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Does User Participation Lead to System Success?

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ABSTRACT

The effect of user participation on successful systems development has been the focus of much attention for information systems researchers for some time. Common understanding has been that extensive user participation is not only important, but absolutely essential to system success. However, earlier studies trying to link user participation to system success have shown mixed results. In this paper, we analyze fourteen more recently published, empirical research studies that investigate the significance of user participation. From our results we conclude that user participation in the systems development process is indeed critical to system success. Common themes are identified.

Keywords

user participation, user satisfaction, user attitudes, user involvement, systems development, system development success

INTRODUCTION

User participation has long been regarded as a factor for success in developing an information system. There are a number of benefits that can come from users being involved in the development process. These may include enhanced system quality, increased user knowledge about the system, greater user commitment, and user acceptance. But does user participation lead to system success? Previously published studies show conflicting results. Ison and Ives (1981), in a review of empirical studies conducted between 1959 and 1981, report that only 36% showed a positive correlation between user participation and some measure of system success. Cavaye (1995), in another review of empirical studies, conducted between 1982 and 1992, found that 37% of the studies investigated showed a participation/success link. Cavaye suggests that such low results might be because “participation is a nebulous term that is difficult to define clearly: it is a concept with many dimensions.” Hwang and Thorn (1999), in a contradicting study, indicate that user participation is indeed positively related to system success. Their meta-analysis examined 25 previous studies up to 1995.

The purpose of our review is to confirm or repudiate the importance of user participation to successful system development, particularly to see the trend in this regard since 1995. Though we primarily looked at studies since 1995, we did include a few earlier studies that had not been included in the other analyses, but that we felt fit our research. We start our treatise by articulating an understanding of what is meant by user participation and system success.

Barki and Hartwick (1989) suggest that the term *user participation* should be used “when referring to the behaviors and activities that the target users or their representatives perform in the systems development process.” They further suggest that the term *user involvement* “should be used to refer to a subjective psychological state of the individual and defined as the importance and personal relevance that users attach either to a particular system or to IS in general ...” User involvement and *user attitude* are psychological factors that are in the user’s mind, while user participation is an “observable behavior of users during the development process of a system” (Hwang & Thorn 1999). Lin and Shao (2000) define user involvement as “a psychological state reflecting the importance and personal relevance that a user attaches to a given system,” user attitude as “an affective or evaluative judgment toward some object or behavior,” and user participation as “a behavioral construct (the degree of participative behaviors of users during the development process)” as opposed to the psychological constructs of user involvement and user attitudes. Cavaye (1995) defines user participation as a “set of operations and activities performed by users during system development.” Our review looks at user participation and its relation to information systems success.

What constitutes system success is also controversial and difficult to measure. The most common forms of measuring system success are user acceptance and user satisfaction, which we have found are used synonymously in the literature. User acceptance “means that the user is motivated and well inclined towards the system”; this has been argued to have an

important impact on the way the system is used (Hartwick & Barki 1994). Since both terms are used interchangeably, we will from now on use the term user satisfaction.

Other measures used for system success include system quality, information quality, information use, individual impact, and organizational impact (DeLone 1992). System quality measures the processing system itself (i.e. response time, resource utilization, ease of use). Information quality measures primarily the quality of system output reports. Information use measures the use of the information contained on output reports. Individual impact measures the effect of information on the behavior of the recipient and is the most difficult to measure (DeLone 1992). Organizational impact measures the effect of information on organizational performance. DeLone defines user satisfaction as the recipient response to the use of the output of an information system and states that user satisfaction is probably the most widely used single measure of information systems success.

The following section identifies how we selected studies to be included in our analysis. Table 1 describes each study and highlights the measures used in the study, the impact of users on system’s success, and important aspects of the study. The next section is the results and conclusion, where we synthesize what we learned. The final section describes the paper’s contributions to information systems research.

SUMMARY OF SELECTED EMPIRICAL STUDIES

We primarily selected studies since 1995 that were published in the top 50 journals according to the list of Mylonopoulos and Theoharakis (2001). However, we included three studies outside of that limitation that we feel fit the scope of our research. Although there are many articles discussing user participation and system development, only relatively few report on an actual experiment or survey. For our review, we selected articles that we believe meet the following requirements:

1. a clear specification of the source of the data;
2. a known number of subjects;
3. well defined measurement variables;
4. discussion of construct validity; and
5. well presented results that show the correlations (or lack thereof) between user participation and system success.

| Authors and Date of Study | Increased System Success? | Participation Measure | System Success Measure | Notes |
|-------------------------------------|----------------------------------|--|------------------------------------|--|
| <i>Tait & Vessey 1988</i> | yes | Unspecified survey | user satisfaction | user participation had a positive impact, but as involvement increased, the likelihood of system success did not increase. |
| <i>Hunton 1996</i> | yes | 2-item scale | user satisfaction system output | participation by voice and choice is best |
| <i>Kirsch & Beath 1996</i> | yes | Semi-structured, open-ended interviews | user satisfaction | shared participation is the best |
| <i>Saleem 1996</i> | yes | 4-item scale, forced into low or high | user satisfaction | users that perceive themselves as functional experts should be included in development |
| <i>Butler & Fitzgerald 1997</i> | yes | Unspecified Interviews | perspectives of social actors | user dissatisfaction centered on poor change management |
| <i>Hunton & Beeler 1997</i> | yes | 21-item scale | system output | participation by voice is best (no voice & choice option) |

| | | | | |
|-------------------------------------|-----|-------------------------------------|---|---|
| <i>Hunton & Price 1997</i> | yes | 9-point interval bipolar scale | user satisfaction | participation by voice and choice is best |
| <i>Lu & Wang 1997</i> | yes | 8-item scale | user satisfaction | people oriented managers are best in initiation stage |
| <i>McKeen & Guirmaraes 1997</i> | yes | 31-item scale | user satisfaction | task and system complexity dictate specific tasks users should participate in |
| <i>Choe 1998</i> | yes | Structured Interviews, 2-item scale | user satisfaction system use | user participation has greatest effect under high task uncertainty/complexity |
| <i>Lin & Shao 2000</i> | yes | 2-item scale | user satisfaction | the more participation, the more satisfied the user |
| <i>Yetton, et al. 2000</i> | yes | Single-item measure | project completion | participation builds support for the system during implementation |
| <i>Doll & Deng 2001</i> | yes | 33-item scale and 8-item scale | user satisfaction, but not well defined | more effective when developing collaborative work systems |
| <i>Lawrence, et al. 2002</i> | no | Forced into low or high | accuracy of forecast results | users were satisfied, but at the cost of forecast accuracy |

Table 1: Summary of Studies Reviewed

RESULTS AND CONCLUSION

The results of our review contradict the results of two previous reviews (Ison & Ives 1981, Cavaye 1995), which failed to show substantial correlation between user participation and system success. As Table 1 indicates, all but one of the fourteen studies (93%) considered in our review profess increased system success with user participation, relative to the measures employed. The one study which failed to show system success did have satisfied users, but at the expense of optimal system output. Our study does agree with the review and meta-analysis of Hwang and Thorn (1999), which concluded that user participation is positively related to system success. One possible explanation is that user participation and/or systems development may have changed: The ascertained impact of user participation on system success seems to have been greater in the more recent studies. It is possible that user participation has become more directed and thus more effective.

Several other studies that we investigated, but didn't include in our review of the previous section because they didn't meet the requirements that we had set forth, also support a positive correlation between user participation and system success. Vreede et al. (1995) used action research to involve users and stake holders in the use of a Group Support System (GSS) during the information requirements specification phase. User satisfaction was determined through questionnaires, interviews, system logs, and observations. The authors conclude that the users were satisfied with the process and the outcomes of the process. Kontogiannis and Embrey (1997) used a user-centered design approach to increase operability of a graphical control device in a chemical plant. "Human factors considerations and user participation" are the essential components in user-centered design. In the study, observations, interviews, and analysis of procedures, incidents, and documents were used to determine that a newly designed graphical display for furnace operation was optimized compared to the older display. The authors recommend that "human factors advice should be integrated with user participation early in the design". They also suggested watching out for some problems, such as "management commitment to user involvement is not always demonstrated in practice", and that there may be communication difficulties between designers and users. Lynch and Gregor (2004), in a study of 38 decision support systems developed for sale in the agriculture industry, concluded that user influence was a strong contributor to the impact of the system. Here, the authors define user influence as a combination of user participation type and participation depth. The impact of the system was generally determined by the percentage of sales of the product in relation to the potential market size.

Ten or fifteen years ago, researchers and practitioners were still more focused on determining the factors that lead to system success; consequently they were in a trial and error phase. It appears that since then, researchers have identified many of these factors, and user participation apparently has become much more effectual in system development. Synthesizing from the studies reviewed in this treatise, we infer:

1. User participation has the greatest impact on system success if the user is allowed to voice an opinion and make choices from predefined options. The reasoning may be that with the voice and choice option, users anticipate their opinions and concerns to be accepted and implemented by the developers, thus raising their confidence and satisfaction levels. This constitutes a kind of shared user participation: the users feel like partners in the development process, having a sense of control over the outcome.
2. The importance of user participation increases with system complexity. The explanation may be that more complex systems make the determination of system requirements more difficult, and therefore the likelihood of building the wrong system increases. User participation increases the likelihood of capturing the right requirements.
3. There are certain core activities for which user participation is especially important. These include: (a) feasibility analysis, (b) information requirements determination, (c) defining input/output forms, (d) defining screen and report formats, and (e) the final installation of the system. The necessity of user participation in other activities is dependent on the complexity of the system, with more complex systems requiring more user participation.
4. It is important to have people-oriented managers, especially if an organization is still in the initiation stage of MIS use. This type of manager is better at communicating with users in an environment where uncertainty and fear of change are high.
5. It is particularly important to allow user participation by users that are functionally knowledgeable. Users with functional expertise develop negative attitudes toward the system being developed if they feel being left out, i.e. if they have little or no influence over the development of the system. Users without this functional expertise are less likely to develop such negative feelings toward the system, even if they have no or only little input.
6. There is an optimal level of user participation. Though user involvement generally increases the likelihood of system success, increasing user involvement past certain levels may be counterproductive. Once users have contributed what they are best able to contribute to the development process, further involvement does not add value, but may rather be perceived as wasting time or resources.

As was pointed out in the introduction of this treatise, and as is apparent from Table 1, most studies relating user participation to system success use user satisfaction as the measure of system success. We also pointed out in the introduction that having satisfied users may not always imply that the system is successful, if other measures for success are used. From at least one study reviewed in this treatise (Lawrence et al. 2002), it is clear that a system (in this case a forecasting system) may not be better (i.e. more accurate, in this case) for having satisfied users, compared to a system with less satisfied users.

However, for many systems, user satisfaction does seem to be a valid measure for system success. If several potential systems accomplish the same tasks, though perhaps in different ways, the system with the most satisfied users would appear to be the most successful. Conversely, a system with unsatisfied users would in most cases not be considered successful. Thus the appropriate measure for system success may be dependent on the type of system under consideration. In our review, therefore, we accepted whatever success measures were proposed in the studies we looked at, and accepted the authors' contentions that systems were successful.

From the 14 papers reviewed, user participation was measured in about as many ways. Two experimental studies forced subjects into either low or high participation. Several studies were not very clear on how they developed and validated their measures and the others ranged from 1-item to 33-item instruments. The most common measures were instruments created from scales developed by Olson and Ives (1981) and Doll and Torkzadeh (1990, 1991). With so many variations and modifications of popular instruments, a standardized measure for user participation has yet to be agreed upon.

CONTRIBUTION AND FURTHER RESEARCH

Past research of the importance of user participation on information systems development success has shown mixed results, with studies prior to 1992 showing little impact of user participation. Our review confirms more recent studies that user participation is indeed important to systems success. The reason for the seemingly contradictory results between the earlier and later research could lie in the definitions of user participation and system success used by these studies, or it could indicate a trend, that user participation has become more effective in the last 15 years or so. In our review we accepted whatever definition the authors of the published studies used for system success. Our review covers primarily the period

since 1995, for which, to our knowledge, there has been no previous general review. We feel that this is a definite contribution to the literature in that, at the very least, it shows that Hwang and Thorn's 1995 meta-analysis was not an aberration, but rather demonstrates a continuing trend.

Synthesizing from our review we presented six points that may help information systems professionals in choosing the right kind of user participation to achieve maximum benefits from such. These six points may also serve as a starting point for future information systems research on making user participation as effective as possible.

Though our review of empirical studies found that system success is positively correlated with user participation, we pointed out that determining a system to be successful may depend on the measure used, and the most common measure used in the studies we reviewed has been user satisfaction. As one of the studies in our review concluded, user satisfaction does not always imply optimality (Lawrence et al. 2002). In fact, it is possible for users to be satisfied and the system to be considered a failure by other methods of measurement. It is also possible for a system to be considered successful when it is completed and then be considered unsuccessful at some point in the future. Perhaps future research can look into system success and user participation with some of the lesser used measures, such as system quality, information quality, individual impact, and organizational impact (DeLone 1999). The review by Hwang and Thorn (1999) attempted to take a broad view and look at all of these measures, but most of the studies included in their review also employed user satisfaction as the measure for system success. If more research is conducted using other system success measures, then perhaps a different picture of the relationship between user participation and system success may emerge, one that is more complex, perhaps showing correlation in some dimensions, but not in others.

A possible weakness of our review is that we may not be aware of all relevant studies conducted and published in this area. We also did not include all studies that we did find, because, we set certain requirements for inclusion. Our objective was to determine whether user participation does have an important impact on system success, in light of conflicting earlier studies. We are confident that, within the limitations mentioned, we accomplished this task and established that user participation is indeed important.

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