# USER INVOLVEMENT IN INFORMATION SYSTEMS:
# A CRITICAL REVIEW OF THE EMPIRICAL LITERATURE

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ABSTRACT

Considerable prescriptive literature exists which advocates user involvement in the development of information systems and suggests alternative mechanisms by which such involvement can be increased. However, formal empirical studies investigating user involvement are few in number, fragmented, and generally methodologically flawed. Furthermore, they do not provide the strong support for user involvement that the prescriptive literature would lead one to expect. This paper critically examines past studies of user involvement, focusing on methodological and measurement issues. The relationships between user involvement and system quality, system usage, information satisfaction, and user attitudes are considered. Suggestions for future research are discussed.

INTRODUCTION

Developing computer-based information systems that satisfy user requirements is one of the more difficult problems facing the information systems professional. Systems are regularly developed that provide data to the wrong users at the wrong time, support interfaces to nonexistent users, solve nonexistent problems, or are simply non-functional. User reactions of aggression, projection, and avoidance are not unusual when new information systems are introduced [17]. Other information systems that are used and appear to be accepted nevertheless fail to provide the benefits that initially justified their development.

One common prescription for system development problems is "user involvement", participation in the development process by a member or members of the target user group. Proponents of user involvement maintain that it will increase system quality, decrease resistance to change, and increase user commitment to new systems [44].

The purpose of this paper is to critically evaluate user involvement in information system development. Empirical research to date on user involvement and its relationship to user attitudes, system usage, and other measures of system quality is reviewed. Special attention is paid to the characteristics of measurement methods utilized in these studies. Based on the research, conclusions are drawn about current understanding of user involvement in the development process. Implications for future research on user involvement are discussed.

## A DESCRIPTIVE MODEL OF USER INVOLVEMENT

User involvement has been hypothesized to be related to system quality, system usage, and user attitudes. The relationships between these four variable types is complex. Several models have been proposed [5,18,41,45,53,71,76,83] that describe relationships among two or more of these variable groups. Figure 1 presents an amalgam of these models. According to Figure 1, it is predicted that user involvement will positively influence system quality, that both system quality and user attitudes influenced by involvement will result in increased system utilization, and that each of these three variable classes will influence subsequent involvement. In the next section these variables are defined and the methods commonly used to measure them are discussed.

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## VARIABLES AND THEIR MEASUREMENT

### User Involvement

Users can become "involved" in the system development process through a variety of mechanisms. A user may be a member of the project team responsible for designing the system [29,35,39,44,57,60,64,75,82]. User feedback may be elicited through questionnaires [9,44,54]. A user or information system staff person may be appointed to act as a "liaison" between the two groups [44,58]. "Evolutionary" system design strategies have been suggested as a means to elicit early user feedback in development of relatively unstructured systems [2,4,6,49]. Ongoing involvement by executive management in planning and evaluation of the total information system resource may be elicited through steering committees [39,44] and chargeback systems [12,57].

The prescriptive literature consistently affirms that user involvement positively affects the success of information system implementation [3,33,44].

Characteristics of the system designers, the nature of the problem, and the organizational context of the new system have been hypothesized to influence the success of user involvement [7,8,15,25,35,49,57]. Terms with meanings similar to "involvement" have been used. "Participation" [34,44,67], "a priori involvement" [76], "participative systems design' [24], and "influence" [18,67] have been considered. Of these, only the construct "influence" differs conceptually from involvement. "Influence" has been proposed to refer to substantive involvement, where the user actually contributes to the project, as distinguished from symbolic involvement, where user contributions are ignored [35].

Measures of user involvement can refer to general involvement in activities related to information systems development [19,26,30,52,59,78], or to involvement in design of a specific system [18,21,34,47,67,76]. Measures tend to be single-item or multiple-item Likert-type scales [38]. They are often based on self-reports of users' perceptions but can also be objective or behaviorally anchored, such as independent rankings by outside observers. In two studies [8,34] user involvement has been manipulated experimentally.

Table 1 contains a summary of measures of user involvement employed in research to date, including the term used for the construct as it is defined in each study. The table also indicates whether the measures focus on a specific system or information systems in general, the type of measure and/or setting (e.g. experimental), and whether the measure was self-report and perceptual or objective.

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As indicated in Table 1, most studies of user involvement rely only on self-report measures; usually the measures are taken after the system has been developed. Two studies had both the user and the information systems manager rate the general level of user involvement [59,78]. When there was substantial disagreement between the two ratings in [78], the researchers utilized the information systems managers' responses, reasoning that "the EDP staff was in a better position to make an expert judgment since a user might be biased by his personal experience with a specific project." While Kling [35] has hypothesized that information systems managers will overreport user involvement, Olson and Ives [59] found that information systems managers' ratings of user involvement were generally lower than user ratings.

Existing measures of user involvement generally do not differentiate between types of involvement (e.g., membership on or leadership of a project team, formal approval of project phase completions, formal liaison with the information systems group, etc.). Some studies [76,78] have considered specific stages in the system development life cycle, but rarely have studies referred to specific behaviorally anchored activities. Moreover, few attempts have been made to differentiate between symbolic and substantive involvement.

No examples were found where user involvement was observed or measured over time in a longitudinal field study.

Generally, user involvement has been weakly operationalized. Heavy reliance on perceptual self-report measures casts suspicion on study results. Scale reliability and validity have been almost universally ignored. Furthermore, self-report measures of involvement appear frequently on the same questionnaire as measures of other variables of interest, making it impossible to distinguish unwanted method variance from variance attributable to the variables of interest [10]. (The problem of common method variance is discussed in a later section of this paper.) Finally, the ex post facto measurement strategies commonly employed encourage "halo" effects. Users' perceptions of system quality after the system is installed will affect their recollections of how much they personally contributed to achieving it. (For instance, a user who is satisfied with a system may recall participating more on its design than a dissatisfied user.)

System Quality

Ultimately, the objective of a computer-based system is improved decision making performance, leading to improved organizational effectiveness. The implementation of a computer-based system is usually justified on the basis of a favorable cost/benefit tradeoff. Unfortunately, it is often impossible to assess the benefits derived from a system whose objective is to improve decision-making performance. Even where this data is determinable, it is not usually recorded and is, therefore, unavailable for research purposes [18]. Empirical studies therefore employ surrogate measures of system benefits. In Figure 1, such measures are collectively referred to under the term "system quality". The other three classes of variables -- system usage, user attitudes, and user information satisfaction -- all can be considered surrogates of system quality to the extent that they predict the success of the system in accomplishing its objectives (i.e. improved user performance). Each of these classes of variables is discussed separately.

Table 2 presents thirteen measures of system quality employed in research to date. Each entry includes the label given to the variable by the researcher, the method of measurement employed and whether or not the measure is self-report.

PLACE TABLE 2 HERE

Two studies collect actual performance data; one compares performance statistics between users and non-users [45], while the other measures decision maker performance on a simulated activity in a laboratory setting [16]. Generally, however, researchers have settled for indirect perceptual measures of system quality. Gallagher [22] asked users to assign a dollar value to reports received from an information system. He found that respondents had difficulty providing estimates. King and Rodriguez [34] had business professors rank student decision making performance. Lucas [43] and Vanlommel and Debrabander [78] employed ratings of system quality by the information systems staff. Boland [8] employed experts to rank the quality of ideas generated in a design interview. Edstrom [18] asked each of four project participants to rate the perceived success of the system.

System Usage

Although the economic implications of an information system are rarely measurable, it is often possible to evaluate behavioral consequences of system implementation. When system usage is voluntary, it can serve as a behavioral indicator of system implementation. Table 3 contains a summary of system usage measures employed in research to date.

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Several studies examining system usage have focused on all computer-based systems available to a user rather than a specific system, but most measures of usage focus on a particular system.

Measures may be objective and provide ratio scales [34,47,66,71,76,79], dichotomous categories of use or non-use [2,5,40,69], or subjective estimates by the user [21,43,53,71,72]. Objective measures generally employ some form of automated system monitoring. Although many studies relying on subjective estimates employ single-item measures, some multiple-item scales have been employed [43,45,52]. Several studies rely on indirect estimates by others [51,66,72].

According to Table 3, 12 out of 20 studies measuring system usage employed perceptual, self-report measures. Because perceptual, self-report measures can be misleading, an objective measure is preferable, particularly when self-report instruments are used to measure other variables of interest. Lucas [47] has shown a correlation of only .61 between reported and actual use, while Robey [65] has demonstrated a correlation of .97 between two different behavioral measures of usage. The current proliferation of online applications, frequently accompanied by automatic logging of user queries and updates, permit usage measures based on objective data. If self-report measures of system usage are necessary, they should be taken at a different time and in a different context than self-report measures of other variables of interest.

User Attitudes

Several researchers have suggested that user attitudes will influence information system usage [45,71,76], user involvement [83], or MIS success [51,83]. User attitudes have in turn been hypothesized to be influenced by user involvement [45,76].

The concept of attitudes is an old one. In 1935 Allport stressed the importance of attitudes to the social psychologist [77]. Attitudes were originally viewed as a predisposition of an individual to act in certain ways given certain stimuli. More recently, attitudes are seen to carry an evaluative component. Individuals are expected to behave in a favorable or unfavorable manner given certain stimuli [61].

Attitudes are generally expected to be consistent predictors of behavior. However, the existence of the link between attitudes and behavior has been widely debated. Many studies have failed to show significant relationships between attitudes and relevant behaviors, and as a result the usefulness of attitudes as predictors has been questioned. Ajzen and Fishbein [1] have shed considerable light on this complex subject. They demonstrate that an attitude will significantly predict behavior only if the entity considered in the attitude measure corresponds appropriately to the entity examined by the behavioral measure. Correspondence requires the two measures to be in agreement in four respects: the target, action, context, and timing.

In the context of information systems, suppose we wish to predict usage (the action component) of a particular decision support system (the target) by a user involved in planning activities (the context) during the next month (the time dimension). If the attitudinal measure was, "How do you feel about computer-based information systems?" (the target), Ajzen and Fishbein would predict that no significant relationship would be found; the criterion measure has well specified target, action, context, and time components, while the predictor measure has unspecified action, context and time dimension and a broadly defined target (i.e., computer-based information systems). Predictor and criterion measures clearly do not correspond.

On the other hand, if we wish to predict user involvement (action component) in the design of computer-based information systems in general (the target), the time and context dimensions are unspecified and the action and target dimensions are broadly defined. In this case a scale measuring the respondent's reactions to numerous types of involvement (action component) in the design of computer-based information systems (target component) correspond in specificity with the behavioral measure (i.e. they are both general).

Ajzen and Fishbein have mapped the existing research on the relationship between attitudes and behaviors into their model. Table 4 presents the results from 142 separate attitude-behavior relations. In these comparisons only the "target" and "action" components were examined for correspondence. A high correspondence means predictor and criterion measures were in agreement on those two dimensions, while a partial correspondence indicates that one or the other dimension was not in correspondence.

-PLACE TABLE 4 HERE-

Ajzen and Fishbein's results necessitate a rethinking of MIS attitude research. Past studies have hypothesized that specific behaviors (e.g., usage of a particular information system) can be predicted from a general attitude (e.g., "computer potential"). Attitudes have also been considered as surrogate indicators of system quality. Information satisfaction, for instance, is frequently employed when a behavioral measure is not obtainable. Ajzen and Fishbein's results suggest that such measures, if defined in the appropriate correspondence, can predict behavioral outcomes with a high degree of certainty and can therefore be acceptable surrogate measures of system quality. When they are used inappropriately, however, the relationship between attitudes and behavior will be predictably low.

Table 5 presents attitude measures employed in information systems research, including the type of measurement utilized and whether it was specific or general in the sense of Ajzen and Fishbein's work. Although the research on user attitudes toward information systems is rather extensive, it is an important area that still is not well understood. This review focuses only on those studies relating user attitudes to user involvement.

PLACE TABLE 5 HERE

Perhaps the most refined measures of MIS-related attitudes were developed by Schultz and Slevin [72]. They used factor analytic techniques to develop an attitudinal scale for predicting implementation success of operations research/management science models. Their seven-factor solution consists of multiple-item Likert-type scales measuring attitudes, listed in Table 5, about a specific model. Schultz and Slevin's instruments have been used by others [34,65,69]. Robey calculated reliability figures for the seven factor scales, finding two ("interpersonal relations" and "changes in organizational structure"), to be at unacceptable levels. Schultz and Slevin [72] also developed semantic differential scales for measuring attitudes thought to predict model success.

Schewe [71] employed a five-point bipolar scale to measure ten attitudes related to a specific information system (shown in Table 5) and averaged the individual scales to produce an overall attitudinal measure. Lucas [42,43,45,47,48,50] developed measures of several attitudes toward computer-based systems in general, employing two or three Likert-type items for each attitude measured. The attitudes Lucas examined included "computer potential", "attitudes toward the information systems staff", "management support of computer activities", and items pertaining to information system quality (e.g. "quality of database", "ease of use"). Igersheim [30] developed a seven-factor attitude measure (shown in Table 5) based on 57 six-point items.

It is clear from Table 5 that some measures of attitudes are general while others are specific. A later section of this paper discusses whether, in those studies where the relationship between user involvement and attitudes is examined, the measures are in correspondence.

## Information Satisfaction

Information satisfaction is the extent to which users believe the information system available to them meets their information requirements. Although information satisfaction is an attitude, it is also commonly employed as a surrogate measure for system quality and is therefore examined separately.

The concept of information satisfaction probably originated with the work of Cyert and March [13]. Their model, depicted in Figure 2, suggests that an information system that meets the needs of its users will reinforce satisfaction with that system. If the system does not provide the information required the dissatisfied user will look elsewhere.

-PLACE FIGURE 2 HERE-

Table 6 contains a summary of information satisfaction measures, including characteristics of the measure employed. Several instruments measure satisfaction with a specific system. Some are single-item Likert-type scales [5,47,50]. Larcker and Lessig [37] criticize the single-item measure as inadequate. Other researchers

[11,22,31,37,52,56,73,76] employ scales consisting of multiple items, each focusing on some dimension of the user system interface (e.g., input ease, output quality, timeliness, accuracy).

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General measures of information satisfaction examine users' overall satisfaction with all the computer-based information used in their jobs. One such measure [26], based on earlier work on job satisfaction [63], examines the difference between a user's "felt need" for a particular type of information and the amount of such information provided by the information system. The greater the difference, the higher the user's perceived need, and the greater the user's dissatisfaction with the current system. Guthrie's scale can be interpreted in contradictory ways. Nolan [55] has interpreted a high perceived need score (i.e., dissatisfaction with existing information systems) as a positive user attitude, conducive to user involvement in subsequent system design activities. However, high perceived need can also be interpreted as an indicator of dissatisfaction with the current system.

Perhaps because of the lack of suitable alternatives, most authors have elected to design their own instruments for measuring information satisfaction rather than relying on scales developed previously. Little attention is paid to scale validity in most of these studies. Fortunately, in the last few years several researchers have, apparently independently, initiated rigorous investigations into the underlying dimensionality of information satisfaction [31,36,37,62,81]. Psychometrically valid measures of information satisfaction are important contributions to information systems research.

## RELATIONSHIPS AMONG VARIABLES MEASURING SUCCESS

Information satisfaction, system usage, and the measures listed under the general category of "system quality" are all measures of system success or changes in performance attributable to the system. Table 7 summarizes the studies that have investigated the relationship between two or more of these measures. The relationship between each of these surrogate measures and user involvement is examined in the section immediately following.

PLACE TABLE 7 HERE

The empirical data relating user attitudes to the other surrogate measures of system success is extensive, complex, and often contradictory. A review of this research is considered beyond the scope of this paper and worthy of separate treatment; it is therefore not included here. Robey [66] summarizes the research examining the relationship between attitudes and system usage.

System Usage and System Quality

Five studies compared some measure of system quality to system usage. Three of these were conducted by Lucas. In one survey [43] he found a significant positive relationship between system quality and usage in five of 28 comparisons. In another study [45], he examined the relationship between system quality and two types of usage: problem finding and problem solving. In two cross-sectional surveys, sales and banking personnel were found to be more likely to refer to data classified as useful for locating problems when the user's performance was low. In a simulated decision-making environment permitting tests of causality, Lucas [45] found that subjects were more inclined to rely on problem finding data after they had experienced low performance. The data suggest, however, that performance did not improve easily once the problem finding data was displayed. The survey data also showed that low performers were more inclined to rely on data of a problem solving nature; the experimental study provided only weak support for this finding.

Robey [68] found consistently low but significant positive correlations between four objective measures of system quality and a perceptual measure of "perceived worth" of the information system. In an experimental setting, King and Rodriguez [34] compared a behavioral measure of system usage (number of queries) to expert ratings of system quality and found no significant relationship.

System Usage and Information Satisfaction

Six studies measured the relationship between system usage and information satisfaction. Of these, two showed positive results with objective measures of usage [5,76]. The other studies had either mixed results or, where a significant positive relationship was found, utilized perceptual, self-report measures of usage which may have resulted in common method variance.

System Quality and Information Satisfaction

Only two studies addressed these two variables. The results in one study [45] were negative. In the other, Gallagher [22] found a positive relationship but not strong enough, in his opinion, to justify use of information satisfaction as a surrogate measure for the system quality scale.

Comparison of Success Variables

System quality, system usage, and information satisfaction are, as noted, "surrogate" measures for improvements in user performance. Based on the studies shown in Table 7, selection of one variable as an acceptable surrogate over the others is not warranted. The situation being investigated will in part determine what measures are feasible and, where possible, multiple surrogate measures should be employed.

System usage has the advantage that it can be measured objectively. Problems of self-reporting and common method variance can be avoided. Automatic logging of usage is often possible and should be encouraged. Where usage is mandatory, however, it is a poor measure and user information satisfaction may need to be considered. Several efforts are under way to develop validated measures of user information satisfaction; this will contribute to future research by permitting comparisons of data across studies and will also provide a practical tool for evaluation of specific systems. Finally other surrogate measures referred to collectively as "system quality" vary widely in terms of definition and are generally system dependent. Employing multiple raters of system quality seems to offer some solution to the bias inherent in the commonly employed self-report measures.

## RELATIONSHIPS BETWEEN USER INVOLVEMENT AND OTHER VARIABLES

The primary concern of this paper is to put into focus the relationship between user involvement and the other variables depicted in Figure 1. In this section, the empirical results regarding user involvement are critically reviewed. Table 8 contains a summary of these findings, including possible problems that may have confounded reported results. Generally, acceptable results are considered to be at the .05 level of significance unless otherwise indicated.

PLACE TABLE 8 HERE

## User Involvement and System Quality

Five studies examined the relationship between user involvement and surrogate measures of system quality. Based on users' perceptions of the estimated dollar value associated with a report, Gallagher [22] found a positive relationship. Edstrom [18] found a positive relationship between user perceptions of quality and their involvement in two out of six stages of system development. In an experimental setting, Boland [8] found a positive relationship between user involvement and expert ratings of the quality of the design process.

Two studies, both employing relatively objective measures of system quality, failed to show a significant relationship between it and user involvement. Powers and Dickson [64] examined the quality of the development process through historical records. Vanlommel and Debrabander [78] utilized a general questionnaire distributed to the EDP staff.

Based on the results to date, the relationship between user involvement and system quality is inconclusive.

## User Involvement and System Usage

System usage as a surrogate measure for system quality is expected to vary positively with user involvement. Furthermore, user involvement may increase system usage regardless of system quality as the user develops a better understanding of the system and how it works [44].

As shown in Table 8, five studies found no significant relationship between user involvement and system usage [21,47,52,71,82] while one study [76] found a weak relationship (significant at the .10 level). In an experimental setting, King and Rodriguez [34] found that user involvement affected the nature of usage but not the total amount. Two studies found a relationship to variables related to system usage: Alter [2] found that user involvement was related to decreased resistance to use, while Lonnstedt [40] found successful implementation to be more likely when users were involved in system development.

User Involvement and User Attitudes

Most studies examining the relationship between user involvement and user attitudes have concentrated on information satisfaction as the attitudinal measure of interest. These are discussed in the next section. Seven studies consider the relationship between user involvement and other attitudinal variables.

Igersheim [30] found user involvement in system design activities to be significantly and positively correlated with job satisfaction, job skill, job opportunity, job originality, job status, and job salary in one or more of five organizations investigated. Maish [52] found a significant positive relationship between involvement and a user's "feelings about the information systems staff". Lucas [45] found involvement to be significantly related to "computer potential for administrative/clerical activities" but not related to "user feelings about the information systems staff". In another study [47], Lucas found significant positive associations between user involvement and "database quality", "model contribution", and "potential of computer-based planning systems", while attitudes about the "user interface" correlated negatively with involvement.

Unfortunately, involvement in each of these studies is measured by perceptual, self-report indices taken at the same time as the attitude measures and after the fact, thus possibly leading to over-reports of involvement and common method variance.

User Involvement and Information Satisfaction

User involvement is expected to lead to greater information satisfaction [44]. However, the evidence is mixed. Two studies showed no significant relationship [47,74]. Several studies showed a significant positive relationship [20,22,26,30,32,76]. Others found mixed evidence: Powers and Dickson [64] found information satisfaction to improve with involvement by operating management but found no relationship between satisfaction and use of project teams containing users as members. Edstrom [18] found user involvement in "determining project scope" and "systems analysis" stages of the system development life cycle to be positively correlated with a measure of system success as perceived by individuals in four different positions. However, involvement by the user's supervisor in "systems analysis" and "programming" stages of the system development life cycle correlated negatively with the same measure of success.

Most studies showing a positive relationship relied on self-report measures of both variables at the same time, suggesting common method variance may have accounted for the results.

GUIDELINES FOR FUTURE RESEARCH

This review of research on user involvement suggests some guidelines for future investigations. These guidelines may appear to be critical and to downplay the importance of early research efforts; this is not the intention. The MIS field is only beginning its second decade and, as a result, research has tended to be exploratory in nature. Furthermore, researchers addressing the issues discussed in this paper come from diverse fields. The bibliography includes references in the fields of psychology, organizational behavior, management, management sciences, accounting, information systems, and computer science. It is not surprising, therefore, that the literature is fragmented.

This line of research seems to have reached a point, however, where a unified and rigorous approach is necessary. Our suggestions for this approach fall into three general categories: variables and relationships among them, measurement, and methodology.

Variables and Relationships

It is clear that although considerable research has been generated focusing on user involvement, this work has tended to be scattered throughout the literature with little cross-referencing among research studies. Furthermore, as Robey [67] has pointed out, the MIS discipline has been slow in adapting research from other areas to its context. We ask researchers to put future works into their proper context among past studies and relevant areas of inquiry. If MIS is to mature as a scientific discipline the development of a cumulative knowledge base is essential.

We call on researchers to settle on commonly accepted variable labels rather than inventing new constructs that, conceptually, vary little from those already receiving wide-spread research attention. "Inquiry involvement" [76] and "user behavior" [52] are illustrative of similar constructs. On the other hand, the term "influence" [67] probably represents a conceptually different construct than involvement and deserves separate research attention. Other constructs that are important and need to be operationalized are "commitment" and "responsibility" of users for their own information systems. Ginzberg [25] found that two of three issues which were central to successful MIS implementation involved commitment: commitment to the project and commitment to change. Measures of involvement that do not differentiate between symbolic participation (no commitment) and substantive (indicating user influence, responsibility, and commitment) may in fact be meaningless.

## Measurement

We have provided general comments on the measurement of each variable class as they were discussed. Summarized here are some implications of the measurement problems we have identified. First, user involvement and system usage are both behaviorally anchored constructs and should be measured as such. Perceptual measures should be avoided, particularly for usage which is relatively easy to objectively measure. Where subjective measures must be employed, care should be taken to establish their validity. In any case, self-report measures of multiple variables for which a relationship is believed to exist should not be contained in the same questionnaire. If perceptual measures of user involvement are employed they should be taken from more than one source. Besides users other knowledgeable respondents are the users' manager, the information systems manager, and the information systems staff members assigned to the project.

We also suggest that behavioral constructs are considerably more relevant to this line of inquiry than are attitudes. If attitudes are to be examined they should be considered as either surrogates for behavioral measures (e.g., information satisfaction) or as moderators of relationships among behavioral constructs. Finally, the implications of Ajzen and Fishbein's [1] impressive findings must be seriously considered in attempts to measure relationships between attitudes.

Methodology

A majority of studies reviewed in this paper are based on cross-sectional data collected primarily on a single questionnaire administered to a user group. Longitudinal field studies, experiments and field tests can provide information about causality while avoiding many of the problems encountered with survey data. We particularly encourage researchers to study ongoing development efforts, permitting assessment of the impacts of differing levels and types of user involvement on dependent measures of interest.

## CONCLUSIONS

As shown in this review, much of the research to date on user involvement in information systems development is methodologically weak. Considerably more, and better, research in this area is needed if information systems are to be more effectively developed to meet their users' needs. This new research must strive toward a unified approach.

Moreover, this review of research suggests that the relationship between user involvement in information system development and system success is not as strongly supported by the empirical evidence as the prescriptive literature leads one to think. Replication of past studies with improved research designs and measures would help to determine whether or not methodological weakness has masked a significant relationship between user involvement and user performance. Most previous research has been conducted under the a priori assumption that user involvement <u>is</u> essential to system success. This review clearly indicates that in future research it would be worthwhile to challenge this assumption and to begin to focus on the conditions under which user involvement may or may not be appropriate.

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Figure 1

A Research Model
Showing Expected Expected Relationships
Among Classes of Variables

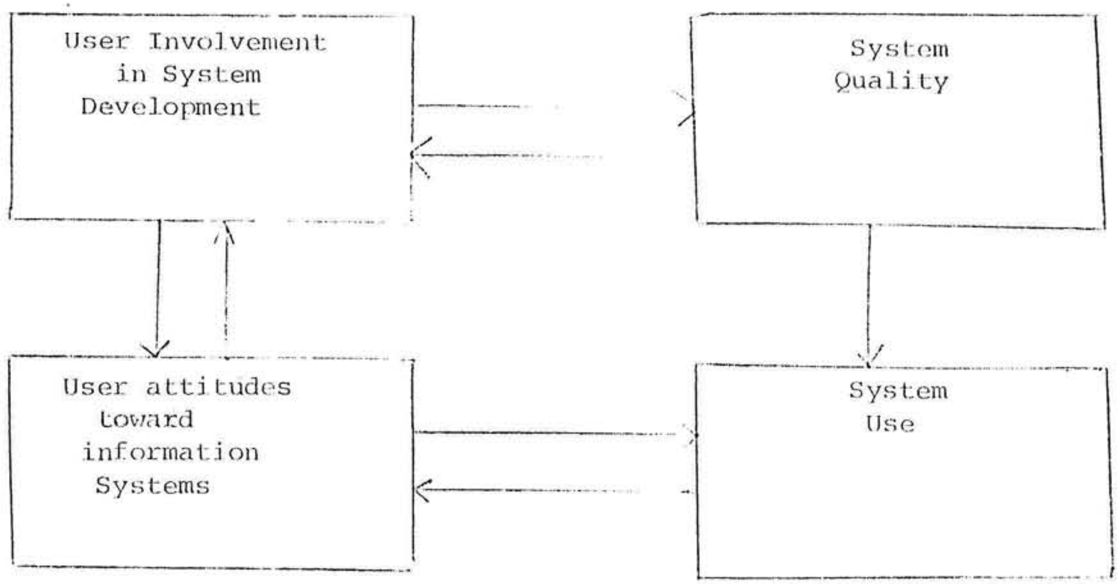

Figure 2

CYERT AND MARCH BEHAVIORAL THEORY OF THE FIRM AND USER SATISFACTION WITH AN INFORMATION SYSTEM

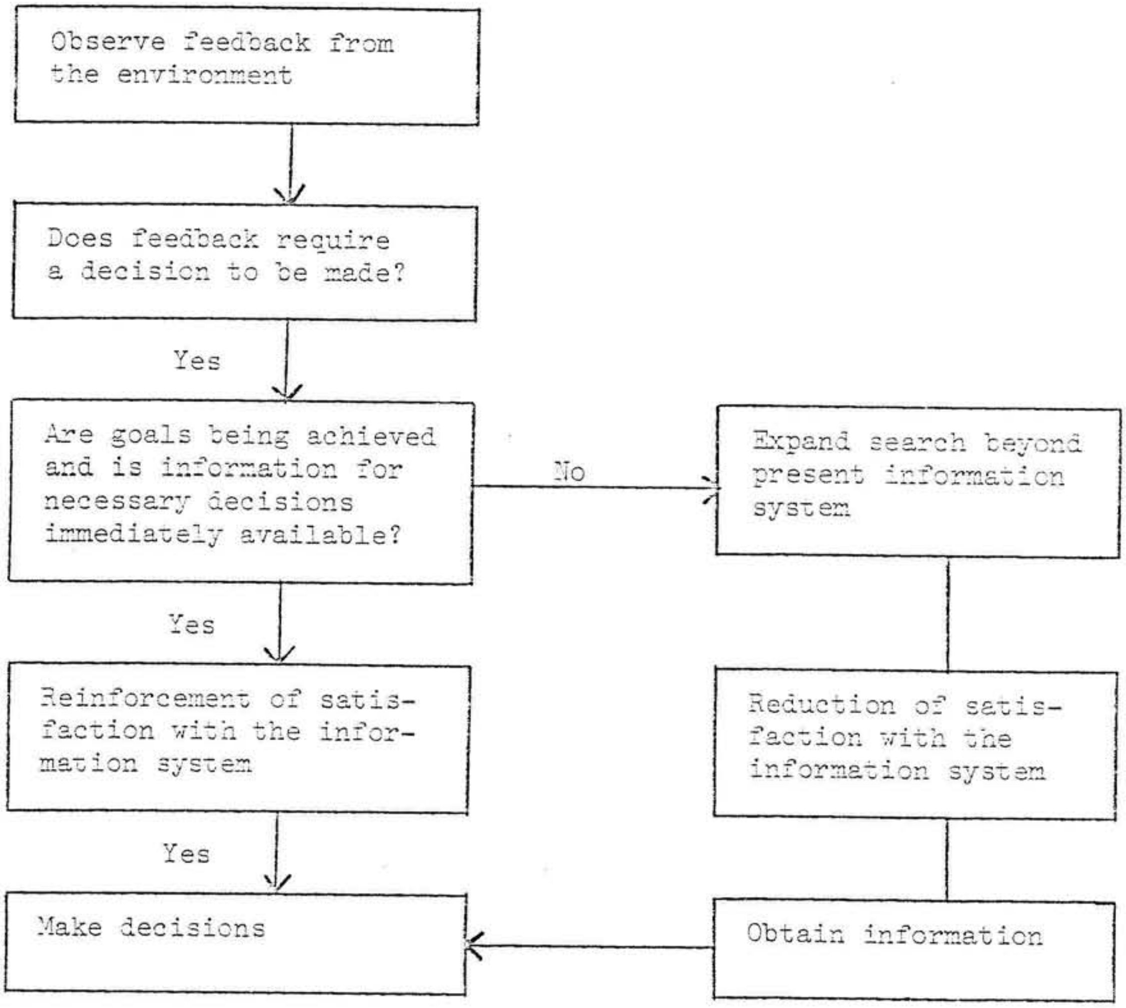

TABLE 1 - MEASURES OF USER INVOLVEMENT

| STUDY | VARIABLE LABEL | METHOD OF MEASUREMENT | (CODE) | COMMENTS |
|---|---|---|---|---|
| Alter [3] | Initiation<br>Participation | Interview-Dichotomous Classification<br>Interview-Dichotomous Classification | s,p,sr<br>s,p,sr | |
| Boland [8] | Traditional Design Protocols versus Mutual Interactions | Simulated Systems Design Problem | ex | |
| Edstrom [18] | Influence | Single-item, bipolar scales | s,p,sr | Repeated for 6 SDLC phases |
| Ference & Uretsky [19] | Top Management Involvement | Multiple-item, "forced choice" | g,p,sr | |
| Franz [20] | User-Manager Influence | Multiple-item, behaviorally anchored | s,p,sr | For design and implementation |
| Fuerst [21] | User Involvement | Single-item, Likert-type scale | s,p,sr | |
| Gallagher [22] | Participation | Dichotomous Measure | s,p,sr | |
| Guthrie [26] | Participation Index | Single-item, open-ended, coded as low, medium or high | g,p,sr | Users "expressed philosophy" |
| Igersheim [30] | User Involvement | Six-item, Likert-type scale | g,p,sr | |
| Kaiser & Srinivasen [32] | User Involvement | Three-item, Likert-type scale | s,p,sr | |
| King & Rodriquez | Participation | Dichotomous manipulation | ex | |
| Lonnstedt [40] | Participation<br>Initiation | Dichotomous item<br>Tricotomous (user, top mgmt., O.R.) | s,sr<br>s,sr | Unspecified agreement with O.R. ratings |
| Lucas [45],(Six Company Study) | User Involvement | Two-item, Likert-type Scale | s,p,sr | |
| Lucas [45] , (Bay Area Study) | User Involvement | Two-item, Likert-type Scale | s,p,sr | |
| Lucas [46] | User Involvement | Single-item, Likert-type Scale | s,p,sr | |
| Maish [52] | User Involvement | Single-item, behaviorally anchored | g,p,sr | |
| Olson &Ives [59] | User Involvement | Multiple-item, behaviorally anchored | g,p,sr | Also included ratings by EDP |
| Powers & Dickson [64] | Participation-Operations Mgmt.<br>Users on Project Team<br>User Initiation | Interviews<br>Interviews<br>Interviews | ? | |
| Robey & Farrow [67] | Involvement Influence | Single-item, Likert-type scale | g,p,sr | For Initiation, Design, & Implementation Stages |
| | | Single-item, Likert-type scale | g,p,sr | For Initiation, Design, & Imp. Stages |
| Sartore [70] | ? | ? | | |
| Schewe [71] | Involvement in Systems Dev. | Single-item, bipolar scale | s,p,sr | |
| Spence [74] | Pre-Implementation Involve.<br>Post-Implementation Involve. | ?<br>? | ?<br>? | |
| Swanson [76] | A priori Involvement | Ten-item, Likert-type Scale | s,p,sr | Possible confound with system image |
| Vanlommel & DeBrabander [78] | Organizational Involvement Pattern<br>User Project Involvement | Single-item, behaviorally anchored<br>Single-item, behaviorally anchored | g,p<br>g,p | EDP ratings, scales for design and imp.<br>EDP ratings, scales for design and imp. |
| Zmud [83] | Involvement Role Sets | Single-item, Likert-type scale | g,p,sr | |

CODES:
s - system specific
g - nonsystem specific
p - perceptual measure
o - objective measure
sr - self-report measure
ex - experimental manipulation
? - unknown/not described

TABLE 2 - ALTERNATIVE MEASURES OF SYSTEM QUALITY

| STUDY | VARIABLE LABEL | METHOD OF MEASUREMENT | (CODE) | COMMENTS |
|---|---|---|---|---|
| Boland [8] | Design Quality | Experts rated ideas generated in a problem-finding interview | s,p | Measure of design process not system quality. |
| Dickson, Senn, Chesvany [16] | Decision Quality | Experimental Simulator | s,o | |
| | Decision Time | Experimental Simulator | s,o | |
| Edstrom [18] | Perceived Success of IS | Single-item, bipolar scale | s,p | Average of four project participants |
| Franz [20] | System Success | Multiple-item, Most Likert-type scales | s,sr | Mixture of Perceptual and objective items |
| Gallagher [22] | Value of Report | Dollar estimate of perceived value | s,p | Managers had difficulties with estimates |
| King & Rodriquez [34] | Decision-Making Performance | Expert Evaluations | s,p | Experiment |
| Lucas [43] | User Perceptions of Quality | Multi-item, Likert-type scales | s,p,sr | |
| | ISD Rating | Multi-item, Likert-type scales | | |
| Lucas [45], (Branch Bank) | Performance | Computer files - 6 indicators | s,o | |
| | | Supervisor ratings (questionnaire) | s,p | |
| Lucas [45] (The Experiment) | Performance | Monitored - 6 indicators | s,o | Experiment |
| Lucas [48] | Quality of Order Processing | Four-item, Likert-type scale | s,p,sr | |
| | Customer Service | Three-item, Likert-type scale | s,p,sr | |
| | Order Cycle | Three-item, Likert-type scale | s,p,sr | |
| | Input Form | Four-item, Likert-type scale | s,p,sr | |
| Powers & Dickson [64] | Cost to Develop | Historical Records | s,o | Measure of development process not system quality |
| | Time to Develop | Historical Records | s,o | |
| Robey [65] | Perceived Worth | Four-item, ten-point rating scale | s,p,sr | |
| Vanlommel & Debrabander [78] | Functional Balance of Use | Historical Records | g,o | Supplied by EDP |
| | Management Level of Use | Historical Records | g,o | Supplied by EDP |
| | Advancement in Use | Historical Records | g,o | Supplied by EDP |
| | Economic Benefits | Seven-item, Likert-type scale | s,p | Rated by users and EDP |
| | Operational Advantages | Five-item, Likert-type scale | s,p | Rated by users and EDP |
| | Improvements in IS | Six-item, Likert-type scale | s,p | Rated by users and EDP |

CODES: s = system specific; g = nonsystem specific
p = perceptual; o = objective
sr = self report

TABLE 3 - MEASURES OF SYSTEM USAGE

| STUDY | VARIABLE LABEL | METHOD OF MEASUREMENT | (CODE) | COMMENTS |
|---|---|---|---|---|
| Alter [2] | Resistance | Interview Dichotomous Classification | s,p | Debatable measure of system use |
| Barrett, Thornton, & Cabe [5] | Use/Non-Use | Dichotomous Measure | s,o | |
| Foerst [21] | Use | User Estimate | s,g,p,sr | Use of system and general MIS |
| King & Rodriguez [34] | Amount of Use<br>Substantive nature of use | Number of system queries<br>? | s,o | Usage related to design suggestions |
| Lucas [43] | Batch Use-General<br>Batch Use-Specific Activity<br>Online Use-General<br>Online Use-Specific Activity | Single-Item, Likert-type scale<br>Single-Item, Likert-type scale<br>Single-Item, Likert-type scale<br>Single-Item, Likert-type scale | s,p,sr<br>s,p,sr<br>s,p,sr<br>s,p,sr | |
| Lucas [45], (Branch Bank) | Use of Reports | Multiple-Item, Likert-type | s,p,sr | One scale for each of five reports |
| Lucas [45], (The Experiment) | Usage of Data Items<br>Usage of Graphics Features | 17 single-item scales<br>Monitored - 9 indicators | s,p,sr<br>s,o | Individual data items |
| Lucas [46] | Usage | Single-item measures of 6 usage types | s,p,sr | |
| Lucas [47] | Reported Usage<br>Extent of Usage Types<br>Hours of Usage | Single-Item<br>Single-Item<br>Monitored - Single Indicator | s,p,sr<br>s,p,sr<br>s,o | |
| Lucas [50] | Use by Others<br>Use by Others<br>Use by Final User<br>Use by Final User<br>General Use | Monitored - 4 Indicators<br>Questionnaire - 3 single-item scales<br>Monitored - 4 Indicators<br>Questionnaire - 3 single-item scale<br>Questionnaire - 1 single item scale | s,o<br>s,p,sr<br>s,o<br>s,p,sr<br>s,p,sr | Research librarian, research assistant<br>Research librarian, research assistant |
| Mehra & Alexander [51] | Usage | Multiple-Item estimates | g,p,sr | |
| Maish [52] | User Behavior | Multiple-Item, behaviorally anchored | s,p,sr | May be confounded with user involvement |
| Robey [66] | 2 Records Updated Over Time<br>Customer Records Maintained | Rankings based on Monitor<br>Rankings based on Monitor | s,o<br>s,o | |
| Robey & Zeller [69] | System Acceptance | Dichotomous Categorization | s,p | 1 system, 2 departments (1 good, 1 bad) |
| Schewe [71] | System Usage | Monthly requests for more information | s,o | Activity based |
| Schultz & Slevin [72] | Intended Use<br>Intended Use by Others | Single-Item scale<br>Single-Item scale | s,p,sr<br>s,p,sr | |
| Swanson [76] | Inquiry Involvement | Monitored - single indicator | s,o | |
| Vanlommel & DeBrabander [78] | Advancement of Computer Use<br>Functional Balance of Use<br>Managerial Level of Use | Company Records<br>Company Records<br>Classification | g,o<br>g,o<br>g,p | |
| Vasarhelyi [79] | Usage | Monitored - single indicator<br>Multi-Item scale | s,o<br>s,p,sr | Alternative measures not compared |
| Zmud [83] | System Usage | Single-Item, Likert-type scale | g,p,sr | |

CODES:
- s = system specific
- g = nonsystem specific
- p = perceptual measure
- o = objective measure
- sr = self-report measure
- ex = experimentally manipulated
- ? = unknown/not described

TABLE 4 - Effect of Correspondence on the Attitude-Behavior Relation (From Ajzen and Fishbein, 1977)

| Correspondence | Attitude Behavior Relation | | |
|---|---|---|---|
| | Not Significant | Low or inconsistent [a] | High [b] |
| Low | 26 | 1 | 0 |
| Partial | 20 | 47 | 4 |
| High | | | |
| Questionable Measures | 0 | 9 | 9 |
| Appropriate Measures | 0 | 0 | 26 |

(a)
(b)

TABLE 5 - MEASURES OF USER ATTITUDES

| STUDY | VARIABLE LABEL | METHOD OF MEASUREMENT | (CODE) | COMMENTS |
|---|---|---|---|---|
| Ference & Uretsky [19] | Performance of EDP<br>EDP Budget Performance<br>EDP Delivery Performance<br>Quality of Personnel | "forced-choice" questionnaire | g | Corporate Presidents |
| Igersheim [30] | Job Satisfaction, Job Skill, Job Opportunity, Job Status, Job Originality, Job Salary | Multi-item scales | g | |
| Kaiser & Srinivasan [32] | Systems Staff<br>Top Management Support<br>Group Process Skills | Four-item, Likert-type scale<br>Two-item, Likert-type scale<br>Eight-item, Likert-type scale | s<br><br>s | |
| King & Rodriquez [34] | (See Entry for Schultz & Slevin [1975] below | Multi-item, Likert-type scales | s | |
| Lucas [42] | Systems Staff<br>Computer Potential | Nineteen-item, bipolar scale<br>Two-item, bipolar scale | g<br>g | |
| Lucas [43] | Computer Potential<br>Attitudes Towards Staff | Two-item, Likert-type scale<br>"Several" item, Likert-type scale | g<br>g | |
| Lucas [45],(6 Company Study) | Systems Staff<br>Computer Potential | Single-item, Likert-type scale<br>Single-item, Likert-type scale | g<br>g | |
| Lucas [45],(Bay Area Study) | Systems Staff<br>Computer Potential | Single-item, Likert-type scale<br>Single-item, Likert-type scale | g<br>g | |
| Lucas [47] | ATTITUDES TOWARDS SYSTEM<br>Impediments to Use, User Interface, quality of data base, model contribution, simplicity, understanding<br>GENERAL ATTITUDES<br>Management support, potential of systems, Inhouse computer support. | ? | ? | |
| Lucas [48] | Job Satisfaction | Nine-item, Likert-type scale | g | |
| Maish [52] | Quality of IS Staff<br>Management Support | Ten-item, bipolar scales<br>Single-item, bipolar scale | g<br>g | Possible Confound with Involvement |
| Robey [67] | (See Schultz & Slevin [1975] entry below) | Multi-item, Likert-type scales | s | |
| Robey & Zeller [69] | (See Schultz & Slevin [1975] entry below) | Multi-item, Likert-type scales | s | |
| Schewe [71] | THE EFFECT OF INFO. SYS. ON: Decision-making, Managerial capabilities, Job productivity, prestige, control, information usefulness, information quality, corporate costs, clerical costs, corporate procedures | Single-item, bipolar scales | s | |
| Schultz & Slevin [72] | THE EFFECT OF INFO. SYS ON: Performance, Interpersonal relations, change, goals, support/resistance, client/researcher, urgency | Multi-item, Likert-type scales | s | Validation support provided |

CODES: s = system specific
g = nonsystem specific

TABLE 6 - MEASURES OF INFORMATION SATISFACTION

| STUDY | VARIABLE LABEL | METHOD OF MEASUREMENT | (CODE) | COMMENTS |
|---|---|---|---|---|
| Barrett, Thornton & Cabe [5] | Information Satisfaction | Single-item, graphic rating scale | s | |
| Cheney [11] | Information Satisfaction | Multiple-item, bipolar scale | s | |
| Gallagher [22] | Information Satisfaction | Fifteen-item, semantic differential | s | "Better scales need to be found (p.54)" |
| Guthrie [26] | "Felt need" | Multi-item, difference scale | g | We view "felt-need" as dissatisfaction |
| Igersheim [30] | System Acceptance | Multi-item, Likert-type scale | ? | Measure not described |
| Jenkins & Ricketts [31] | Information Satisfaction | Multi-item, Likert-type scales | s | 5 Dimensions, evidence for validity |
| Kaiser & Srinivasen [32] | Information System Success | Two-item, Likert-type scale | s | |
| Larcker & Lessig [37] | Perceived Usefulness | Six-item, Likert-type scale | s | |
| Lucas [45] | Output Quality | Multi-item, Likert-type scale | s | |
| Lucas [47] | Rating of Success | Single-item, Likert-type scale | s | |
| Lucas [50] | Rating of System | Single-item, Likert-type scale | s | |
| Maish [52] | Feelings about Info. System | Five-item, bipolar scale | s | |
| Nolan & Seward [56] | User Satisfaction | Multiple-item | s | Prescription on Measurement |
| Powers & Dickson [64] | User Satisfaction | Questionnaire | s | Measure not described |
| Pearson [62] | Information Satisfaction | Multi-item, semantic differential | g | 39 separate "factors", validation |
| Sartore [70] | ? | ? | ? | |
| Seward [73] | Information Sys. Effectiveness | Multiple-items | s | ? = unknown/nor described |
| Spence [74] | ? | ? | ? | |
| Swanson [76] | MIS Appreciation | 16-item, Likert-type scale | s | |
| Zmud [81] | Information Satisfaction | Multi-item, Semantic Differential | s | Eight Dimensions |

CODES: s = system specific
g = nonsystem specific

TABLE 7 - RELATIONSHIP AMONG VARIABLES MEASURING SUCCESS

| STUDY | INFO SAT | SYS USE | SYS QUAL | RESULTS | NUMBER OF ORG'S | NUMBER OF SYS'S | NUMBER OF USER'S | TYPE | POSSIBLE PROBLEMS | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|
| King & Rodriquez [34] | | X | X | (n.s.) | | 1 | 45 | ex | | Use was the independent measure |
| Lucas [43] | | X | X | (+) | 1 | 26 | 118 | s | mv | Five of 28 comparisons were positive |
| Lucas [45], (Branch Bank) | | X | X | mixed | 165 | 1 | ? | s | | Of 35 comparisons-2 pos/2negative |
| Lucas [45], (The Experiment) | | X | X | (-) | | 1 | 115 | ex | | Low performance leads to greater use of problem finding types of info. |
| Robey [68] | | X | X | (+) | 1 | 1 | 66 | s | | |
| Barrett, Thornton & Cabe [5] | X | X | | Non-users less satisfied than users | 3 | 1 | ? | s | | |
| Lucas [45], (Branch Bank) | X | X | | (+) | 165 | 1 | ? | s | mv,lc | For 4 of 5 self-report use measures |
| Lucas [47] | X | X | | (+) | 21 | 1 | ? | s | mv | For self-reported use |
| | X | X | | (n.s.) | 21 | 1 | ? | s | | For actual use |
| Lucas [50] | X | X | | (-) | 1 | 1 | 180 | s | lc | For 3 of 8 monitored use measures |
| | X | X | | (+) | 1 | 1 | 180 | s | mv,lc | For 1 of 7 self-report measures |
| Maish [52] | X | X | | (n.s.) | 4 | | 62 | s | mv,lc | Usage measure titled "user behavior" |
| Swanson [76] | X | X | | (+) | 1 | 1 | 37 | s | | |
| Gallagher [22] | X | | X | (+) | 1 | 1 | 75 | s | mv | "[correlation] too low to use semantic differential mean score as a surrogate for dollar value" [p.53] |
| Lucas [45], (Branch Bank) | X | | X | (n.s.) | 165 | 1 | ? | s | | |

+ = positive at .05
- = negative at .05
n.s. = nonsignificant at .05

ex = experiment
s = survey

mv = possible method variance
lc = possible lack of correspondance

TABLE 8 - USER INVOLVEMENT AND VARIABLES OF INTEREST

| STUDY | USER ATTITUDES | INFO SAT | USAGE | SYS QUAL | RESULTS | NUMBER OF ORG'S | SYS'S | USER'S | TYPE | POSSIBLE PROBLEMS | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Boland [8] | | | | X | (+) | N.A. | N.A. | N.A. | ex | | |
| Edstrom [18] | | | | X | (mixed) | 13 | 13 | 52 | s | | Positive for 2 of 6 SDLC stages for users, negative for 2 of 6 for functional managers. |
| Gallagher [22] | | | | X | (+) | 1 | 1 | 75 | s | | |
| Powers & Dickson [64] | | | | X | (n.s.) | 10 | 20 | ? | s | | For all types of involvement |
| Vonlommel & Debrabander [78] | | | | X<br>X | (n.s.)<br>(mixed) | 17 | 20 | ? | s | | Among 6 combinations at organizational level<br>1 of 12 at project level |
| Alter [2] | | | X | | (+) | ? | 57 | ? | s | mv | Apparently positive for both initiation and participation |
| Fuerst [21] | | | X | | (n.s.) | ? | ? | ? | s | mv | |
| King & Rodriquez [34] | | | X<br>X | | (n.s.)<br>(+) | | 1 | 45 | ex | | For amount of use<br>For substance of use |
| Lonnstedt [40] | | | X | | (+) | ? | 92 | ? | s | | Positive for initiation and participation |
| Lucas [47] | | | X | | (n.s.) | 21 | 1 | ? | s | mv | |
| Maish [52] | | | X | | (n.s.) | 4 | | 62 | s | mv,cv | |
| Schewe [71] | | | X | | (n.s.) | 10 | | 79 | s | | |
| Swanson [76] | | | X | | (+) | 1 | 1 | 37 | s | | Demonstrates mediating influence of information satisfaction |
| Zaud [83] | | | X | | (n.s.) | | | 56 | s | mv | |
| Ference & Uretsky [19] | EDP Effectiveness | | | | (+) | 76 | | 76 | s | mv,lc | "apparent" positive relationship. |
| Igersheim [30] | (See Table 5) | | | | (+) | 5 | | 238 | s | mv | |
| Kaiser & Srinivasen [32] | Systems Staff<br>Group Process Skills<br>Top Management Support | | | | (n.s.)<br>(+)<br>(+) | 38 | | 102 | s | mv<br>mv<br>mv | |
| Lucas [45], (6 Company) | Computer Potential<br>Attitudes Towards Staff | | | | (+)<br>(n.s.) | 6 | | 683 | s | mv,lc<br>mv,lc | |
| Lucas [45], (Bay Area) | Computer Potential<br>Attitudes Towards Staff | | | | (+)<br>(n.s.) | 7 | | 616 | s | mv,lc<br>mv,lc | |
| Lucas [47] | Database Quality<br>Model Contribution<br>Computer Potential<br>User Interface | | | | (+)<br>(+)<br>(+)<br>(-) | | | | | | |
| Maish [52] | Attitudes Towards Staff | | | | (+) | 4 | | 62 | s | mv,lc | |
| Franz [20] | | X | | | (+) | 34 | 107 | 150 | s | mv | |
| Gallagher [22] | | X | | | (+) | 1 | 1 | 75 | s | mv | |
| Guthrie [26] | | X | | | (+) | | | 1991 | s | mv | Alternative interpretations of "felt-need" are possible. |
| Igersheim [30] | | X | | | (+) | 5 | | 238 | s | mv | |
| Kaiser & Srinivasen [32] | | X | | | (+) | 38 | | 102 | s | mv | |
| Lucas [47] | | X | | | (n.s.) | 21 | 1 | ? | s | mv | Negative corr. at p=.1 |
| Maish [52] | | X | | | (+) | 4 | | 62 | s | mv,lc | |
| Powers & Dickson [64] | | X<br>X<br>X | | | (+)<br>(n.s.)<br>(+) | 10 | 20 | ? | s | lc | Participation by operating mgmt.<br>Users on design teams<br>User Initiation |
| Sartore [70] | | X | | | (n.s.) | 7 | 1 | 111 | s | mv | Certain environmental variables were controlled for. |
| Spence [74] | | X | | | (n.s.) | 3 | | 125 | s | mv | |
| Swanson [2] | | X | | | (+) | 1 | 1 | 37 | s | mv | |

+ = positive at .05
− = negative at .05
n.s. = nonsignificant at .05

ex = experiment
s = survey

mv = possible method variance
lc = possible lack of correspondance
cv = possible confounding of variables