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A New Look at the Relationship between User Involvement in Systems Development and System Success

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Abstract:

The relationship of user involvement to successful systems development has been the focus of much attention for information systems researchers for some time. Common understanding has been that extensive user involvement is not only important, but absolutely essential to system success. However, earlier studies trying to link user involvement to system success have shown mixed results. In this paper we review 28 empirical research studies that investigate the significance of user involvement. From our results we conclude that user involvement in the systems development process is indeed important to system success. We further identify several key points pertinent to making user involvement effective.

Keywords: systems development, user participation, user involvement, user satisfaction, stakeholder involvement, system success

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I. INTRODUCTION

Conventional wisdom has long regarded user participation or involvement as an important factor for successfully developing information systems (IS). The benefits of user involvement are described by Damodaran [1996] as (1) improved quality of the system arising from more accurate user requirements; (2) avoiding costly system features that the user did not want or cannot use; (3) improved levels of acceptance of the system; (4) greater understanding of the system by the user resulting in more effective use; and (5) increased participation in decision-making in the organization. But is user participation or involvement essential for system success? Previously published studies show conflicting results. A review of empirical studies conducted between 1959 and 1981 [Olson and Ives 1981] reported that only about a third of the studies showed a positive correlation between user participation and some measure of system success. A later review of 19 empirical studies, conducted between 1982 and 1992 [Cavaye 1995] also found only slightly more than a third of the studies investigated showed a participation–success link. The author of the latter study suggested that such low results may be because “participation is a nebulous term that is difficult to define clearly: it is a concept with many dimensions.” However, a contradicting analysis which reviewed 25 studies up to 1996 [Hwang and Thorn 1999] did show a positive relation between user participation and system success.

The purpose of our review is to take another look at this seemingly unresolved issue and confirm or repudiate the importance of user involvement to successful system development. In particular, we want to observe the more recent trend in this regard.

Clearly, in order to determine whether user participation or involvement is important to system success, we need to first define what constitutes user participation or involvement. The term *user participation* is often used interchangeably with *user involvement*, though some authors differentiate between the two terms. For example, 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,” and 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 ….” According to Hwang and Thorn [1999], 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.” 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.”

More recent research seems to suggest that user involvement encompasses user participation, thus including direct and indirect contact with the system development process. Kujala [2003] suggests user involvement can be found in several common forms: (1) user-centered design, (2) participatory design, (3) ethnography, and (4) contextual design. User-centered design emphasizes usability with methods such as task analysis, prototyping, and usability evaluations. Participatory design emphasizes democratic participation through workshops or prototyping. Ethnography emphasizes the social aspects of work through observation or video analysis, and contextual design emphasizes the context of work through contextual inquiry prototyping. Thus, what previous authors described as hands-on contact (user participation) versus psychological contact (user involvement) can be seen wrapped into the same user involvement term. Based on the evolution of these definitions, our review includes studies that discuss user participation or user involvement. For the rest of this paper we will use the term “user involvement” as an encompassing term that refers to both hands-on and psychological contact during systems development. We will continue to use the term "user participation" in the reviews of studies when that is the term used by the authors of that study.

The term "user" may also be applied somewhat differently by authors. Primarily the term should apply to people that use the system themselves, hands-on, but sometimes secondary users are also included, i.e. people that make use of the information provided by the system, but do so through an intermediary. As can be seen from Table 1 and the summaries of the reviewed studies, some of the studies collected data by interviewing managers. The term “user” then would be subject to the interviewed managers' interpretations. Some of the reviewed studies also made use of students as proxy users. It is arguable to what extent student subjects represent external validity, but the findings of the various studies appear to be largely congruent, irrespective of the approach used in determining users.

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 often used synonymously in the literature. User acceptance "means that the user is motivated and well inclined towards the system", which has been argued to have an important impact on the way the system is used [Hartwick and Barki 1994]. Delone and McLean [1992] list system quality, information quality, use, user satisfaction, individual impact, and organizational impact as measures of successful systems. System quality measures the system itself (i.e. response time, resource utilization, ease of use). Information quality primarily measures 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 perhaps the most difficult to measure. User satisfaction is defined as the recipient response to the use of the output of an information system, and according to Delone and McLean is probably the single most widely used measure of system success. Organizational impact measures the effect of information on organizational performance.

Rai et al. [2002] build on previous models and suggest information quality, ease of use, perceived usefulness, user satisfaction, and utilization as measures of successful systems. Information quality is the "degree to which information produced has the attributes of content, accuracy, and format required by the user." Ease of use is the degree to which the system is easy to use and is related to "system quality" as used by Delone and McLean [1992]. Perceived usefulness is "the degree to which the user believes that using a particular system has enhanced his or her job performance" and is related to "individual impact" as defined by Delone and McLean. User satisfaction is "the degree of user satisfaction with the system." Utilization is "the degree to which the user is dependent on the information system for the execution of their tasks" and is related to "information system use" as described by Delone and McLean.

Kim et al. [1999] rank "satisfying users' needs" (which we equate with user satisfaction) as the most important criterion in determining system success. In descending order of importance after user satisfaction, they also list system reliability, increasing company profit, and bringing a competitive advantage to the company as other possible measures of system success. In our analysis we accepted whatever measures the authors of the published studies used for system success.

II. REVIEW OF SELECTED EMPIRICAL STUDIES

Overview

We selected studies published from 1996 to 2009 in scholarly journals using the ABI\Inform Global Business Database. We looked for research that collected data from an actual experiment, survey, or case study and disclosed the number of subjects and measures used for user involvement and system success. The title and abstract of each paper in the search results were read to help identify possible studies. Identified studies were then read in their entirety for verification. Although we found many articles discussing user participation in system development, only a relatively small subset reported on empirical studies that met the above criteria. Our first database search was for the terms "user participation" or "user involvement" in the document title. That search yielded 58 papers, eighteen of which met our criteria. We then expanded our search by looking for the same terms in the citation and abstract. That search yielded 206 articles, of which six new papers met our criteria. Searching the reference section of the 24 identified papers yielded an additional four papers that had not been identified in our previous searches. The total number of studies identified for review is 28.

Table 1 summarizes the studies included in our review. Each of these studies is briefly described in the following sub-sections.

Table 1. Reviewed Studies			
Study	**Subjects**	**Involvement Measure**	**Success Measure**
Choe 1996	unknown number of managers and 450 users	2-item measure	user satisfaction system use
Hunton 1996	726 media employees	2-item measure	user satisfaction system output
Kirsch & Beath 1996	43 MIS managers and users	semi-structured, open-ended interviews	user satisfaction
Saleem 1996	lab experiment: 60 statistics students field study: IS managers and end-users	4-item measure, forced into low or high	user satisfaction
Butler & Fitzgerald 1997	21 managers and users	unspecified Interviews	perspectives of social actors
Guimaraes & Igbaria 1997	148 MIS managers and end-user managers	9-item measure	user satisfaction, system usage, impact on job
Hunton & Beeler 1997	516 accountants	21-item measure	system output
Hunton & Price 1997	144 data entry personnel	9-point interval bipolar measure	user satisfaction
Lu & Wang 1997	172 MIS managers and users	8-item measure	user satisfaction
McKeen & Guirmaraes 1997	151 MIS managers and users	31-item measure	user satisfaction
Blili et al. 1998	505 managers	11-item measure	user satisfaction user impact
Choe 1998	78 users of a new or developing acct. system	structured Interviews, 2-item measure	user satisfaction system use
Yoon et al. 1998	62 project managers and 62 users	9-item measure	user satisfaction system benefits
Zeffane et al. 1998	308 IT managers and users	5-item measure in 8 fundamental development stages	perceived data quality
Foster & Franz 1999	150 users and systems analysts	2-item measure	perceived usefulness
Lin & Shao 2000	32 unknown participants	2-item measure	user satisfaction
Yetton et al. 2000	72 managers	single item measure	project completion
Doll & Deng 2001	402 managers and users	33-item measure and a 8-item measure	user satisfaction, but not well defined
Palanisamy 2001	104 managers and users	5-item measure	user satisfaction
Santhanam et al. 2000	17 project managers and 147 users	9-item measure	user satisfaction, perceived benefits, and job impacts
Jiang et al., 2002	186 project managers	5 item measure	project performance
Lawrence et al. 2002	180 students	forced into low or high	accuracy of forecast results
Guimaraes et al. 2003	228 project managers and users	9-item measure	user satisfaction
Lynch & Gregor 2004	developers and managers from 38 systems	degree of Influence	system Impact
Wu & Marakas 2006	210 students	extent and degree of participation; 4-item questionnaire	process satisfaction, perceived ownership, and intention to use
Discenza et al. 2008	169 project managers	5-item measure and a 6-item measure	software success
Hsu et al. 2008	130 unknown participants	single item measure	user satisfaction
Pries-Heje 2008	18 managers, vendors, and users	open-ended interviews	user perceived system usefulness

User Participation Effect on Accounting IS Design [Choe 1996]

This study investigated factors influencing the success of accounting information systems (AIS) at various evolution levels. The influence factors described in the author's model are top management support, technical capability of IS personnel, user involvement, user training, steering committees, location of the IS department, formalization of system development, and organization size. The system success constructs used are user satisfaction and system use. Information systems evolution was matched to six maturity stages, with stages 1 to 3 representing *prior stages* and stages 4 to 6 representing *posterior stages*. User involvement was determined using a two-item measure. User satisfaction was determined using a nine-item measure, and system use was determined using a two-item measure. An unspecified number of managers and 450 users from 78 different companies were surveyed. The correlation results of the influence factors and AIS success indicate that user involvement was the most significant, with user involvement correlating well with both user satisfaction (.354, $p<0.01$) and system use (.368, $p<0.01$).

Procedural Justice Perceptions on User Attitudes and Performance [Hunton 1996]

This study involved 726 media employees from 59 local newspaper sites. User perceptions of procedural justice, control over the development process, and satisfaction were gauged. These perceptions were predicted to increase as participation increased along the range of mute, voice only, choice only, and choice plus voice. Mute allows no participation. Voice allows participation through verbal exchange. Choice allows participation through the selection of multiple alternatives. Choice plus voice is a combination [Hunton and Price 1997]. System performance (measured by output error rate) was also expected to increase accordingly along the same range. User participation was measured on a two-item scale, derived by condensing Doll and Torkzadeh's four-item scale. User satisfaction was measured using Doll and Tokzadeh's scale [Doll and Torkzadeh 1988; 1991]. The study concludes that only procedural justice increases from mute to voice (2.64 to 4.49 mean on an interval scale), from voice to choice (4.49 to 6.02), and from choice to voice plus choice (6.02 to 7.40). Perceived control and satisfaction increased from mute to voice (2.28 to 4.26 and 3.27 to 5.77, respectively), were not significantly different from voice to choice (4.26 to 4.54 and 5.77 to 5.85, respectively), and increased again from choice to choice plus voice (4.54 to 6.94 and 5.85 to 7.28, respectively). System performance produced similar results as control and satisfaction, increasing in all cases except from voice to choice. However, the author notes that the results for voice to choice might have been from a flaw in design: the "relatively restricted nature of the options coupled with the fact that subjects in the choice condition had no voice in developing the option set could have weakened the choice manipulation."

Token, Shared, and Compliant Participation in IS Development [Kirsch and Beath 1996]

Forty-three interviews with IS managers, project leaders, and users from eight information system projects provided the data for this study. The purpose of the study was "to examine how user participation is actually enacted in practice and to explain why those enactments result in particular project outcomes, such as task-system fit, psychological involvement, and client ownership of the system." Task-fit can be described as delivering an appropriately designed system that can adequately help users perform their work. The authors did not propose specific hypotheses in this study. Semi-structured, open-ended interviews were conducted with IS project leaders, managers, and users. The interviews were transcribed and searched for references of user participation, such as in feature selection and client-developer coordination. The study showed that users participated in three different ways: token participation, shared participation, and compliant participation. Token participation is when the users play relatively minor roles in the development process. Shared participation is when users and developers share roles and work together on a substantial portion of the project. Compliant participation means users trust the decisions made by the developers to be best for the company. The authors write "as confidence builds, the user complies more frequently with IS requests and suggestions, taking those suggestions as professional advice." Though statistics were not provided, the findings suggest a correlation between users participating in shared activities and system success. However, token and compliant participation did not lead to significant user satisfaction. With token participation, user satisfaction seems to depend on the skills of the developer.

Prototyping a Statistics Application [Saleem 1996]

This study consisted of a laboratory experiment and a field study. The experiment used sixty students in an undergraduate statistics course who were put in a laboratory setting and asked to work on the development of a SAS based prototype system. The first hypothesis (H1) tested suggested that users with a high degree of participation in systems development will demonstrate greater system acceptance than the users with a low degree of participation. The second hypothesis (H2) suggested that for users with a low degree of participation in systems development, those with more functional knowledge will demonstrate less system acceptance than those with less functional knowledge. Put differently, users with great functional expertise will be less likely to accept the system if they are not allowed a high degree of participation. User participation was measured using a four-item scale based on the definition employed by Robey et al. [1989]. The degree of participation was either high or low, which was forced by the controlled experiment. System success was measured by a user satisfaction questionnaire which consisted of a five-item scale. Both hypotheses were supported, where user participation leads to greater system acceptance (extent of system use, F=.14, p=.7145; resistance to system use, F=.02, p=.8943; and user satisfaction, F=1.70, p=.20), and user participation is particularly important for users with system-related functional expertise (extent of system use, F=10.25, p=.0034; resistance to system use, F=9.54, p=.0045; and user satisfaction, F=16.31, p=.0004). The field experiment surveyed IS managers and end-users from 64 organizations. The two hypotheses were also supported (H1: F=22.34, p=.0001; H2: F=18.89, p=.0001). Based on the results Saleem suggests that a user's functional expertise should be the driving factor for participation in design teams, whereas other criteria, such as communication skills, computing backgrounds, and personality traits should be given secondary considerations.

Social Actors in the IS Development Process [Butler and Fitzgerald 1997]

Butler and Fitzgerald interviewed twenty-one development project managers, developers, information systems function managers, user representatives, and user project managers. The study did not measure system success directly, but instead "relied on the perspectives and constructions of social actors in both development processes and their related environments to indicate the perceived success of these endeavors and their outcomes" [Butler and Fitzgerald 1997]. User participation was measured by an adapted framework developed by Cavaye [1995]. The framework was applied to users in various tasks such as system implementation, prototyping, and system testing. The participation ranged from "participation by doing" to "participation by advice" [Ives and Olson 1984]. Though statistical methods were not used, the authors concluded that user participation does contribute to system success. However, the study also points out that user dissatisfaction with systems was due to poor change management.

Human Side in Client/Server System Success [Guimaraes and Igbaria 1997]

This study investigated success factors of client/server systems (CSS), including end-user involvement, end-user characteristics, developer skills, and management support. Measures for success included end-user satisfaction, systems usage, and its impact on end-user jobs. End-user jobs measured the user's perceived impact of the system on their job performance. Surveys from 148 IS managers and end-user managers were analyzed. The results support end-user involvement impact on end-user satisfaction (.19, p<.05) and on end-user jobs (.08 at p<.05), but not on system usage.

User Participation Impact on System Performance [Hunton and Beeler 1997]

This study involved 516 accounting professionals working in 162 field offices and used a pretest and a posttest to measure the influence of different levels of participation on user involvement, user attitude, behavior, and system performance. System output was used rather than user satisfaction to measure system performance. Here, system output was vendor payments, and the specific measure used was the percentage of late vendor payments. Participants in the study were randomly assigned to one of three groups: participation by instrumental voice (meaning, user opinions have an impact on decisions), participation by non-instrumental voice (users express opinions after the decisions have already been made), and no participation. User participation was measured with a twenty-one-item instrument modified from the Hartwick and Barki [1994] model by "integrating theory from self-efficacy and procedural justice into the research framework" [Hunton and Beeler 1997]. The results of the study showed that user involvement and user attitude were highest in the instrumental voice participation condition group (mean gain score +1.26 for each), followed by the non-instrumental voice condition (mean gain scores +.47 and +.59 respectively), and were lowest in the no voice condition (mean gain scores +.03 and +.84 respectively). The gain in user performance (i.e., change in percentage of late vendor payments) was significantly highest in the instrumental voice participation condition (mean gain score +.0586), while performance gains in the non-instrumental voice and no voice participation conditions were not significantly different from each other (mean gain scores +.0470 and +.0472 respectively). The study concludes that system success is best if users are involved with an instrumental voice.

User Participation and Task Meaningfulness [Hunton and Price 1997]

Hunton and Price report on a laboratory experiment with 144 professional data entry personnel in a US company. The subjects were involved in the design of a user interface for a new information system. The study used a 4×2 (mode of participation × task meaningfulness), fully crossed, between-subjects, fixed factorial design. The participation modes were: mute condition, voice only condition, choice only condition, and choice plus a voice condition (see also [Hunton 1996]). The two task meaningfulness items were high meaningfulness and low meaningfulness, where high meaningfulness refers to the condition where participants expect to use the input screen in the near future and low meaningfulness refers to participants not expecting to use the input screen in the near future. Dependent variable measures included a nine-point interval, bipolar scale that measured perceptions of procedural justice, decision control, task commitment, and satisfaction with the performance screen. Two items were used to measure each construct. The study concludes that perceptions of control (means 3.01, 4.24, 5.75, and 7.29 respectively), procedural justice (means 3.78, 5.21, 6.57, and 7.79 respectively), outcome satisfaction (means 4.10, 5.39, 6.32, and 7.54 respectively), and performance (output 2042, 2263, 2676, and 3157 respectively) increased as the mode of participation increased along a range of mute, voice, choice, to voice plus choice. Procedural justice refers to the extent to which a decision process is perceived to be fair or in accordance with "accepted norms of behavior." When task meaningfulness was changed from low to high, procedural justice, control, task commitment, and performance also increased. However, task meaningfulness did not effect outcome satisfaction. The authors conclude that "providing employees with a sense of control – even limited control – can result in positive consequences."

Management Styles and User Participation [Lu and Wang 1997]

Lu and Wang surveyed 172 information systems managers in different organizations to study the relationship between management styles, user participation, and system success over management IS growth stages. The two main questions addressed in this research were, first, whether the effect of user participation on system success changes over growth stages, and second, what the appropriate management styles are to promote user participation and system success over the MIS growth stages. User participation was measured with an eight-item instrument [Doll and Torkzadeh 1990]. Users were asked about their participation in project initiation, determining system objectives and user information needs, assessing alternative ways of meeting users' information needs, outlining information flows, developing input forms and screens, and developing output formats. System success was measured by user satisfaction. Growth stages were defined by the overall status of an organization's IS within its growth process and classified as *initiation*, *contagion*, *control*, *integration*, *data*, and *maturity*. In the initiation stage, computers are used by only a small number of users. In the contagion stage, computers and systems are used by many users. The control stage is characterized by a high level of control and IS development placing attention on system planning. The integration stage puts more emphasis on integration of applications and the use of databases. The data stage focuses on data administration rather than applications. The maturity stage has a complete application portfolio that matches organizational objectives. Management styles are broken down into people oriented and task oriented. The authors conclude that user participation is significantly and positively correlated to system success (.573, $p<.0001$). However, only people oriented managers, rather than task oriented managers, working with users, built successful systems during the initiation stage. Both types of managers were successful working with users in the other stages.

User Participation and User Satisfaction [McKeen and Guirmaraes 1997]

McKeen and Guimaraes collected data from 151 independent system development projects in eight organizations to find specific participatory behaviors most beneficial to system success under different contexts. The authors did not propose specific hypotheses, but instead present the results of a survey of managers and users using known measures. User participation in the areas of project feasibility, project design, project installation, and project management was measured using a thirty-one-item scale [Olsen and Ives 1981; McKeen et al. 1994]. The authors conclude that user participation is positively related to user satisfaction and system success in fifteen out of thirty-one participative behaviors analyzed ($r=.416$, $p=.001$). The more users participated in a project the more satisfied they were. The main contribution of this paper is ascertaining which of the thirty-one participative activities for users to participate in are most likely to lead to user satisfaction. According to the authors, the core set of activities that users should always participate in are feasibility, information requirements, defining input/output forms, screens and report formats, and installation, as these core activities significantly lead to user satisfaction and system success. Furthermore, the study suggests some other activities in addition to the core set, depending on task and/or system complexity: For low complexity systems, users should also participate in approving cost justification and appointing a formal user liaison; for highly complex systems, users should participate in additional activities, such as project definition, physical controls and security features, system testing, and developing and approving project management schedules and progress reports. Based on these conclusions, developers can figure task and system complexity first and then have users participate in those activities that lead to the greatest user satisfaction.

End-user Computing Success Factors [Blili et al. 1998]

End-user computing (EUC) is a technique by which users develop their own applications or use applications developed by other users. End-users can have various skill levels, including analysis and programming skills. The authors surveyed 505 managers from corporations that practiced EUC to investigate the effect of task uncertainty, user involvement, and competence on EUC success. User involvement was measured as a psychological factor with three constructs: the importance of the EUC to the user, the risk perceived by the user, and the status symbol the user attributes the activity. The study related EUC success with user satisfaction and the EUC impact. User satisfaction was measured with three constructs: quality of information, support personnel, and user capabilities. EUC impact was measured with four constructs: information capability, managerial performance, productivity, and implications. The results of path analysis indicated that user involvement did lead to user satisfaction (.25, $p<0.001$). User involvement also led to EUC impact (.41, $p<0.0001$). When assessing EUC success factors, EUC impact was found to be a better predictor of EUC success ($R2=.21$) than was user satisfaction ($R2=.11$).

Developing an Accounting Information System [Choe 1998]

Choe reports on a survey of 78 Korean business firms that were developing or just completed development of a computerized management accounting system. Relationships between user participation, task uncertainty, information characteristics, and system performance were examined. Task uncertainty refers to the difficulty and variability of the work undertaken. Information characteristics involve the three dimensions of scope, timeliness, and aggregation, where scope can be narrow or broad, timeliness is the ability to provide information on request and the frequency of reporting systematically collected information, and aggregation refers to summarized information that covers periods of time or diverse management areas. User participation was measured using a two-item scale [Olson and Ives 1981; Kim and Lee 1986]. System performance was measured by user satisfaction and system use. Statistical methods used for analysis include factor analysis, multiple regression, and a partial derivative to test for monotonic and non-monotonic relationships. The author concluded that when the task uncertainty is low, and information is narrow in scope, periodic, and disaggregated, there is a positive impact on the performance of the system regardless of high or low user participation. In other words, when the work is not difficult and the information required is of the simplest kind, user participation has little effect. A second conclusion was that the effects of the interactions among organizational structure (centralization/formalization), information (scope, timeliness, and aggregation) and user participation on system performance are significant. Choe further concluded that when organizational structure is organic (low centralization/formalization), a combination of a high degree of user participation and more processed information (broad-scope, timely and aggregated) has a positive impact on the performance of the system. On the other hand, user participation has no effect when narrow scope, periodic and disaggregated information is needed. In a low centralized firm, broad scope, timely and aggregated information with high user participation is needed for higher system performance. In a highly centralized firm, it is suggested that narrow-scope and disaggregated information along with high user participation leads to higher system performance.

Expert System Success Factors in BPR [Yoon et al. 1998]

This study investigated the direct and indirect importance of expert systems (ES) used in business process reengineering (BPR) with eight known ES success factors. The model used by the authors listed six exogenous variables (managerial support, problem difficulty, end user characteristics, user involvement, developer's skills, and shell characteristics) that are related to user satisfaction. User satisfaction and problem importance are then related to the outcome variable, with BPR benefits stemming from the use of the ES. User involvement was determined with a nine-item measure adopted by Yoon et al. [1995]. User satisfaction was determined by a nine-item measure, including items such as output quality, user-friendliness, and timeliness. The benefits of using ES in BPR were determined using five items, such as whether ES helped decrease the number of BPR steps or time taken to perform BPR. Representing 62 different expert systems within one company, 62 project managers and 62 users were surveyed. Correlation and path analysis indicate that user involvement (.39, $p<0.05$) had a significant direct relationship with user satisfaction, and user satisfaction (.44, $p<0.01$) had a significant direct relationship with the benefits of using ES in BPR. Problem difficulty (.24, $p<0.1$) and ES shell characteristics (.28, $p<0.1$) also had direct relationships with user satisfaction.

User Involvement and Data Quality [Zeffane et al. 1998]

The authors surveyed 308 IT managers and users from large organizations to investigate the impact of user involvement on perceived data quality. Data quality was measured along nine data quality dimensions with a five-item scale ranging from never fulfilled to always fulfilled. The nine dimensions were spatial availability, data sufficiency, data consistency, data accuracy, timeliness, appropriateness of format, flexibility, availability of historical data, and calculability of future trends. User involvement was measured along eight fundamental stages of information systems development with a five-item scale ranging from no involvement to heavy involvement. The eight fundamental stages were strategic planning for information systems, system requirements definition, functional design of the system, development of the system, documentation of the system, testing of the system, implementation of the system, and on-going maintenance. Data was also collected on the modality of information systems development, where respondents were asked if projects were typically developed by professionals, staff, managers, or with the cooperation of all three. Statistical methods used to analyze the data included multiple regression analysis and varimax factor analysis. The results indicated that there was no obvious distinction between the data quality criteria and user involvement criteria. The authors then aggregated the items to create a uni-dimension measure for data quality and a uni-dimension measure for user involvement. Though the authors did not sufficiently report statistical results, they indicated a significant correlation between overall user involvement and better data quality. They also reported user involvement and cooperation among staff, managers, and professionals as having a major impact on data quality.

User and Analyst Perception Differences [Foster and Franz 1999]

A sample of 150 users and analysts were used to investigate perception differences between the groups in regards to user involvement and system acceptance. Four sets of hypotheses were proposed and tested using multiple statistical techniques, including paired t-tests, factor analysis, and correlation analysis. Though the authors did not sufficiently report statistics, they found a significant relationship between user involvement and system acceptance. However, results also indicate that users and analysts do not agree on the users' involvement and system acceptance. The users demonstrated high correlations between user involvement and system acceptance, while there was no correlation between the analysts' perceptions of user involvement and the users' perceptions of system acceptance. Also, analysts did not rate the users' involvement the same as the users did, where the users rated themselves as more involved. The authors conclude that user involvement is critical to system success and that users and analysts do not have the same perceptions of user involvement. However, the difference is not critical to system success as perceived by users. The users' self perception of involvement was associated with system success, not the analysts' perceptions of user involvement.

Simultaneous Contingency Approach [Lin and Shao 2000]

Lin and Shao report on a survey of 32 randomly selected US companies, mainly from the manufacturing and service industries. The authors created a simultaneous contingency model for user participation that uses several constructs including system impact, system complexity, development methodology, user attitudes, user involvement, user participation, and system success. User participation and user satisfaction were measured on a two-item scale [McKeen et al.1994; Olson and Ives 1981]. The study concludes that there is a positive link between user participation and system success (1.269 three stage least squares, significant at .01 level), and suggests that user participation, user attitudes, and user involvement form a circular relationship. User attitude toward the system tends to improve with involvement in the system development process. Also, the study implies that system complexity has a significant effect on user participation (.407 three stage least squares, significant at .05 level). The more complex the information system project, the more likely users will participate in its development.

Project Managers View on Participation and Project Completion [Yetton et al. 2000]

This study reports on a survey of information systems project managers in medium to large companies in the United Kingdom and New Zealand. One of the tested hypotheses is that "user participation contributes to project completion," where project completion is the extent to which the project meets the original scope. Project completion was measured with a single-item five-point scale, ranging from totally abandoned to smoothly completed. User participation was also measured with a single-item measure, but the authors did not elaborate further about this construct. After analyzing the 72 responses, the authors found nine of ten proposed hypotheses were supported, including that user participation contributes to project completion ($r=.36$, $p<.05$). The authors also concluded that "project completion is a function of a project's strategic nature, senior management support, size, newness, and user participation."

Collaborative Use of Information Technology [Doll and Deng 2001]

Doll and Deng surveyed 402 users in 18 companies to study user participation success in developing collaborative and non-collaborative applications. A collaborative system "is defined as any software application that is actually being used by individuals to help them coordinate their work with others" and a non-collaborative system is one designed for individuals, where "each user is seen by the system as a discrete unit or a point of input in a sequential process." System success is not explicitly defined in this paper; however, user satisfaction is used throughout this paper as the measure to test the hypotheses. User participation was measured using an instrument from Doll and Torkzadeh [1990], which identifies thirty-three decision issues grouped into three factors: (1) systems analysis, (2) system implementation, and (3) administration. An eight-point scale [Doll and Torkzadeh 1991] was used to measure if users participated as much as they wanted to in systems analysis. The authors conclude that user participation is not more effective in the development of collaborative systems over non-collaborative systems (.3622 and .3679 respectively, $p<.01$). However, user participation is equally effective in both systems in relation to user satisfaction. They also suggest that users be encouraged to participate as much as they would like to in the development of such systems, but only in information needs analysis, suggesting that user participation in other areas of design may actually be detrimental.

User Involvement in IS Planning [Palanisamy 2001]

This paper investigated the relationship between user involvement, information waste, and management information system success. A total of 104 employees from various industries with two or more years work experience were surveyed. Results indicate that user involvement is positively related to user satisfaction (.52 at .001) and information waste is negatively related to user satisfaction (-.35 at .01). Also, user involvement at the prioritization stage positively influences involvement in the design stage.

Organizational Decision Support Systems Development [Santhanam et al. 2000]

The development of Organizational Decision Support Systems (ODSS) were investigated to determine the impact at both the individual and organizational level. Within the individual impact part of the model, the authors investigated implementation characteristics (user participation, management support, and training) in relation to individual level success factors (user satisfaction, perceived benefits, and job impacts). Seventeen project managers and 147 users were surveyed. User participation was determined with a nine-item measure, management support with a six-item measure, and training with a five-item measure. User satisfaction was determined with a thirteen-item measure, perceived benefits with a nine-item measure, and job impact with an eleven-item measure. The results indicate that user participation was significantly correlated with all three individual success factors, user satisfaction (r=0.32, p<0.01), perceived benefit (r=0.44, p<0.01), and job impact (r=0.61, p<0.01). Management support was also significantly correlated with all three success factors, user satisfaction (r=0.27, p<0.01), perceived benefit (r=0.21, p<0.01), and job impact (r=0.28, p<0.01). Training results were mixed.

Pre-project Partnering [Jiang et al. 2002]

This study investigated pre-project partnering activities on user support risks and project performance. The authors write that "Pre-project partnering activities allow management, IS users, IS project managers, IS development teams, and sponsors to work together before the project begins." The impact of project partnering activities on user support risks and project performance were significant. Regression analysis indicated that project performance was significantly associated with pre-project partnering activities (.36) and user support risk (-.12). Results also indicate the extent of user support risk is significantly and negatively associated with pre-project partnering activities (-.20). The authors concluded that "the more the pre-project partnering activities were conducted for an IS project, the lower the risk of a lack of user support and the better the project performance" [p. 23].

Decision Support System Use and Decision Accuracy [Lawrence et al. 2002]

This study investigated user satisfaction and forecast accuracy from user participation in the design of a forecasting decision support system. The authors used a pretest and post test survey to question users about two support systems they worked with. The users were able to modify the first system to their tastes and not able to modify the second; thus, user participation was either low or high. Conclusions were based on the percentage of changes made to forecasted results of developed systems. The results indicate the high participation group changed results 15.6 percent of the time versus 36.6 percent for the low participation group. More than twice as many forecasts were changed by the low participation group, thus supporting higher participation leads to greater satisfaction. However, in about half of the cases the users picked models that were far from the most accurate. In other words, user participation led to user satisfaction, but often at the cost of system quality.

User Related Factors in Systems Development Quality [Guimaraes et al. 2003]

This study investigated six user constructs and their relationship with user satisfaction. The constructs are user participation, user expertise, user/developer communication, user training, user influence, and user conflict. User participation was determined using a nine-item measure and user satisfaction was determined using a 10-item measure. The authors surveyed 228 project managers and users. The results of regression analysis indicate that user participation (.54, p<0.01) is the best predictor of user satisfaction, followed by user training (.04, p<0.01) and user expertise (.03, p<0.01). User/developer communication, user influence, and user conflict were not significant.

Decision Support System Outcome [Lynch and Gregor 2004]

The authors investigated the development process of 38 decision support systems and the relationship between user participation and system outcome. These systems were developed for sale in the agricultural industry. The success of a system was determined by system impact, which was measured by units sold and market share. More successful systems sold more units and had higher market share. Participation was measured by degree of influence, which included the type of participation and depth of participation. Data collection originated from interviews conducted primarily with managers and developers of the systems. Results indicate that user influence on system design significantly affects system impact. All but one high impact system had user influence and all of the low impact systems had little or no user participation. However, more than half of the systems seen as low impact were deemed to have reasonable technical outcomes. This study was a qualitative study that did not use statistical methods.

Perceived System Implementation Success [Wu and Marakas 2006]

This study reports on a laboratory experiment using 210 students to investigate user participation in the analysis and design stages and the impact on system success. User participation was observed along two dimensions: the degree and the extent of participation, where degree of participation was either "high" or "low." The extent of participation differentiated between participation in analysis, participation in design, or both. System success was measured along three dimensions: (1) degree of satisfaction with development process, (2) perceived ownership, and (3) intention to use. The authors conclude that user participation positively influences system success. More specifically, perceived participation in the analysis stage was significantly related to process satisfaction (F=11.29, p=.000), perceived ownership (F=14.945, p=.000), and intention to use (F=2.107, p=.008). In the design stage, perceived participation was significantly related to process satisfaction (F=19.118, p=.000), perceived ownership (F=23.449, p=.000), and intention to use (F=3.244, p=.000). High participation in either analysis or design resulted in more successful systems than low participation in both. Also, high participation in analysis activities reduces the necessity of further participation in design activities. However, if users do not participate in analysis activities, high participation in design activities is still beneficial.

Involvement and Project Manager Expertise [Discenza et al. 2008]

A survey of 169 project managers was used to investigate the influence of user involvement and project manager expertise on system success. The user involvement measures were focused on user partnering and hands-on activities. User partnering refers to activities used to build relationships between users and project managers to create responsibility sharing. User hands-on activities describe direct user participation in software development. Measures for project manager expertise focused on general expertise, application expertise, requirements analysis expertise, and technology analysis expertise. Software success was measured with twelve items, such as software reliability, response time, and responsiveness. Partial least squares was used to determine path coefficients for the authors' multiple hypotheses. Results indicate that both user partnering and hands-on activities directly affect system success (.14 and .16 respectively). However, there were also mediating affects with project manager expertise that led to system success. For example, user partnering is a partial mediator between general expertise and system success (.25) and a full mediator between application expertise and system success (.16). General expertise of the project manager is also directly related to system success (.33), but application expertise is not (-.01). User hands-on activities is a full mediator between requirements analysis expertise of the project manger and system success (.39), but not with project manger technology analysis expertise (-.02). However, technology analysis expertise of the project manger directly affects system success (.19). The authors conclude that user involvement leads to a higher likelihood of system success and that future research should seek the optimal level of involvement.

ERP Implementation Success Factors [Hsu et al. 2008]

The authors surveyed 130 companies implementing enterprise resource planning (ERP) systems to investigate factors that influence user satisfaction. Among the constructs were user attributes (computer anxiety, involvement, training), perceived attributes of innovation (compatibility, complexity, observability, trialability), and organizational attributes (top management support, centralization, formalization). The research model also suggests user satisfaction has an effect on individual impacts, such as system quality, user productivity, and time to decision. User satisfaction is also theorized to have an effect on organizational impacts, i.e. the economic impacts of the system on the organization. Another model relationship is that individual impacts are expected to affect organizational impacts. The path analysis results show a significant effect of user involvement (.014) and training experience (.18) on user satisfaction. Observability (.21) and top management support (.119) also had effects on user satisfaction. Observability represents visibility and result demonstrability. The authors also report that user satisfaction effects individual impacts (.703) and organizational impacts (.208). Individual impacts are then reported to have an effect on organizational impacts (.493).

User Attitudes during ERP Implementation [Pries-Heje 2008]

The author interviewed 18 managers, users, and consultants at five intervals during an ERP implementation. During the implementation process, the users' attitudes toward the system varied along a range of acceptance, equivocation, resistance, and rejection. At the beginning of the implementation, the users' attitudes were very positive and accepting of the system. As the project progressed, their attitudes toward the system dipped to equivocation, resistance, and then rejection, before rising back to acceptance as the project concluded. The users' attitude toward the system changed over time, depending on three factors: (1) the dynamics between the users and the consultants, (2) the dynamics between various user groups, and (3) knowledge about the technical and socio-technical systems [Pries-Heje 2008]. The dynamics between users and consultants can become strained when users feel the consultants are limiting the users' influence. The users' attitudes toward the system vary depending on their perceived influence with the consultants. The dynamics between various user groups can become strained when compromises must be made that do not satisfy all groups. In regard to technical and socio-technical knowledge, the users' attitudes toward the system was less satisfactory when their knowledge of these aspects of the system was limited, and became more satisfactory as their knowledge increased. The author calls for more research in helping users resolve conflicts of interest and increasing user knowledge.

III. RESULTS AND DISCUSSION

Conclusions Drawn from the Review

The review of the 28 studies suggests that user involvement does indeed substantially influence system success. This is in agreement with the review and meta-analysis of Hwang and Thorn [1999], but contradicts the results of two previous reviews [Olson and Ives 1981; Cavaye 1995], which failed to show substantial correlation between user participation or involvement and system success.

Table 2 summarizes the findings of the reviewed studies. These findings show that all but one of the studies profess increased system success with user participation, relative to the measures employed. Only one study [Lawrence et al. 2002] indicated that user participation may actually lead to a less successful system. That study showed that user participation may lead to a less accurate system, albeit user satisfaction increased with user participation. Thus, if user satisfaction were the only measure of success, this study also showed increased system success.

Table 2. Summary of Findings Reported by the Reviewed Studies

Choe 1996	user satisfaction and system use correlated strongest with user involvement
Hunton 1996	as the degree of user participation increases (from mute participation to voice participation to choice participation to choice plus voice), perceived control, procedural justice, user satisfaction and system performance increases
Kirsch & Beath 1996	strong correlation between users participating in shared activities and system success; however, token and compliant participation does not lead to significant user satisfaction
Saleem 1996	user participation leads to greater system acceptance in general, and user participation is particularly important for users with system-related functional expertise
Butler & Fitzgerald 1997	user participation does contribute to system success; user dissatisfaction with systems was due to poor change management
Guimaraes & Igbaria 1997	user involvement is positively related to user satisfaction and the perceived impact on their jobs, but is not significantly related to system usage
Hunton & Beeler 1997	gain in user performance is highest with instrumental voice participation; performance gains with non-instrumental voice and no voice participation are not significantly different from each other
Hunton & Price 1997	perceptions of control, procedural justice, outcome satisfaction, and performance increases as the mode of participation increases along a range of mute, voice, choice, and voice plus choice
Lu & Wang 1997	user participation is significantly, positively related to system success; however, people oriented managers, rather than task oriented managers, working with users, build successful systems during the initiation stage; both types of managers are successful working with users during the other stages
McKeen & Guirmaraes 1997	user participation (especially in core activities such as feasibility and requirements) is positively related to user satisfaction and system success
Blili et al. 1998	user involvement leads to user satisfaction and EUC impact; EUC impact was a better predictor of EUC success than was user satisfaction
Choe 1998	when organizational structure is organic (low centralization/formalization), a combination of a high degree of user participation and more processed information (broad-scope, timely and aggregated) has a positive impact on the performance of the system; user participation has no effect when narrow scope, periodic and disaggregated information is needed
Yoon et al. 1998	user involvement had a significant direct relationship with user satisfaction and user satisfaction had a significant direct relationship with the business benefits of using expert systems in business process reengineering
Zeffane et al. 1998	user involvement is positively correlated with better perceived data quality; cooperation among staff, managers, and professionals is also correlated with better data quality
Foster & Franz 1999	user involvement is critical to system success; users and analysts do not have the same perceptions of user involvement, though only the users' perception is critical to system success
Lin & Shao 2000	positive link between user participation and system success; user attitude toward the system tends to improve with involvement in the system development process

Yetton et al. 2000	user participation contributes to project completion, i.e. to the finished project satisfying the original scope
Doll & Deng 2001	user participation is more effective in the development of collaborative than non-collaborative systems; user participation in information needs analysis is positive, but user participation in other areas of design may be detrimental
Palanisamy 2001	user involvement is positively related to user satisfaction, and information waste is negatively related to user satisfaction; user involvement at the prioritization stage positively influences involvement in the design stage
Santhanam et al. 2000	user participation and management support were significantly correlated with three individual success factors, user satisfaction, perceived benefit, and job impact
Jiang et al. 2002	increasing pre-project partnering activities lowers the risk of a lack of user support and increases project performance
Lawrence et al. 2002	user participation leads to user satisfaction, but at the cost of system accuracy
Guimaraes et al. 2003	user participation is the best predictor of user satisfaction, followed by user training and user expertise
Lynch & Gregor 2004	influence on system design significantly influences system impact; more than half of the systems seen as unsuccessful in terms of impact were deemed to have reasonable technical outcomes
Wu & Marakas 2006	high user participation in either analysis or design results in more successful systems
Discenza et al. 2008	user partnering and hands-on activities directly affect system success; user partnering partially mediates project manger general expertise and fully mediates requirements analysis expertise with system success; hands-on activities fully mediates requirements analysis expertise and system success
Hsu et al. 2008	there is a significant effect of user involvement, training experience, observability and top management support on user satisfaction; user satisfaction significantly effects individual impacts and organizational impacts; individual impacts positively affect organizational impacts
Pries-Heje 2008	users' attitude toward the system was affected by three factors: (1) the dynamic between the users' and the consultants, (2) the dynamic between various user groups, and (3) knowledge about the technical and socio-technical systems; managing these dynamics properly helps user attitude

Several other studies that we investigated but did not include in our review in the previous section because they did not 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. 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."

Thus, referring back to the purpose of our review, which was to confirm or repudiate the importance of user involvement to successful system development, the answer seems to be clearly that, yes, user participation or involvement is indeed important. One possible explanation for the two earlier reviews [Olson and Ives 1981; Cavaye 1995] showing contradictory results may be that the practices used in engaging users and for systems development may have changed. The two earlier studies looked at systems development between 1959 to 1992. The ascertained impact of user engagement on system success seems to have been greater in the more recent studies. It is possible that the more complex systems being developed now benefit more from user engagement than did earlier systems, or that user engagement has become more directed and thus more effective.

Inferences and Recommendations

As was pointed out in the introduction of this treatise, and as is apparent from Table 1, most studies relating user participation or involvement to system success use user satisfaction as the measure for system success. We also pointed out in the introduction that having satisfied users does not always imply that the system is successful, if other measures for success are used. From at least one study reviewed [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.

In the 28 papers reviewed, user involvement was measured in about as many ways. Three 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 one-item to thirty-three-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.

As stated earlier, the results of our review indicate that user involvement is indeed important for successful systems development. We also indicated that perhaps the reason some earlier reviews showed contradicting results may be due to user involvement in the past having been less well directed and thus, perhaps less effective. As suggested by Markus and Mao [2004], future research, rather than investigating whether or not user involvement is linked to system success, should look at how user involvement can best be put into practice in varying development contexts to increase the chances of a successful outcome. To some degree, the studies that we reviewed do provide useful results as to the type and degree of user involvement that may be particularly useful for certain types of systems development, as pointed out below. However, much more needs to be done in this direction, and Markus and Mao [2004] provide a possible theoretical foundation for this.

Synthesizing from the studies reviewed in this treatise, we infer the following points and recommendations:

Degree of User Involvement

User involvement 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 involvement: the users feel like partners in the development process, having a sense of control over the outcome.

Complexity of System

The importance of user involvement 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 involvement increases the likelihood of capturing the right requirements.

Activities for User Involvement

There are certain core activities for which user involvement 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 involvement in other activities is dependent on the complexity of the system, with more complex systems requiring more user involvement.

Management Style

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.

Users with or without Functional Expertise

It is particularly important to allow user involvement by users that are functionally knowledgeable. Users with functional expertise develop negative attitudes toward the system being developed if they feel they are 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.

Amount of User Involvement

There is an optimal level of user involvement. 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. Rather, it may be perceived as wasting time or resources.

IV. CONTRIBUTION, FURTHER RESEARCH AND CAVEATS

Past research of the importance of user involvement on information systems development success has shown mixed results, with studies prior to 1992 showing little impact of user involvement [Olson and Ives 1981; Cavaye 1995]. Our review confirms more recent studies [Hwang and Thorn 1999] that user involvement is indeed important to systems success. The different results between the earlier and later research may be due to different definitions of user involvement and system success used by these studies, or it may indicate a trend that user involvement has become more effective in the last fifteen years or so. In our review we accepted whatever definition the authors of the published studies used for system success. Our review covers 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 Hwang and Thorn's [1999] meta-analysis was not an aberration, but rather demonstrates a continuing trend.

Though our review of empirical studies found that system success is positively correlated with user involvement, 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 deemed unsuccessful at some later point in time. Perhaps future research can look into system success and user involvement with some of the less often used measures such as system quality, information quality, individual impact, and organizational impact [DeLone and McLean 1992]. The review by Hwang and Thorn [1999] attempted to take a broad view 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 more complex picture of the relationship between user involvement and system success may emerge showing that user participation impacts some of these dimensions much more than others.

Synthesizing from the reviewed studies we present six points that may help information systems professionals and managers in choosing the right kind of user involvement at the most appropriate times in the systems development process, and to achieve maximum benefits from such. These six points may also serve as a starting point for future information systems research on making user involvement as effective as possible. We feel that the importance of user involvement to system success has been established. However, much more research is needed to further increase the value of user involvement practices to systems development in various development environments and contexts.

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