The process of user involvement in systems development

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User involvement has been perceived to bring benefits in the systems development process. The process of involving the user emerged in the 1980's, as this is the period where the socio-technical approaches to development had already appeared (Mumford 1981). User involvement can be either considered as part of systems development or as a separate process. Hence this paper considers approaches to user involvement as opposed to systems development methodologies. There is a considerable amount of empirical research, which has been undertaken to provide evidence for the proposed benefits, however it remains inconclusive. There is a need to understand the issues surrounding the user involvement process. The two major issues are the user-developer relationship and the degree of user involvement. Studying these issues shows the social and political complications that are apparent in this concept. Therefore it becomes evident that there is a need to remodel the process of user involvement.

Introduction

A significant number of information systems development projects can be considered as failures because they are either "excessively over budget, months or years behind schedule, of poor quality, or simply because they fail adequately to satisfy users' requirements" (Doherty and King 1998, p.41). A recent study by Verner (2006) identified that from a survey of 400 projects, 49% of the organisations had one or more failures. In addition to this, 33% of projects said they had no risk, yet 62% of these resulted in failure. There remains a growing concern that organisational issues are not being addressed during the development process and that this is a result of weaknesses in user involvement during systems development (Hornby *et al.* 1992).

The literature on user involvement in systems development leads to the understanding that for successful systems development the user must be involved in the process (Kujala 2003, Nandhakumar and Jones 1997). Research indicates that involvement is most effective in the early stages of the systems development, this is because costs and the difficulty to implement changes increase in the latter stages of the development process (Noyes *et al.* 1996).

The terms user participation and user involvement are often used interchangeably. It has been argued that user involvement refers to the psychological state of the user and user participation is the event which influences this state of mind (Barki and Hartwick 1989). However Kujala (2003, p.1) defines user involvement as "a general term describing direct contact with users and covering many approaches".

The increasing complexity of technology has caused a shift from the traditional hard approach to a 'softer' approach (Howcroft and Wilson 2003). This is vividly illustrated in the socio-technical approach, which combines the needs of both the social and technical aspects of systems development.

The research and literature surrounding user involvement suggests benefits such as system acceptance and increased system usage (Baroudi *et al.* 1986). However there remains ongoing review and empirical research into issues such as the differing approaches to user participation (Saleem 1994), perceptions of user involvement (Foster and Franz 1999), the political reasoning for involving the user (Howcroft and Wilson 2003) and the challenges proposed by user involvement (Kujala 2003).

This review considers four approaches to user involvement, the reasons for user involvement and then considers the ongoing challenges of user-developer relations and differences in the degree of user involvement.

The review aims to answer the following question: with a growing number of system development methodologies reliant upon user involvement, is it not essential to first remodel the user involvement process before developing new system methodologies?

Approaches to user involvement

Kujala (2003) suggests four main approaches to user involvement. The number of systems development approaches is continually growing therefore it is appropriate to concentrate on the approaches to user involvement (see Table 1).

The aim of user-centered design is to develop a product, which is both useful and usable to its end-users. There is no fixed method for involving the user in this approach however methods include prototyping and usability evaluations. Prototyping is likely to be an iterative process, allowing the user to be involved throughout the design phase of the development cycle.

Participatory design originates from Scandinavia. Involvement takes place in a democratic form and the importance of user and organizational needs are central to this approach. This approach differs to participative decision making (PDM), a concept identified by Saleem (1994). PDM is an approach based on group decision making.

Ethnography aims to describe both human activities and culture with a focus on the social aspect. Hence it is fundamentally a social based approach. Involvement takes place through observation and developers often watch videos of the user to understand the nature of the tasks performed.

Contextual design is focused on the processes within the organization. The user involvement takes place directly with the developer through one-to-one observation sessions. This enables the developer to gain an insight of the user role in the context of the organization. Ethnography is often used within the contextual design approach.

Though the four approaches differ in the type of user involvement, the approaches originate from the same theory (Kujala 2003), which states that user involvement is beneficial in systems development. The epistemology behind these approaches is that knowledge of the organisation and technology is acquired through the communication and coordination of the user and the developer (Kensing and Bloomberg 1998).

The potential benefits of user involvement

The involvement of the user is required for the developer to gain an improved understanding of the functional requirements of a system. Involving the user enables the developer to understand the context of the users' tasks (Kujala 2003, Wilson *et al.* 1997). Jiang *et al.* (2002, p.507) identify three drivers for successful systems development; "user involvement and participation, executive management support, and a clear statement of user requirements". The statement of requirements and user involvement are related. It can be said that to achieve a clear statement of requirements user involvement is a necessity. The system should also be of higher quality due to the accuracy of the requirements (Damodaran 1996). With reference to the waterfall model for systems development, gathering requirements is the first stage of this process (Royce 1970). The requirements are considered a basis for the design and development of a system. Hence there is constant referral in the literature to involve the user early in the development process. Involving a user during the requirements phase is likely to have an impact on the final design as the requirements have been gathered directly from the end users.

An empirical study carried out by Baroudi (1986) concludes that involving the user results in increased satisfaction amongst users and increased system usage. However there are limitations to this research. A functionalist approach was taken towards the research, the 'user' was restricted to middle level management and there was little evidence to indicate that the user had any influence in the design process. To be considered as evidence for the need for user involvement it is essential that different levels of users are researched, in particular the lower level users. The reason for this is that the political issues in organisations often affect lower level users whose involvement is restricted by higher levels of management.

Mumford (1996) states that there is an increasing level of user involvement in systems development projects and management strongly believe that this leads to the creation of a more committed and motivated workforce. User involvement should increase system quality by improving the level of understanding by the user (Ives and Olsen 1984). These papers take a social perspective towards the involvement of the user and do not consider the effects in an economic or political view.

An effort can be made to minimise user related risk through increased user involvement. User related risks include user resistance to change, lack of support and unwilling IS users (Jiang *et al.* 2002). Involving the user prior and during systems development can help address these problems. The research was carried out by a mail survey to random members of a project management group. This functionalist approach fails to consider the user involvement process in systems development. An overall response rate of 37% further adds to the limitations and questionable accuracy of this research.

User involvement is also said to improve buy-in, greater system acceptance and usage (Gallivan and Keil 2003). The user involvement process in the early stages of development often raises requirements that developers may have never considered. Inclusion of such requirements in the system then leads to buy-in of the system. This is because users feel they have influenced the design of the system and that their opinion has been taken into consideration. However a study conducted by Ives and Olsen (1984) found that from a total of 22 studies only eight represented a positive relationship between user involvement and system success. User involvement is also considered to facilitate the implementation of a system. This is achieved by ensuring acceptance of the system and also providing continuous support for the users (Nandhakumar and Jones 1997).

Though there have been various benefits of user involvement discussed by different authors, the issues of user-developer communication and continuing failure of IS projects raises concerns about the practical use of the user involvement concept. The result of a case study carried out by Iivari (2004, p.294) suggests that "user involvement might be used as a buzzword and as a ritual that has form but no substance".

The user-developer relationship

One common issue surrounding user involvement is that it may lead to the gathering of incorrect or irrelevant requirements. This is because users are often unaware as to what information is needed by the developers (Kujala 2003). Developers may agree with the principles of involving the user however there are few who follow them. This then causes communication problems between the user and the developer (Webb 1996). Discovering the problems with user-developer relationships begins to show that user involvement is a concept which both the user and developer find challenging.

The perception of user involvement often differs between the user and the analyst. This difference in perception can result in problems with successful systems development and user satisfaction. This also leads to communication problems between the analyst and the user (Foster and Franz 1999). A field study conducted by Foster and Franz (1999) concluded that analysts and users do not rate user involvement the same. The study also stated that there was a positive impact on system acceptance through user involvement. An interpretivist approach was taken towards the research allowing it to include a wide range of organisations and used the lead analyst when possible. The research only included users who had been involved in more than one of the development stages.

A study conducted by Wilson *et al.* (1997) shows the importance of selecting the right users. Kujala (2003) also states that there can be difficulties of identifying the appropriate end users. It is common for a developer to be unable to include all users due to constraints which may be physical, social or individual (Nandhakumar and Jones 1997). The selec-

Table 1. User involvement approaches.

	User-centred design	Participatory design	Ethnography	Contextual design
Emphasis	Usability	Democratic participation	Social aspects of work	Context of work
Typical methods	Task analysis, Prototyping, Usability evaluations	Workshops, Prototyping	Observation, Video-analysis	Contextual inquiry[1] Prototyping

[1]Contextual Inquiry is a field interviewing method which combines observing and interviewing (Beyer and Holtzblatt 1998).

Source Kujala 2003

tion of users is often affected by political conflicts. Some users express a willingness to be involved as they feel their input towards the system requirements is essential. The developers feel they have the knowledge and expertise to select the right users to be involved. The final conflict comes from management; Howcroft and Wilson (2003) take a political stance towards user involvement by identifying that higher level management motives are likely to go beyond the system such as reducing absenteeism and increasing productivity. Therefore this three way conflict indicates the political issues which arise during user involvement in systems development. The user involvement process needs effective management as it potentially has more conflicts than system development methodologies. Hence it is necessary for developers to have some form of training on organisational relations (Howcroft and Wilson 2003).

Wilson *et al.* (1997) discusses the "facilitators and obstacles" to user involvement. Educating the user is seen as a facilitator to this process. Users often have knowledge of the organisation however it is the developers who design the system. The lack of knowledge in designing systems prevents full user involvement and can result in users having passive involvement (Howcroft and Wilson 2003). Though much of the literature concentrates on the necessity of users educating themselves for the involvement process, there is little to indicate the weaknesses of the developer. It is common to find a set of principles and guidelines for involving users in the development process. Gathering requirements is often achieved by interviewing the user. This process requires the developer to have social skills (Kujala and Mantayla 2000). Social skills can be used by the developer not only whilst interviewing but also to overcome constraints which cannot be solved through practical negotiation (Nandhakumar and Jones 1997).

Degree of involvement

The degree of involvement "refers to the amount of influence the user has over the final product" (Ives and Olsen 1984, p.590). Mumford (1981) stated three types of user involvement:

1. Consultative – the users are consulted when decisions are being made however the final decision is not made by the users

2. Representative – a group of users are selected to represent the needs and requirements

3. Consensus – this is the extreme of both previous types. The users make the decisions and take full responsibility for implementation.

Howcroft and Wilson (2003, p.7) argue that the degree of involvement is heavily influenced by "power relations inherent in the workplace". They feel it is often the management who decide what approach will be taken towards user involvement. Kensing and Bloomberg (1998) suggest that participative design (an approach to user involvement) aims to "rebalance the power" not only between users and the developers but also between the users and management. This political stance is then challenged by Webb (1996, p.76) who questions the degree to which users should be involved through the use of a metaphor, "when computers are theatre, do we want the audience to write the script?" This metaphor has weaknesses as it is assumed that user involvement means consensus involvement. A consultative approach towards involvement can be used and the use of this metaphor does not suggest this. Iivari (2004) suggests that user involvement is influenced by the culture of the organisation. The culture of the organisation facilitates the user involvement process and the degree of involvement is influenced by the importance of people in the organisational culture.

Vroom and Jago (1988) define the degree of involvement differently from Mumford (1981):

1. Direct or indirect

2. Formal or informal

3. Performed alone or shared.

Direct refers to the user having personal involvement and indirect refers to the views of the user being represented by others. Formal refers to structured involvement such as meetings and informal refers to discussions, which may have taken place with the developer. Performed alone refers to activities unique to the individual user and shared refers to activities which are common amongst a number of users (Barki and Hartwick 1994). Comparing the definitions of the degree of involvement of Mumford (1981) with Vroom and Jago (1988) shows a relationship between the two. It is possible that both methods be used in conjunction. Mumford (1981) defines the degree of user involvement and Vroom and Jago (1988) define the various forms in which this involvement can occur. However both definitions are from the 1980's and there is little literature in recent times which illustrates a different understanding or approach to the degree of user involvement in the development process.

It is important to consider the degree of involvement because it is the approach towards this, which will determine the influence that user involvement has had on the systems development. Therefore it can be said that the type of involvement is separate to the channel of involvement. For example a user may have consultative involvement, which takes a formal or informal channel.

Limitations

The review has no standardised quantitative measure for the benefits of user involvement in systems development. As an effect, the benefits have been discussed in a qualitative manner, however there is little statistical evidence providing support to this argument. It can be argued that the benefits of user involvement are not quantifiable. This is not only a weakness of the review it is also apparent in the IS field.

The cost-effectiveness of user involvement has not been considered. The benefits on user requirements, system usage and system satisfaction have been discussed. However the volume of information which users generate and the cost impact on development has not been discussed in detail.

There is a high percentage of literature used from the 1980's. Thorough research was conducted, however the user involvement concept was the topic of the 1980's as this is when the concept was adopted into systems development.

Finally, it should be noted that the review has not taken the engineering perspective into account. It concentrates mainly on the social and political issues which can surround the process of user involvement. Including the engineering or economic perspective may have allowed a greater examination of the user involvement process.

Discussion and conclusion

The empirical research reviewed demonstrates some relationship between user involvement and system acceptance. However there is no hard evidence to suggest that there is a definitive relationship between user involvement and system acceptance. As stated by Howcroft and Wilson (2003) there remains myths that user involvement leads to successful systems development.

A considerable amount of the literature reviewed comes from the 1980's, as this was a key period of growth for the social-technical approach. So, the recent literature has been concentrating on systems development methodologies such as rapid applications development (RAD), extreme programming (XP) and the socio-technical approach. However there is a need to return and review the process of user involvement as opposed to system development methodologies.

User involvement can lead to successful development and increased usage however the process needs to be remodelled. As identified in this review, the process of involvement can be a conflict of differing rationalities, commonly the social and the political. It is important that the degree of involvement is determined between the user and developer, not by management. This is because management motives may hinder the process.

Reviewing the developers role can assist with the user in-

volvement process during systems development. Research into how the developer can gain organisational knowledge is vital. Any "information system is a social system" (Smithson and Angell 1991) therefore the developer requires more than technical expertise. Social skills are now a necessity for the developer. It can be argued that possibly both the user and developer need educating *before* the development process begins as opposed to learning during the process. With a user having some technical knowledge they will be in a position to provide relevant requirements. For the developer having knowledge and understanding of the organisation will enable them to incorporate this unique context into the system.

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