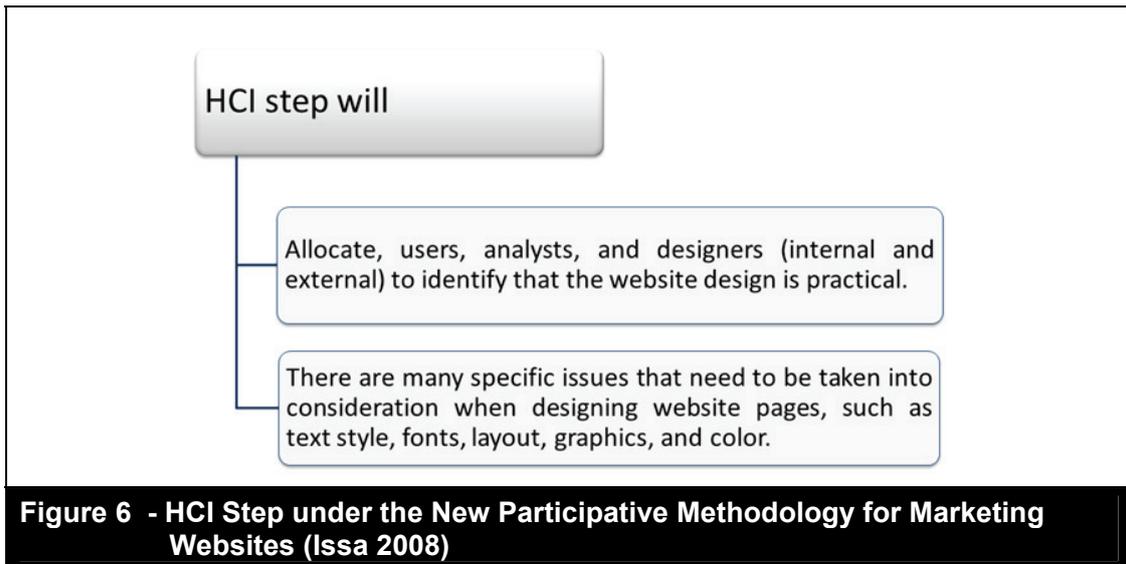
### ***Theoretical Significance***

The theoretical significance from this study confirmed that HCI and usability tools and techniques are fundamental in the web development process for ensuring that the website will meet users’ needs and requirements. Incorporating HCI and usability in the website development process will increase user productivity, satisfaction and trust in the website. In addition, the website will become more effective and efficient, and maintenance and development costs will be reduced (Dou, Nielsen, & Tan, 2002; Nielsen, 2000, 2003). Moreover, this study added a new theoretical significance to the current web methodologies literature review by developing the NPMMW methodology. The authors concocted a comprehensive and intensive study from the existing methodologies from various disciplines, and integration techniques were examined and assessed; the most effective stages and steps were combined into a new coherent methodology called NPMMW. Concisely, this methodology incorporates all the essential requirements which are needed by the designers and users to build an efficient and effective website, and adopting the new methodology in the industry will help businesses to increase revenue, improve overall user satisfaction, increase users’ loyalty and retention, improve service levels and decrease operational costs. Finally, this study intended to support academics, university teachers, researchers and master and doctorate students to raise the awareness of HCI and usability tools and techniques in the web development process especially the marketing websites.

As well from the theoretical significance, HCI and usability steps are defined new concepts from the web development process, as the HCI step will allow users,

analysts, and designers (internal and external) to identify that the website design is practical. 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. The usability step will allow users, analysts, and

designers (internal and external) to confirm that the website design is efficient, effective, safe, useful, easy to learn, easy to remember, easy to use and to evaluate, practical, and visible, and that it provides job satisfaction (see Figures 6 and 7).



**Practical Significance**

The practical significance from this study is to emphasis and fosters the importance of HCI and Usability aspects in the web development process especially in the

marketing websites design. From the survey, the web developers and information technology industry professionals confirmed that NPMMW has all the stages, which need to develop a website; as well, the NPMMW is very much a user-centered methodology

and all the stages and steps in NPMMW are required for creating and developing a successful website. This research was conducted to identify the problems that currently exist in the web design industry and present some solutions and suggestions to resolve the current problems and to minimize the gaps in the present methodologies.

Finally, several studies (Gregor & Hevner, 2013; Hevner, March, Park, & Ram, 2004) confirm that designers, users and various stakeholders should engage and participate in the design process to implement the successful design with technology capacity. The empire of Information Systems research is the collaboration and cooperation between people, organizations and technology, aiming to work side by side to achieve the design which meets the users' needs and requirements. This contribution supports the study aims, as NPMMW aim to encourage the collaboration between various stakeholders, internal and external to achieve the system and user needs.

## **LIMITATION**

This study examined the perspective of IT and Web Developers toward Human Computer Interaction and Usability as well NPMMW methodology in Australia. The aims and goals of this study were met by employing the online survey targeting 210 Australian IT professionals, however, to strengths the research aims and objectives, further research with larger and diverse countries is required.

## **CONCLUSION AND FURTHER RESEARCH DIRECTIONS**

This study investigated and assessed whether HCI and usability are indispensable in the web development process and whether the NPMMW satisfied the Australian IT industry needs. To assess the influence of HCI and usability tools and techniques in the web development process;

and to confirm whether the New Participative Methodology for Marketing Websites will meet users' and designer' needs an online survey was employed among IT Australian industry. The Australian industry participants affirmed that HCI and usability usage will improve the structure and functionality of a website, and that business will increase their profit, as users will revisit the website frequently. The Australian industry participants declared that the NPMMW was well designed and that it contained all the stages and steps required to develop websites successfully.

Furthermore, a majority of responses indicated that the presence of user participation in this methodology is an excellent approach, as it allows users to participate from the beginning until the end of the process, and this will reduce the implementation time of the websites and reduce the staff training required for the new website. Further research was carried out by the authors to raise awareness in the higher education to the importance of usability and HCI so far; both authors received an outstanding feedback from their students. Finally, the authors will also develop a website describing the new methodology in a similar style to the UsabilityNet website ([www.usabilitynet.org](http://www.usabilitynet.org)). 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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## APPENDIX A

The seven parts were as follows:

**Part One - User Participation:** The authors distinguished 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-customers' queries. The client-customer users (external) are those who interact with this website to accomplish their goals.

**Part Two – Monitoring of Real Interaction (website use statistics or 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) a feedback form to elicit users' opinions; or 2) a counter on a webpage, which will provide detailed statistics (log file) to the designer.

**Part Three – Human Computer Interaction (HCI) and Usability:** 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, Rogers, Benyon, Holland, & Carey, 1994, p.7). Usability evaluation is used to confirm that the website design is efficient, effective, safe, useful, easy to learn, easy to remember, and practical, and that it provides job satisfaction, in terms of defined performance measures that effectively assess the users' requirements.

**Part Four - 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 the users' requirements. Steps within

the methodology may be repeated if necessary.

**Part Five - New Participative Methodology for Marketing 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, website methodologies, marketing methodologies, and additional detailed techniques (e.g. Task analysis and detailed website design and implementation). The main stages include defining users' requirements and needs, planning, analysis, design, testing, implementation, evaluation and maintenance. The new integrated methodology needs to be "contingent," with both analyst and client choosing the particular techniques, which suit the problem situation.

**Part Six - General Questions:** The key results of the post-doctoral research project are summarized in this section, and the authors' requests comments on these aspects of the new methodology.

**Part Seven - 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 survey to "examine how strongly subjects agree or disagree with statements" (Sekaran, 2003, p.197). The Likert scale is widely used in survey research to measure respondents' level of agreement to a statement (Likert, 1932). The five points on the scale are 'strongly disagree', 'disagree', 'neutral', 'agree', and 'strongly agree'. Respondents were asked to select the point which best reflected their level of agreement or the importance they attributed to each statement (Karkukly, 2011). Cavana et al. (2001, p.205) stated that the midpoint in the Likert scale (e.g. The third in a five-point scale) "is either neutral ('neither agree nor disagree') or a passing level (e.g. 'Satisfactory')". Besides using the Likert five-point scale for this survey, the authors

provided a section for participants to write down other comments regarding each part.

## **ABOUT AUTHORS**

**Tomayess Issa** is a senior lecturer at the School of Information Systems at Curtin University, Australia. Tomayess completed her doctoral research in Web development and Human Factors. As an academic, she is also interested in establishing teaching methods and styles to enhance the students' learning experiences and resolve problems that students face. Tomayess Issa Conference and Program Co-Chair of the IADIS International Conference on Internet Technologies and Society and IADIS International Conference on International Higher Education. Furthermore, she initiated the IADIS conference for Sustainability, Green IT and Education. Currently, she conducts research locally and globally in information systems, Human-Computer Interaction, Usability, Social Networking, Teaching and Learning, Sustainability, Green IT and Cloud Computing. Tomayess participated in a couple of conferences and published her work in several peer-reviewed journals, books, book chapters, papers and research reports. Tomayess Issa is a Project leader in the International research network (IRNet-EU (Jan2014 – Jan- 2016)) for

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