The impact of end-user participation in IT projects on product usability

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Abstract

Many companies implementing new IT projects show that they face numerous problems with ensuring good usability of the final product. Strong market competition that they experience often results in necessity of undertaking difficult decisions towards cost optimization. This often forces cuts in usability expertise and giving up end-user participation in the project. However, it may also result in serious consequences in final quality of the product being developed.

The paper discusses the outcomes of a study conducted among Polish companies. The core analysis includes conclusions from study done with fifteen IT project managers on end-user participation and their impact on the final product usability.

Author Keywords

Usability; stakeholders; IT project; end-user participation

ACM Classification Keywords

K.6.1 Project and People Management

Introduction

The experience of enterprises pursuing new IT projects indicates many problems relating to the assurance of

end product usability. In the meantime, strong market competition increases the need to optimise project costs and that need often requires difficult decisions to be made. That may force project managers to cut costs relating to product usability assurance, e.g. by limiting the participation of the end user in a project. Such activities may, however, lead to serious consequences with regard to end product usability and cause irreversible changes in the subsequent phases of IT product development.

In this article, the results of research conducted in Polish IT companies were discussed. The analysis comprises conclusions from research done in fifteen projects. As part of the research, interviews were held with the managers of completed IT projects in which the practices regarding the influence of the end user on product usability were examined. The research results may make it easier for IT project decision makers to make a correct decision on the degree of end user involvement in a project.

Product usability

Usability is a particularly crucial concept regarding the quality of IT products. According to Jacob Nielsen, usability is defined as quality attribute that assesses how easy a product is to use. The word usability also refers to the methods of product improvement during the design process and is a product feature, which is responsible for general user satisfaction from working with the product during the performance of work tasks.

According to Nielsen, usability is defined by five basic attributes, which are as follows: [9]

- learnability
- efficiency
- memorability
- errors
- satisfaction

It was assumed in the work presented here that usability is understood as a set of IT product attributes, which triggers satisfaction in the end user's subjective impression.

Division of users in IT projects

Initially, in the 1980's and earlier, end users were omitted from IT projects. That was because they had contact with neither computers nor software. As personal computers (PC) developed, however, particularly with regard to office work stations, the situation began to change. The economic importance of computers was growing, as was the number of their users. When computers were becoming increasingly popular, making their operation friendly posed a problem. Then that the concept of usability in IT systems appeared.

Similarly, as software was becoming more and more widely used, the perspective of its creation was changing. Initially, the main objective of design teams was to achieve a high level of reliability and functionality of the end product only. In market conditions, however, it became more and more often apparent that a new product did not met the users' expectations and that was way it was not accepted by them. Consequently, that led to the reduction of sales figures. That is why, as the IT system market was maturing, the participation of end users became increasingly important. It was then that the importance

of their participation in the development and creation of software was noticed, and they were more and more frequently involved. That was reflected in both the changes in the technology of the creation of IT products, and in the final usability of the product. The so-called "human factor" became, therefore, a significant element in assuring high usability of the end product [15].

The results of empirical investigations published in 1995 [18] demonstrated that projects in which end users and employees share responsibility for the system's quality, may have higher-than-average project success indicators. In turn, various roles in which users may assume in IT projects, while treating them from the end user's point of view, were presented in other investigations [4]. Other researchers [8] presented the results of investigations which indicate that continuous user participation in the design process of IT products enables the elimination of many conceptual errors at an appropriately early design stage and increases the efficiency of the process consisting in high quality assurance. Moreover, the development of IT project methodologies irreversibly increased the participation and importance of end users [17].

Figure 1 presents the trend observed in recent years and indicating the changes in end-user participation in IT projects. The trend was divided into several stages constituting separate design paradigms, adequately adapted to the user's role in IT projects.
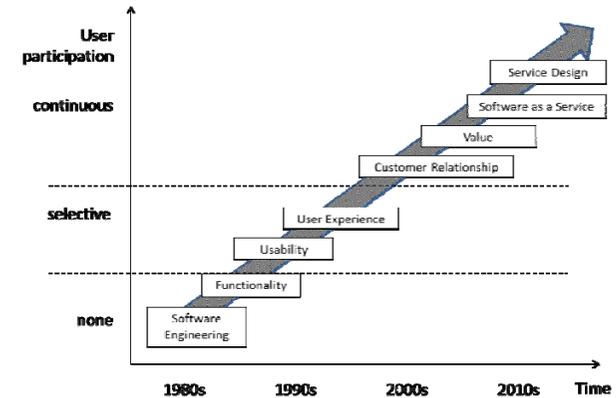
Figure 1. Subsequent stages of end-user participation in IT projects [16]

End users usually do not have design knowledge or that of creation and functioning of IT systems. That is why, to ensure the highest level of satisfaction and end user comfort – through the constant use of IT tools to carry out work tasks and through continuous contact with them – it became necessary to understand the users' needs and and take the aspects influencing the human-computer interaction into consideration and manage them effectively. In effect, that allows influencing long-term efficiency of working with IT tools.

It is important to note that access to broadband Internet permitted the use of various mobile devices for work tasks. Research results indicate that it is possible with the help of those devices to actively and effectively carry out typical work tasks which, until recently, were reserved for desktop devices only [12]. As a result, available application markets have grown, a fact which forced a change of the approach towards IT product

design through newly developed business models. Consequently, the way of end-user participation in projects orientated towards the assurance of high usability, particularly in mass products, has changed as well. The opportunity to personalise products and services, which is fully reflected by the development of CRM systems [10], from the point of view of the satisfaction of individual user needs, or creating solutions based on loyalty programmes, are only some of the available techniques for improving end product usability.

More and more stringent requirements laid down on IT projects, along with pressure on their quicker implementation, are conducive to the use of agile project implementation methodologies. Their presence often seems justified, especially in the context of interdisciplinarity of projects and increasingly early and full involvement of users in the development process of those systems. Their natural iteracy and flexibility are very conducive to that involvement [5]. This notwithstanding, one should always take into consideration that user participation in IT projects may always a greater risk for the project in economic terms.

Impact of user participation on product usability

The analysis of user participation in IT projects demonstrated its importance for the assurance of product usability, but also gave rise to concern that the project costs may increase. Indeed, the analysis of IT projects indicates that their implementation is constantly a failure, and that tendency seems to grow [2, 6]. That problem may stem from the so-called conflict of interest in quality, which describes a different perspective of the various project participant groups [1,

7, 14]. The influence of the project's business environment is equally important [3]. The selection of a correct project implementation method is therefore of crucial importance [13].

To obtain information on the influence of users on the usability of IT products, research was carried out among the managers of 15 projects. Research had the nature of in-depth interviews, owing to which it was possible to learn about the factors determining high final usability. The participants in research could directly share their experience and specify the practices used to ensure a high level of usability. In the majority of cases investigated, interviews with the same persons responsible for the implementation of a given project were conducted at least twice.

The first series of meetings had the nature of a casual conversation in which the participants in the research shared their observations, while talking about the experience following from projects implemented by them, with regard to the influence of user participation on the usability of the product. A casual form of the conversation (in the first part of research) allowed, first of all, opinions of a project manager to be collected.

The second series of meetings was fully moderated and allowed gathering additional information. In that series of meetings, project managers answered questions about the way of solving problems relating to the assurance of product usability, which arose in other projects. It was possible to compare the project managers' opinions on various practices used to ensure the high usability of the product. Questions in that series of meetings were also about the possibility and way of optimisation of user participation in a project.

That approach permitted the analysis of practices with regard to the participation of end users in Polish enterprises pursuing IT projects and the influence of those participants on the usability of the product. Moreover, the use of the qualitative method of information collection by means of in-depth interviews increased the level of the respondents' confidence in the researcher and the credibility of the data obtained.

Figure 2 presents the diagram showing the interaction of variables under examination in the relationship to the quality level (bad, average, good, very good) [11].
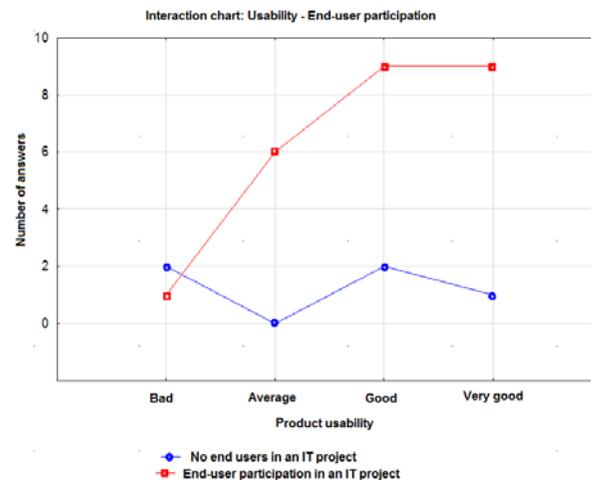
Figure 2. Diagram showing the interaction of variables: user participation and product usability

The analysis of fig. 2 shows that product usability increased in projects in which the end user appeared. Most of projects involving users were reported in research to be successful ones. In projects in which the user did not take part directly, however, there is no decrease trend in the assurance of product usability.

It was also observed as a result of further research that the relationship presented is characterised by the presence of variables affecting product usability. The relationships between them were described by means of the following:

- minimants (marked ⬎) – the lower the value of the variable, the better;

- maximants (marked ⬈) – the higher the value of the variable, the better;

- nominants (marked •) – there is an optimum value of an variable, which should be approached to the greatest possible degree.

The results of the analysis of the impact of variables on high product usable value were presented in table 1.

Variable	Attribute	Their impact on high usability
Product usability	Product specification	⬈
	User participation	•
	Design team size	⬈
	Product innovativeness	•
	Customer kind	•

Table 1. Results of the analysis of the impact of attributes on the product usability variable

Their analysis shows that the following were common practice used to ensure the high usability of the product:

- **Product specification** – product formalisation by means of an official list of the requirements for the designed system for the customer, end users and the design team. At least partial formalisation of the specification permitted high product usable value to be achieved.

- **User participation** – the participation of end users in the creation process of an IT product, with their activity and involvement at various project stages taken into account. There was a certain optimum number of end users, which ensured high usability.

- **Design team size** – the size of the design (development) team creating a product. The greater the figure, the bigger the probability of creating a products of high usable value.

- **Product innovativeness** – the kind of product in view of the degree of its innovativeness. It was observed that in projects in which the product was innovative, end-user participation was considerable. In projects with a typical (imitative) nature of the product, end-user participation was, however, very limited

- **Customer kind** – customer affiliation with the private or public sector. It was observed that the end user was more often involved in projects for the private sector than for the public one.

Additional analysis of user participation variable supported the observation that that variable is determined by the following attributes, presented in Tab. 2.

Variable	Attribute	High product usability
User participation	Group size	↗
	Project participation phase	•

Table 2. Results of the analysis of the impact of attributes on the user participation variable

This analysis shows that the following attributes influenced the user participation variable:

- **Group size** – the number of end users taking part in the project. Group size analysis showed that a higher quality product is obtained when user groups are bigger.

- **Project participation stage** – a product creation stage in which the end user takes part. It was observed that in projects with the high product usability the user appeared at all product creation stages. The most intensive user participation was noted at the design stage.

The research results presented here show that the usability of the product depends on the participation of end users in an IT project.

Conclusion

The purpose of qualitative research was the analysis of the relationships between product usability and user participation in the project. That analysis permitted their preliminary assessment and selection, while the relationships occurring between the selected variables and their attributes.

The conclusions from preliminary research allowed the assessment of the practices consisting in taking advantage of end users in creation of IT systems by enterprises on the Polish market. Information provided by project managers also enabled the analysis of the influence of end-user participation on product usability.

The research results do not unambiguously determine the influence of user participation in IT projects, but may only be a point of departure for further investigations and assist in taking a correct decision regarding cost optimisation by project managers. Despite such limitation, it is important to undertake relevant research because IT projects are one of the most dynamically developing areas of science, and their development and continuous improvement will be a topical subject of scientific research for a long time.

Acknowledgements

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