Chapter 3
User Participation in the System Development Process

Abstract User participation in the system development process is crucial and vital to ensure if user interfaces, devices including website are successful and easy to learn and implement as user participation will improve and enhance performance and increase user acceptance and satisfaction. User participation will encourage users to participate in decision-making and actions during the system development process. The user participation rational will reduce the time taken by designers in various stages from implementation, testing, evaluation, and training, since users will become more aware behind the new design. This chapter aims to discuss the importance of user participation in the system development and sharing with the readers the why, how and when we need to involve participants in the design process.

3.1 Introduction

This chapter focuses on users, their work, and their environment and the reasons for involving them in the design process. Participation role in the system development process is crucial and critical to ensure if the design process will be successful or unsuccessful. In general, if designers manage to work very closely with the users to produce new smart technology or portable devices, then less time will be required in the implementation, testing and training stages, and consequently, the user will work with the new devices, with less frustration and dissatisfaction. This chapter is organized as follows: What is Participation, How We Know Our Users and Conclusion.

3.2 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 and Barki 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 and Torkzadeh 1989, p. 1154).

This research 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 and Wolfe 2004, p. 37). These two types of users (see Fig. 3.1) 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.

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 et al. 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.
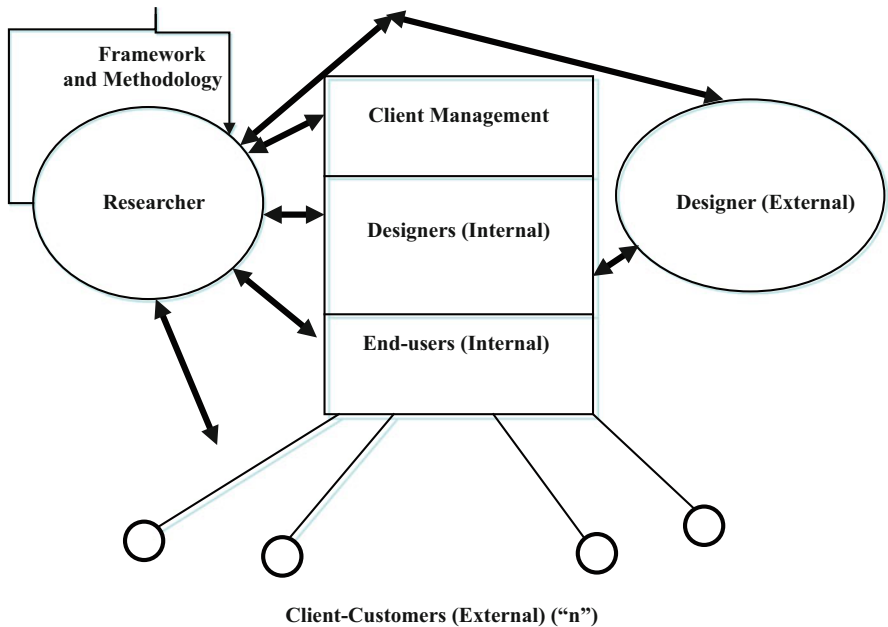
Fig. 3.1 Users (end-user and client-customers) (Prepared by Tomayess Issa)

Participation in the development process can be "viewed as "sharing" in decision making or engaging in activities" (Doll and Torkzadeh 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 et al. 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 "more user participation was undertaken by organizations when the systems were complex" (cited in (Amoako-Gyampah and White 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 (Effective Technical and Human Implementation of Computer Systems) 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, 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 (Cited in (Saleem 1996, p. 147)), 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.

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, 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).

3.2.1   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 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 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 et al. 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).

3.2.2   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 and Torkzadeh 1989, p. 1155).

Participation is considered a valuable experience for some users who will be involved in the system development process since they will obtain more knowledge, experience about the system before it is implemented. Furthermore, Hartwick and

Barki ([1994](#)) indicate that users who participate in the system development process are likely considered that the new system is important and good.

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 life;"
- ***Enhance group harmony,*** as it develops a "sense of cooperation and community and produces a willingness to accept group decisions".

<div align="right">(Mumford1995, p. 13)</div>

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, "it's important to reach online-users because they are generally the most profitable"

3.2.3   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 and Hartwick [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, "consultative 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 and Torkzadeh 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 and White 1993, p. 2).

Rondeau et al. (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 (1998) 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 et al. 2002, p. 20). According to Engler (1996, p. 72), 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.

3.2.4   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 and Low 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 (1995), 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, Olson and Ives (1981) 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).

3.3   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.

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.

3.3.1   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 and Wolfe 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 and Wolfe 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?

<div align="right">(McCracken and Wolfe 2004, p. 39)</div>

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 and Wolfe 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 and Wolfe (2004, p. 41) "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."

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, p. 163) recommends consideration of the following key user characteristics:

• Age
• Culture
• Disabilities
• Education Level
• WWW/IT Experience

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.

3.3.2   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 and Wolfe 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 and Wolfe 2004, p. 42).

McCracken and Wolfe (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 and Wolfe 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 and Redish 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).

3.3.3 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 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.

3.3.4   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 and Wolfe (2004, p. 44), 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".

In this section, several techniques are discussed that will help the designer to gather more information about the users and their tasks. McCracken and Wolfe (2004, p. 49) 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". 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 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 1996). Generally, two types of questions can be used – open or closed.

- *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. 1993, 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 [cannot] speak to the designer and the customers simultaneously" (McCracken and Wolfe 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 and 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 and Wolfe 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 (Fink 2012; Lesser et al. 2011):

    – 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 et al. 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, offers greater anonymity, convenience and more sustainable compared with the previous techniques since they are designed and aimed to provide a more dynamic interaction between respondent and questionnaire compared with the paper mail survey. However, online surveys have disadvantages such as technical failures, computer viruses, internet crimes, and hacking into the web-based survey; these aspects can lead to a decrease in the response rate (Dillman 2007; Issa 2013).

- *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 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.

3.3.5   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 et al. 2001, p. 6).

According to Hoffman and Novak (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, several tools 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).

3.4 Conclusion

This chapter discoursed and studied user participation in the system development process, since it is essential to involve users in the design stage to reduce the gap between users and designers' goals and users and computers on the other.

Currently, there are various types of devices in the market i.e. software applications, mobile and portable devices (e.g. iPads, iPhone) but the majority of these devices are still poorly designed and user satisfaction is inadequate. This chapter presented and addressed user participation significance in the design process by discussing several sections in relation how we know our users, recruiting users and managing user participation in the development processes.

User participation is essential in the sustainable design as well as to improve device acceptance amongst the users, and satisfy their needs. Finally, user participation is vital and fundamental in the system development process along with sustainable design to increase users' acceptance and satisfaction.

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