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UMI

THE INTERACTION BETWEEN END-USERS AND SYSTEMS ANALYSTS: THE EFFECTS OF END-USER/ANALYST CONFLICT ON PERCEIVED SYSTEM SUCCESS

Nadine Wilson

A Thesis

In

The Faculty

of

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ABSTRACT

The Interaction Between End-Users and Systems Analysts:

The Effects of End-User/Analyst Conflict on Perceived System Success

Nadine Wilson

This study investigates the interaction between end-users and systems analysts during end-user application development. It further investigates the effect that this interaction has on the success of the system development effort. The interaction between end-users and systems analysts is studied through some of its components namely, participation, involvement, influence, conflict and conflict resolution.

Data was collected from end-users and systems analysts who had recently participated in the development of an end-user application. Factor analysis was then used to identify the underlying factors that contribute to system success in an end-user computing environment. The underlying factors were then examined using regression analysis.

In addition to providing an overall understanding of some of the issues that are considered important to system success within an end-user computing environment, the analysis presented in this research indicates trends that should be examined for further research.

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INTRODUCTION

Considerable information systems research has been devoted to the examination of user participation and involvement and their importance to the systems development process and consequently to system success (Baronas and Louis, 1988; Doll and Torkzadeh, 1988, 1990; Ishman, 1996; Ives and Olson, 1984; Lu and Wang, 1997; Robey and Farrow, 1982; Yap et al, 1992). While user participation has been described as a requirement to the systems development process, there is still little empirical evidence to support it (Barki and Hartwick, 1989; Baroudi et al, 1986; Doll and Torkzadeh, 1989, 1990; Ives and Olson, 1984). Further, while end-user computing has become a prominent subject in information systems literature (Bostrom et al, 1990; Blili et al, 1998; Büyükkurt and Vass, 1993; Doll and Torkzadeh, 1988; Rivard and Huff, 1988; Simon et al, 1996), a review of the literature has indicated that there have been few attempts to ascertain whether or not the empirically supported theories pertaining to user participation and involvement applied to the traditional data processing environment approach are transferable to the end-user computing environment (Doll and Torkzadeh, 1988, 1990).

The main objective of this research is to examine whether or not end-user involvement, during the systems development process, affects systems success within an end-user computing environment. It is also the objective of this research to test the intermediary effects of user influence on user involvement, conflict and its resolution, the effects of user influence on conflict resolution and the effect of conflict resolution on systems success, all within the context of end-user computing[1].

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[1] A summary of the variables examined in this research (and their instruments) is presented in Appendix 1

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The first section of this research project presents an exhaustive literature review of the environment and variables used in this research. The second section describes the development of the model and the evolution of the definitions used in this research.

The third section details the research methodology and outlines the development of the instrument used in this research. The instrument is tested for validity and reliability, and factor analysis is used to assess any underlying constructs. The fourth section describes the data analysis of the research.

The conclusion of this project provides a summary of the findings and an overall perspective on the interaction between systems analysts and end-users within an end-user computing environment and the effect that this interaction has on perceived success.

LITERATURE REVIEW

End-User Computing

End-user computing has been defined as "the process of developing and maintaining any computer application which the end-user is directly involved with and responsible for, through some aspect of system development and which one uses on a frequent basis in the performance of one's job" (Büyükkurt and Vass, 1993). End-user computing has been distinguished from traditional data processing in that the end-user "interacts directly with application software and ... typically has a more direct influence on the determination of information needs and system objectives" (Doll and Torkzadeh, 1989). Additionally McKeen and Guimaraes (1997) state that "involvement in user-developed applications is a substantially different concept than involvement in traditional systems development". This could be because end-users have a more direct relationship with applications to the extent that they are able to utilize tools to develop their own applications or modifying existing ones. When presented with the opportunity to partake in the systems development process for an application, the end-user's expertise and knowledge of their function and their perceived capabilities of computerized applications make them invaluable to the systems development process.

The rapid development of end-user computing has subsequently led to the change in the role of both the end-users and the systems analysts in today's organization. Rockart and Flannery (1983) define six categories of end-users: non-programming end-users, command level users, end-user programmers, functional support personnel, end-user computing support personnel and data processing programmers. While these categories have been the basis of end-user definitions by numerous researchers (Büyükkurt and Vass, 1993; Doll and Torkzadeh, 1990; Palvia, 1996; Rivard and Huff, 1988), it is unclear as to whether the end-users within these categories are IS personnel or not. Wagner (1990) suggests that the literature on end-user computing is divided on

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this point. Rivard and Huff's research (1988) implies that end-users are non-information systems personnel and users. This is echoed in Doll and Torkzadeh's (1989) and Brancheau and Brown's (1993) research. Given the categories of Rockart and Flannery (1983) however, it is perceived that an end-user can indeed be an information systems personnel given that the definition of information systems personnel includes employees that are able to interact with software (from a command level – to programming code) to generate specific reports. The discrepancies of the definition of the end-user is tied to the fact that end-user computing is a constantly evolving environment – and the definition of end-user computing is itself a developing one (Wagner, 1990, Schiffman et al, 1992).

Doll and Torkzadeh (1988) state that within an end-user computing environment "end users are ... on their own to design, implement, modify and run their own applications". Within this context, the traditional role of systems analysts changes from one of active involvement such as liaising between users and programmers to one of less direct involvement such as offering assistance and experience to the development of the end-user application. Conversely, however, if end-user involvement is restricted to Torkzadeh and Doll's (1994) first two definitions of application development within the end-user context: that being developed by a systems analyst and that being developed by another end-user – then an end-user developing an application for a department may solicit the assistance of an analyst to determine the needs and desires of other end-users. This corresponds to more recent research in which Blili et al (1998) noted that "end-users exhibit different computing abilities ... some develop their own applications, while others use and operate end-user computing applications developed by other end-users". In either of these cases, the end-user may not necessarily have, or be qualified to have, an active role in the actual programming of the application, and the systems analyst still has an important role to play within the development of an end-user application , a point echoed in the research of Brancheau

and Brown (1993) and Govindarajulu and Reithel (1998). There is however still no consensus on the definition of end-user computing (Wagner, 1990).

Participation and Involvement

Several researchers have concluded that one of the main reasons for system failure is a lack of interaction between users and systems analysts. It is contended that effective communication behavior will enhance not only the user's ability to specify requirements but also the systems analyst's ability to elicit, interpret and evaluate the requirements specified (Bostrom, 1989; Joshi, 1992; Smith and McKeen, 1992).

Prior to Barki and Hartwick (1989), the terms "user participation" and "user involvement" were used interchangeably in MIS literature (Amoako-Gyampah and White, 1993; Doll and Torkzadeh, 1989; Ives et al, 1983; McKeen and Guimaraes, 1997; Tait and Vessey, 1988). Ives and Olson (1984) defined user involvement as that which "refers to participation in the system development process by representatives of the target user group". Within this definition, both user involvement and user participation were lauded as imperative antecedents to system success, or at the very least, a surrogate measure of system success (Baronas and Louis, 1988; Baroudi et al, 1986; Ives and Olson, 1984; Kim and Lee, 1986).

Within the marketing discipline Zaichkowsky (1985) defined involvement as "a perceived relevance of the object based on inherent needs, values and interests". Building on this definition, Barki and Hartwick (1989) proposed to separate the participation/involvement construct into two dimensions: participation and involvement. Participation, according to the new construct refers "to the assignments, activities and behaviors that users ... perform during the systems development process", whereas involvement refers to a "subjective psychological state reflecting the importance and personal relevance that a user attaches to a system".

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The concept of psychological influences pertaining to involvement was not a new one to MIS literature. Baronas and Louis (1988) discussed the desire for control as "a psychological mechanism underlying user involvement". It was contended that the implementation stage of a computer based information system brought about a feeling of a lack of control over a user's work environment – and this feeling of a lack of control triggers a desire for control as the introduction of the new system threatens existing control. Baronas and Louis (1988) further cite user involvement as that which can "enhance or restore a user's perception of control ... which is hypothesized to contribute to system success". Further illustrating the tendency to link a user's psychological state with the user's involvement Kim and Lee (1986), while measuring user participation and its effects on management information systems use, designed an instrument to measure "users perception and behavior with relation to both the organizational system function and the individual system". An additional instance linking user involvement with psychological issues is encountered in Tait and Vessey's (1988) research which examines the effect of user involvement on system success. Tait and Vessey (1988) contended that user involvement is influenced by user attitudes which follows the definitions of Rokeach (1968) which states that user attitude is "an organization of interrelated beliefs around a common focus". Additionally, Tait and Vessey (1988) included Allport's (1935) definition of attitudes as being "a state of readiness that exerts influence over ones actions". Although Tait and Vessey (1988) used Olson and Ives' (1981) definition of involvement as "...participation in development...", the connection between the activities surrounding system development and the psychological aspects associated with those activities was evident.

It was not only the influence of the psychological factors on user participation / involvement however that prompted Barki and Hartwick (1989) to divide the construct into two separate constructs. There was also a lack of theoretical and empirical evidence linking user participation /

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involvement to system success (Barki and Hartwick, 1989; Baroudi et al, 1986; Doll and

Torkzadeh, 1989, 1990; Ives and Olson, 1984). Management information systems literature had

attributed user participation / involvement as an antecedent to system success by providing

accurate requirements (Doll and Torkzadeh, 1990; Ives and Olson, 1984; Robey and Farrow,

1982; Yap et al, 1992), improving on the quality of design (Doll and Torkzadeh, 1989; Ives and

Olson, 1984; Robey and Farrow, 1982) and reducing unrealistic expectations (Ives and Olson,

1984; Yap et al, 1992). Additionally, user participation / involvement was also found to improve

user understanding of the system (Doll and Torkzadeh, 1989; Ives and Olson, 1984; Robey and

Farrow, 1982), generate greater acceptance and support of the system (Doll and Torkzadeh, 1989;

Robey and Farrow, 1982) and prevent system failures that are unacceptable to users (Ives and

Olson, 1984; Robey and Farrow, 1992).

While these positive features were attributed to the inclusion of user participation / involvement

to the system development process, which ultimately contributed to system success, several

researchers conceded that there were no strong theoretical or empirical research results to support

this principle (Barki and Hartwick, 1989; Baroudi et al, 1986; Doll and Torkzadeh, 1989, 1990;

Ives and Olson, 1984). A renewed interest developed to clarify and explain the inconsistencies in

previous research and has resulted in "a refinement of the definitions of user participation and

user involvement" (Hunton and Price, 1997).

By redefining the participation and involvement constructs, Barki and Hartwick (1989) aligned

the information systems definition of the involvement construct with other disciplines. In

addition, breaking the participation / involvement construct apart was intended to force

researchers into a careful definition of the variables being examined, not only within their

research, but also with the measurements being used. It was hypothesized that with clearer

definitions, results of research examining the role of participation and project and/or system

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success may be more conclusive than previously obtained. Despite this however, when examining the current involvement and participation literature, there still seems to be a difficulty in conceptualizing involvement without some form of activity. Clinging to Barki and Harwick's (1989, 1994a, 1994b) distinction between participation and involvement, Amoako-Gyampah and White's (1997) research examines the psychological perceptions of the user while using the terms involvement and participation interchangeably. Hunton and Beeler (1997), also while describing Barki and Hartwick's (1989, 1994a, 1994b) distinction between participation and involvement proceed to include Barki and Hartwick's (1994a, 1994b) measurement of involvement with the intention of examining the effects of user participation in systems development.

Within the end-user context, Doll and Torkzadeh (1989) initially defined end-user involvement as "the extent to which the user engages in system analysis activities". Refining their definition to include the consideration of a "variety of involvement situations in the end-user context", Doll and Torkzadeh (1990) defined end-user involvement as "the extent to which the user participates in systems development". This definition was further expanded so that end-user involvement was regarded as "the extent to which the user engages in ... system development activities" Torkzadeh and Doll (1994).

Working within Barki and Hartick's (1989) participation and involvement criterion, Ishman (1996) summarized the link between user involvement and user satisfaction (as a surrogate measure of success) by stating that "user satisfaction refers to the positive affective orientation that an individual has towards an information system or how good they feel about it ... and ... user involvement is subjective in nature and reflects the degree to which the user perceives the system to be personally important to them".

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While Zaichkowsky (1986) acknowledges the lack of a "precise" definition for the term "involvement", there is also an awareness of the "underlying theme focusing on personal relevance" when examining involvement. Scanning across several disciplines, Zaichkowsky (1986) concludes that within different domains of research, "some parallelism is found between involvement and personal relevance". This parallelism prompts the transfer of possible results of involvement as discussed in Zaichkowsky (1986) from within the framework of the marketing field to the framework of end-user computing. By examining the entire end-user computing process, rather than just the end-user product (as suggested by Büyükkurt and Vass, 1993) and incorporating Zaichkowsky's (1986) conceptualization of involvement, the possible impacts of end-user involvement may be observed on the elicitation of counter arguments, the level of influence of the end-user and the effectiveness of the end-user requested options.

Conflict and Conflict Resolution

A large extent of the interaction between end-users and systems analysts occurs during the system development process. When defined as "a process in which one party perceives that it's interests are being opposed by another party" (Wall and Callister, 1995), conflict emits a negative influence on communication and interaction. McKeen and Guimaraes (1997) cite occasions where "user participation in systems development became an invitation for open warfare". The connotation of the word "conflict" emits negative images however, Wall and Callister (1995) state that conflict can be controlled and harnessed to improve group efficiency and productivity, stimulate creativity, enhance the quality of decisions, challenge old ideas and develop a faster awareness of the latest problems. This is the concept behind Barki and Hartwick (1994b), Robey and Farrow (1982), Robey et al (1989), Robey et al (1993) and Wall and Callister (1995).

Because end-users often develop their own applications, and depend on systems analysts for support – support is an area within the application development environment that conflict may

arise. Studies have begun to emerge that examine support within the end-user computing context (Govindarajulu and Reithel, 1998; Lundgren, 1998; Speier and Brown, 1997) and it has been noted that "by its nature end-user support involves conflict" (Lundgren, 1998).

Robey and Farrow (1982) developed a conflict model that explored the relationships between user participation, user influence, conflict and conflict resolution. Robey and Farrow (1982) and Robey et al (1989) both concluded that user participation led to conflict if it was accompanied by user influence. They also concluded that user participation and user influence were "positively associated with conflict resolution". The model was further examined when project success was added as a dependent variable (Robey et al, 1993). Robey et al (1993) concluded that "participation's effect on project success was stronger when first converted to influence which then generates both conflict and its resolution". Barki and Hartwick (1994b) also examined user participation, conflict and conflict resolution and the mediating role of influence and found that conflict resolution was only correlated by influence.

Research to date has been focused on conflict and conflict resolution based on user participation within a traditional data processing environment. Within the end-user computing environment however, the relationship between user involvement, conflict and conflict resolution has not yet been investigated.

Influence

Influence has been defined as "the extent to which members affect decisions related to the final design of an information system" and refers to the extent to which "a members suggestions are considered and adopted by the group", Robey et al (1993). Within the participation / involvement literature, influence is regarded as a consequence of user participation (Barki and Hartwick,

1994b) and its existence in the system development process is assured only by the presence of user participation (McKeen et al, 1994).

Edström (1977) concluded that influence from both users and the information systems staff is needed for system project to succeed. Dividing the system development process into phases, Edström (1977) noted that the importance of influence and its effect on system success shifts from one group to another as the application development proceeds through the different phases. McKeen et al (1994), in their investigation of user influence as it affected the relationship between user participation and user satisfaction, concluded that although user influence was satisfying, it did not necessarily have an effect on the relationship between user participation and user satisfaction.

Robey and Farrow's (1982) study of influence as a mediating variable between user participation, conflict and conflict resolution reached a similar conclusion to that of Edström (1977) who had concluded that user participation, which resulted in influence, affected conflict and that this effect changed across the phases of the systems development life cycle. Further, Robey and Farrow (1982) found that "conflict and its resolution are more likely to occur when users can exercise their influence in the development process". While the mediating role of influence has been examined in the context of the traditional data processing environment, it has yet to be examined within the context of end-user computing.

System Success and End-User Computing Success

While a "comprehensive instrument for success does not yet exist" (McHaney and Cronan, 1998), DeLone and McLean (1992) provide a comprehensive review of the different information system success measures. Their research uncovered six distinct categories (or aspects) of information

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systems that were used either singularly or in combination to measure system success: system quality, information quality, use, user satisfaction, individual impact and organizational impact.

Among these measures of information systems success, user satisfaction has frequently been used as a surrogate measure of system success both within the traditional data processing system context (Amoako-Gyampah and White, 1997; Bailey and Pearson, 1983; Baronas and Louis, 1988; Baroudi et al, 1986; Barki and Huff, 1990; Drury and Farmoohand, 1998; Ein-Dor and Segev, 1978; Guimaraes et al, 1996; Hawk and Aldag, 1990; Ives et al, 1983; Kappelman, 1995; Lu and Wang, 1997; Montezemi, 1988; Olson and Ives, 1981, 1982; Raymond, 1985, 1987; Roth and Bartholme, 1994; Saarinen, 1996; Soh et al, 1992; Tait and Vessey, 1988; Yap et al, 1992; Zmud, 1979) and within the end-user computing context (Blili et al, 1998; Büyükkurt and Vass, 1993; Doll and Torkzadeh, 1988, 1989, 1990; Igbaria, 1990; Igbaria and Nachman, 1990; Lawrence and Low, 1993; Palvia, 1996; Rivard and Huff, 1988; Simon et al, 1996; Shayo et al, 1999, Torkzadeh and Doll, 1994).

The Bailey and Pearson (1983) instrument is the pivotal point in information systems literature regarding user satisfaction measurement. Ives et al (1983) replicated the study and discarded several factors to produce a shorter, more refined instrument. By modifying the Bailey and Pearson instrument (1983), Baroudi et al (1986) devised an instrument that not only measured user satisfaction but system usage and user involvement as well. Although the Bailey and Pearson (1983) instrument as modified by Ives et al (1983) has been used extensively as a basis of using user satisfaction as a surrogate measure of system success, it was geared towards a traditional data processing environment (Doll and Torkzadeh, 1988; Shayo et al, 1999).

As the distinction between end-user computing and traditional data processing became more apparent, reflections on the differences between user information satisfaction and end-user

computing information satisfaction increased. The process of evaluating end-user satisfaction emerged as a triad of factors: the information product (focusing on the quality of output), information system department staff and service (including the attitude of the information system department staff and the relationship between the information system department staff and the end-user) and end-user computing involvement in the development of the application (Igbaria and Nachman, 1990).

Doll and Torkzadeh (1988) formulated a 12-item instrument based on an extensive review of literature and recommended that this instrument be utilized to evaluate end-user applications, as it "not only provided an over-all assessment but also can be used to compare specific components across applications". Although Doll and Torkzadeh's (1988) instrument has been used by Igbaria (1990) and Simon et al (1996), it does not seem to be the definitive instrument for measuring end-user computing success. The instrument of Ives et al (1983) has also been used to measure end-user computing success (Blili et al, 1998). Additionally Büyükkurt and Vass (1993) developed an end-user computing satisfaction instrument that combines factors from the work of Bailey and Pearson (1983), Bergeron and Bérubé (1988), Igbaria and Nachman (1990), Ives et al (1983), Raymond (1987); Rivard and Huff (1988) and Vijayaraman and Ramakrishna (1990).

MODEL DEVELOPMENT

The hybrid model proposed extrapolates models and definitions from several streams of management information systems literature.

Robey and Farrow's (1982) model of conflict was developed to explore the relationships between user participation, influence, conflict and conflict resolution. This model was later expanded (Robey et al, 1993) to examine the effects of user participation, influence, conflict and conflict resolution on project success.

Robey and Farrow (1982) cite Deutches (1969) concept of constructive conflict as the basis of the Conflict Model where it is defined as that which is "undertaken to solve complex problems where multiple criteria for success exist and where members possess incompatible goals ... helping in the prevention of domination and stagnation, ... raising problems and encouraging their solution (by) stimulating interest and curiosity ... and underlying creativity and innovation" (Robey and Farrow, 1982). Stemming from the hypotheses that

(i)   user participation positively affects influence,

(ii)   user participation positively affects conflict,

(iii)   user participation positively affects conflict resolution,

(iv)   influence positively affects conflict,

(v)   influence positively affects conflict resolution, and

(vi)   conflict negatively affects conflict resolution

Robey and Farrow (1982) found that "influence results from user participation and that influence leads to both conflict and conflict resolution". Participation, without influence, however was found not to have an effect on conflict resolution. It was observed that user participation did

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affect conflict, however the effect changed across the phases. Results indicated from negligible to a small positive relationship among the phases when examining the effect of participation on conflict and in regards to the effect of participation on conflict resolution, there was a negative relationship. However, when the total effect of participation on both conflict and conflict resolution was examined, stronger effects were found and therefore the hypotheses pertaining to participation and conflict and conflict resolution were deemed correct by Robey and Farrow (1982).

Figure 1 shows the hypothesized Model of Conflict.
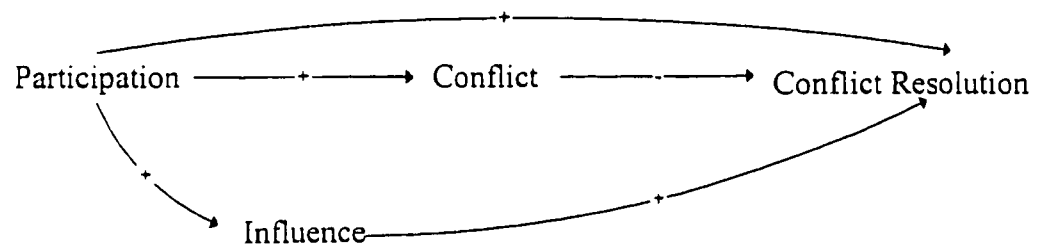
Figure 1: Hypothesized Conflict Model (Robey and Farrow, 1982)

The Conflict Model (Robey and Farrow, 1982) was further tested by Robey et al (1989) where definitions for the four variables were provided. Participation was defined as "the extent to which members of an organization are engaged in activities related to system development". Influence was defined as "the extent to which members affect decisions related to the final design of an Information System". Conflict was defined as "manifest disagreement among group members" and conflict resolution was defined as "the extent to which such disagreements are replaced by argument and consensus".

Coupled with the weak results of the earlier study (Robey and Farrow, 1982) and the results of the research undergone in Robey et al (1989), in which there were time period inconsistencies

Robey et al (1989) revised their model to exclude both the relationship between participation and conflict and the relationship between participation and conflict resolution. The revised model is depicted in figure 2.
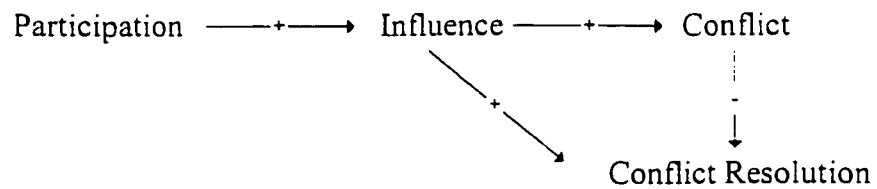
Figure 2: Revised Model of Conflict (Robey et al, 1989)

Furthering the research on the revised Conflict Model (Robey et al, 1989), Robey et al (1993) extended the model to include project success (as shown in figure 3) where the definitions for the variables remained as defined in Robey et al (1989).
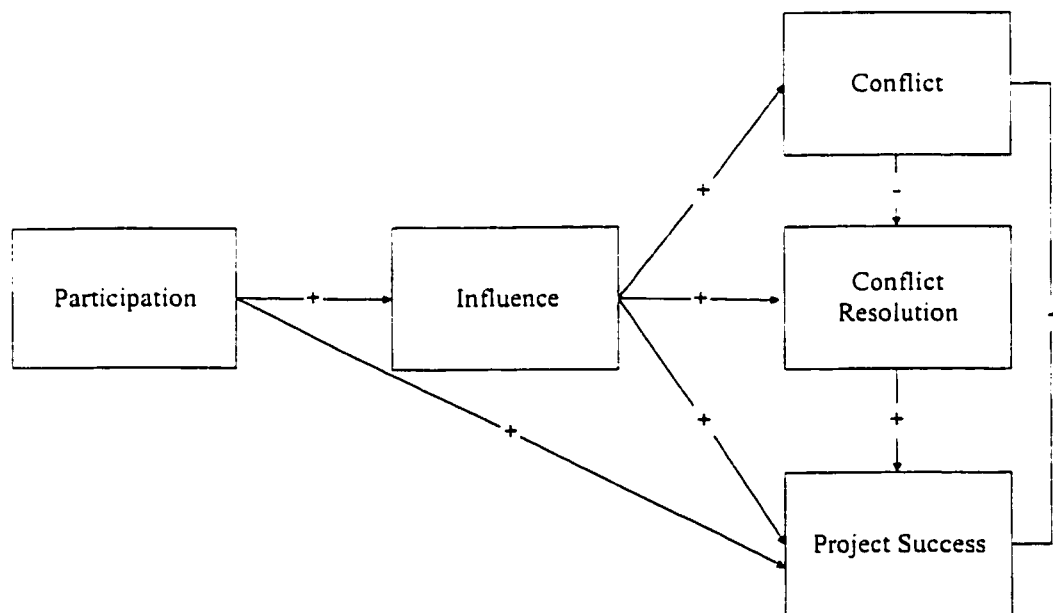
Figure 3: Hypothesized Model of Conflict (Robey et al, 1993)

The additional variable, project success, was defined as "the extent to which the project team is productive in its task and effective in its interaction with non-team members... including the team's compliance with budgets and schedules" (Robey et al, 1993).

It was hypothesized that

(i)   participation is positively associated with influence

(ii)   influence is positively associated with conflict

(iii) influence is positively associated with conflict resolution

(iv)   conflict is negatively associated with conflict resolution

(v)   conflict is negatively associated with project success

(vi)   participation is positively associated with project success

(vii) influence is positively associated with project success

(viii) conflict resolution is positively associated with project success.

Although the relationship between participation and conflict was re-examined, and their Model 2 indicated the possibility of participation having a direct influence on conflict, Robey et al (1993) concluded that there was no correlation between the two variables. Further, there was no evidence that supported the hypothesis that influence is positively associated to project success and therefore it was dropped from the model. It should be noted that the population sampled contained very few users, and as Robey et al (1993) concede, this may have attributed to any weak relationships found in their research. Figure 4 shows the Model of Conflict as concluded in Robey et al (1993).
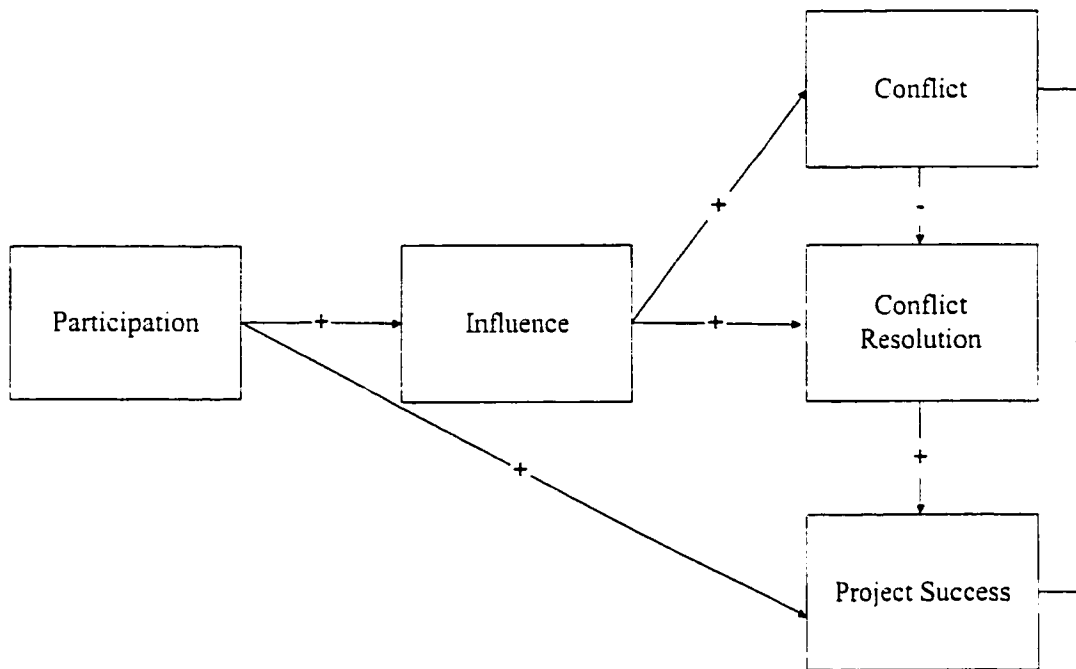
Figure 4: Confirmed Model of Conflict (Robey et al, 1993)

Following the revised Conflict Model of Robey et al (1989), Barki and Hartwick (1994b) sought to re-examine the relationship between (1) participation and conflict and (2) participation and influence, given their model of participation developed in Hartwick and Barki (1994a).

Barki and Hartwick (1989) defined the distinction between participation and involvement - which basically stated that participation pertained to observable behaviors, activities and assignments that users perform during information system development process whereas involvement referred to a subjective psychological state that reflects the users belief that a system is both important and personally relevant (Barki and Hartwick, 1989). This distinction lays down the foundation of the Participation Model developed in Barki and Hartwick (1994a).

Barki and Hartwick (1994a) identified three dimensions of participation stemming from the definition developed in Barki and Hartwick (1989): User/IS Relationship, Responsibility and Hands-on Activities. Hartwick and Barki (1994) developed the Participation Model and defined

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the User/IS Relationship as "development activities reflecting user-IS communication and influence" where development activities replaced participation activities in the earlier definition of Barki and Hartwick (1994a). Responsibilities were defined as "user activities and assignments reflecting overall leadership or accountability for the system development project" and Hands-on-Activities were defined as "specific physical design and implementation tasks performed by users" where systems development activities as defined in Barki and Hartwick (1994a) were specified.

The Participation Model depicted in Figure 5 shows the three dimensions with bi-directional arrows that are meant to indicate Hartwick and Barki's (1994) precept that while User/IS Relationship, Responsibilities and Hands-On-Activities are conceptually distinct, they are empirically related.

Overall Responsibility ⟷ User/IS Relationship ⟷ Hands-On Activity
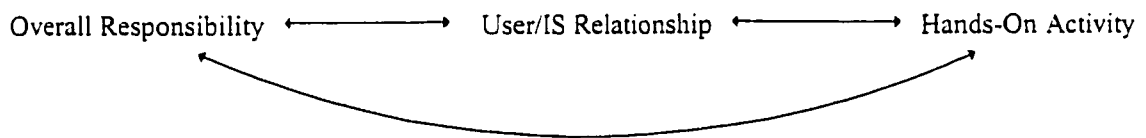
Figure 5: Participation Model (Hartwick and Barki, 1994)

Using their Participation Model, Barki and Hartwick (1994b) re-examined Robey et al's (1989) revised Conflict Model in an attempt to re-examine the role of user participation and how it affects conflict. Barki and Hartwick (1994b) disagreed with the elimination of the relationship of participation to conflict for several reasons. It was argued that increased contact during participation "provides an occasion for the expression of conflicts of a more personal nature" to occur. It was also argued that this increased contact would also serve to "heighten the awareness and importance of differences among the parties". It is for these reasons that Barki and Hartwick (1994b) contend that the relationship between participation and conflict be re-established.

On conducting their data analysis, Barki and Hartwick (1994b) also decided to replace the

conflict construct with two constructs: disagreement *and* conflict citing links to conflict literature

as further motive. Barki and Hartwick (1994b) deferred to modify the Conflict Model of Robey

et al (1989) based on their research (shown in figure 6) to include their participation dimensions

and their decision to redefine the conflict construct.

The model examined in Barki and Hartwick (1994b), shown in Figure 6, therefore reflected four

modifications to the Conflict Model of Robey et al (1989).

1. User participation encompasses the three dimensions of participation as defined in

   Barki and Hartwick (1994a)

2. The relationship between user participation and conflict was re-established

3. The single conflict construct was replaced by two constructs: disagreement and

   conflict where it was hypothesized that influence leads to disagreement which in turn

   leads to conflict.

4. The wording of "conflict resolution " was replaced by "satisfactory conflict

   resolution".
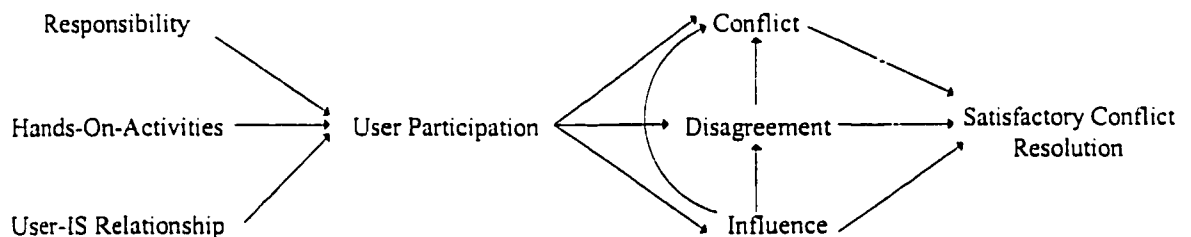
Figure 6: Hypothesized Model of Conflict (Barki and Hartwick, 1994b)

In addition, Barki and Hartwick (1994b) redefined one of the three dimensions of participation

where the User/IS Relationship is now referred to as "the communication, evaluation and

approval activities, which take place between users and I.S. staff". This differs from the original definition in that development activities are replaced by communication, evaluation and approval activities, and influence is not deemed as having any form of control on these activities.

The results of the research conducted by Barki and Hartwick (1994b) provide several differences to the Conflict Model of Robey et al (1989, 1993). There was no evidence to support the hypothesis that influence had a positive association with conflict, unless it was mediated by the new construct of conflict: disagreement. Further, Barki and Hartwick (1994b) also found a positive direct path from User Participation to Conflict. This model is depicted in Figure 7.
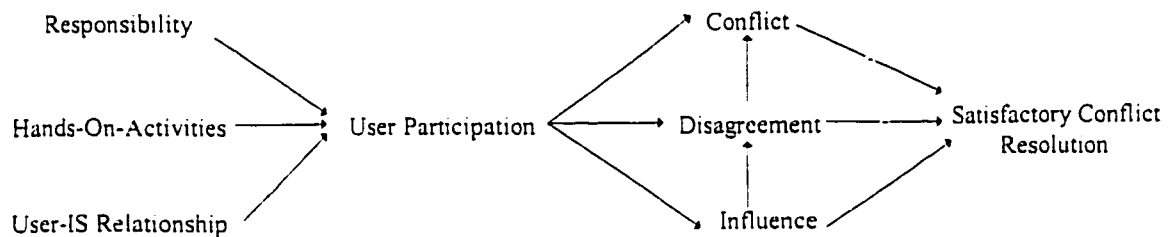
Figure 7: Concluded Model of Conflict (Barki and Hartwick, 1994b)

This difference was hypothesized by Barki and Hartwick (1994b) to have occurred due to the revision made to the conflict construct and the differences in the measure of user participation.

The Proposed Model

Barki and Hartwick (1989, 1994a, 1994b), Hartwick and Barki (1994) , Robey and Farrow (1982), Robey et al (1989) and Robey et al (1993) all examine the effects that various constructs of participation, influence, conflict and conflict resolution have on each other. This research proposes to replicate many of the associations between the variables and replace Robey et al's (1993) project success by system success.

The research model also proposes to investigate the interaction between end-users and systems analysts and the effects of end-user/analyst conflict on perceived system success. The model is designed to test whether or not end-user involvement, during the systems development process affects systems success within an end-user-computing environment. The model also investigates the intermediary effects of user influence and conflict and its resolution, the effects of user influence on conflict resolution and the effect of conflict resolution on system success. End-user satisfaction is used as surrogate measure of system success as recognized by information systems literature (Bailey and Pearson, 1983; Büyükkurt and Vass, 1993; Doll and Torkzadeh, 1988; Ives et al, 1983; Raymond, 1987; Rivard and Huff, 1988) and is the dependent variable. Involvement, participation, influence, conflict and conflict resolution are the independent variables of this study. The term "involvement" is treated as "the psychological state reflecting the users belief that a system is both important and personally relevant" (Barki and Hartwick, 1989) and participation is defined as "the extent to which end-users are engaged in activities related to system development" (Robey et al, 1989; Robey et al, 1993). Influence is defined as "the extent to which end-users affect decisions related to the final design of an Information System" (Robey et al, 1989; Robey et al, 1993). Conflict is defined as the "manifest disagreement among group members" (Robey et al, 1989; Robey et al, 1993) where group members, in this study, are regarded as being end-users and/or systems analysts. Conflict resolution is defined as "the extent to which such disagreements are replaced by argument and consensus" (Robey et al, 1989; Robey et al, 1993).

The model describing the relationships between the variables is depicted in figure 8 with the direction of the arrows showing the causal ordering among the six variables.
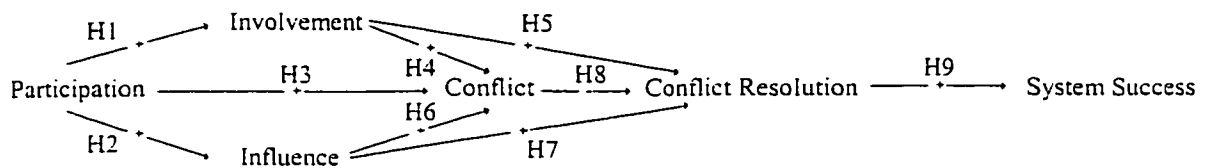
Figure 8: Hypothesized Model

The proposed relationships between the variables are hypothesized as follows:

H1 - End-user Participation is positively associated with End-user Involvement

> It is hypothesized that the more an end-user actively partakes in activities pertaining to system development, the more the end-user perceives the systems relevance and importance. Barki and Hartwick (1994a), using their definitions of participation and involvement, found that "users who participate in the development process were likely to develop beliefs that a new system is good, important and personally relevant". This finding indicates that the more a user participates in the application development process, the more involved a user will become. This research seeks to investigate the effect that end-user participation has on end-user involvement within the end-user computing environment rather than within the traditional data processing environment.

H2 - End-user Participation is positively associated with Influence

> The more an end-user participates in the analysis process, the more influence an end-user has over the development of the end-user application. The relationship between participation and influence has been investigated by Robey et al (1989), Robey et al (1993) and Barki and Hartwick (1994b) within the traditional data processing environment and found to be significant. This research seeks to investigate whether the relationship between participation and influence within an end-user computing environment is also significant.

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H3 – End-user Participation is positively associated with Conflict

The more participation an end-user has in the development process of an end-user application, the more there is potential for conflict to occur between the end-user and the systems analyst. Robey et al (1989) and Robey et al (1993) found that the effect of user participation on conflict was mediated by influence. However, Barki and Hartwick (1994b) indicated that user participation did affect conflict, and that the more a user participated in the application development process, the more conflict was experienced during the processes. This research seeks to examine the direct effect that end-user participation has on conflict within an end-user computing environment (rather than within a traditional data processing environment).

H4 – End-User Involvement is positively associated with Conflict

The more involvement an end-user has in the development process of an end-user application, the more there is potential for conflict to occur between the end-user and the systems analyst. Because involvement includes personal attitudes and beliefs pertaining to the activities surrounding the development of the end-user application, it stands to follow that disagreements may be regarded as an attack on ones person. An end-users defence, or stance, therefore may be regarded somewhat as "defending ones honour" and will be more aggressive than the defence of a topic to which there is no emotional attachment. Robey et al (1989), Robey et al (1993) and Barki and Hartwick (1994b) examined participation and its effect on conflict; however, none of them investigated the role of end-user involvement and its possible effects on conflict.

H5 – End-user Involvement is positively associated with Conflict Resolution

The more an end-user is involved in the development of an end-user application, the more there is potential for conflict resolution. If the emotional attachment to the application development is strong, then the end-user has more to gain by resolving the conflict rather than leaving it unresolved. An end-user, because of their strong attachment

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to the application development may actually demand that the issue be resolved rather than left unresolved. This may lead either to satisfactory or unsatisfactory conflict resolution. Robey et al (1989), Robey et al (1993) and Barki and Hartwick (1994b) examined participation and its effects on conflict resolution, however, none of them investigated the role of end-user involvement and its possible effects on conflict resolution.

H6 – Influence is positively associated with Conflict

It is hypothesized that end-users participating in the systems development process may exert influence when interacting with analysts and other end-users which may lead to conflict. Robey and Farrow (1982), Robey et al (1989) and Robey et al (1993) found that influence affected conflict in that the more influence was exercised during the application development process, the more conflict was experienced during the process. Barki and Hartwick (1994b) found that influence affected conflict if it were mediated by disagreement. Further, Barki and Hartwick (1994b) found that there was no mediating effects of disagreement and if a user had more influence, then there would be less conflict. The mediating role of influence on conflict has not yet been investigated within the end-user computing environment.

H7 – Influence is positively associated with Conflict Resolution

While end-users exerting influence during the systems development process may lead to conflict, it is hypothesized that this influence may also lead to conflict resolution, (Barki and Hartwick (1994b)). The mediating role of influence on conflict resolution has not yet been investigated within the end-user computing environment.

H8 – Conflict is negatively associated to Conflict Resolution

The more conflict there is between the end-user and the systems analyst during end-user application development, the less likely it is that conflict will be resolved. Robey and Farrow (1982), Robey et al (1989) and Robey et al (1993) found that conflict has a

negative effect on conflict resolution. It was noted that "while conflict may be beneficial for surfacing and resolving disagreements, a larger number of conflicts may overload the project member's ability to resolve them" (Robey et al, 1993). Barki and Hartwick (1994b) however, found that conflict resolution was only affected by influence. This research seeks to investigate the effect that conflict has on conflict resolution within the end-user computing environment.

H9 – Conflict Resolution is positively associated to System Success

Conflict, if not resolved, may lead to a breakdown in communication within the group, which may prove to be unfavorable to system success. An increase in the level of conflict resolution will result in an increase in system success. Robey et al (1993) examined the effect of participation, influence, conflict and conflict resolution on project success. Differing from system success in that project success was defined as "the extent to which the project team is productive and effective in its interaction with non-team members" (Robey et al, 1993), conflict resolution was found to be positively associated with project success. Robey et al (1993) measured project success with questions "reflecting standard concerns associated with the efficiency and quality of project work as well as the effectiveness of interactions with people outside the team". This research uses user satisfaction as the surrogate measure of system success and seeks to investigate the effect that conflict resolution has on system success within the end-user computing environment.

RESEARCH DESIGN

Instrument Development

Development of the instrument comprised of a thorough examination of existing instruments that

measured, in whole, or in part, the participation, involvement, influence, conflict, conflict

resolution, and end-user computing success variables.

Although Barki and Hartwick (1989, 1994a, 1994b) provided the basis of the proposed model a

modified version of Torkzadeh and Doll's (1994) instrument was used to measure participation

and involvement. This was due partly because the Torkzadeh and Doll (1994) eight (8) item

instrument compared perceived actual activities and the desired activities thus measuring

participation and involvement within the same framework. The instrument of Barki and Hartwick

(1994b) measured three separate constructs of participation: responsibility, hands-on activities

and user/IS relationship. These constructs were not part of the proposed model. Further, the

Barki and Hartwick (1994b) instrument did not include a separate measurement for involvement.

While Hartwick and Barki (1994) did include a separate measurement for involvement, it was

decided to use a single instrument to measure both participation and involvement rather than two

separate instruments.

The influence, conflict and conflict resolution measurements used in Barki and Hartwick (1994b)

are those developed in Robey et al (1989). The system success measurements were derived from

Büyükkurt and Vass's (1993) instrument adapted items from Bailey and Pearson (1983) and

Torkzadeh and Doll (1988).

The question items for specific variables which were extracted from established instruments is

indicated in appendix 2.

The instrument emerged as one questionnaire with sections designated to either all respondents, systems analysts only or end-users only. Divided into four sections, the instrument provided not only extensive instructions on how to complete this questionnaire but also descriptions of intended respondents.

Instructions were printed on the first page of the questionnaire and placed within a box to increase visibility. Examples were provided with detailed information regarding the interpretation of the answers. The research title was at the top of the page in a bold font set.

The first section was designed to establish the type of end-user and measure participation and conflict resolution. The second section (intended for end-users only) measured involvement, influence, conflict, conflict resolution and system success whereas the third section (intended for systems analysts only) measured involvement, influence, conflict and conflict resolution.

The fourth section, intended for all respondents, collected demographic information.

Pretest and Revisions

Many of the original instruments used measured variables within a different context or environment. Because of this, and the fact that it is necessary to report on the reliability and validity of the data (Emory and Cooper, 1991), a pre-test was performed on the proposed instrument.

The instrument was pre-tested for content validity by eight individuals from four different organizations before the instrument was finalized. In the pretest, the instrument was modified progressively as improvements were identified. During the pretest the following issues were indicated:

- The questionnaire was too long

- The application types in the demographic section needed expansion

- Words such as "requirement and "opinions" may be interpreted differently.

- Some questions were difficult to understand

- One format was preferred over the other

In response to the issues raised in the pretest, a number of significant changes to the instrument were made both during and at the end of the pretest period. The instrument was also divided into two instruments - one for systems analysts and the other for end-users so that the instrument was shorter. The preferred format was used and the application types in the demographic section were expanded to include DSS tools and client-server applications. The wording of the questions were carefully restructured so as to eliminate the interpretation problems identified.

In order to facilitate a higher response rate several steps were taken:

- Cover letters were personalized. The letters were addressed to specific personnel and were signed by hand (Berdie et al, 1986; de Vaus, 1985; Emery & Cooper, 1991),

- Confidentiality was assured both in the cover letter and on the questionnaire itself. Anonymity however, was not assured since each questionnaire was numbered to facilitate follow-ups to non-respondents (Berdie et al, 1986; Emery & Cooper, 1991; Mangione, 1995),

- Letters were printed on high-quality Concordia University letterhead to indicate research sponsorship and reflect professionalism (deVaus, 1985; Mangione, 1995),

- Questionnaires were off-set printed to facilitate the reproduction of an original design, give a professional impression and enhance the importance of the survey from the respondents point of view (Dillman, 1978),

- The last page of the questionnaire provided space to the respondent for additional comments regarding the subject or the instrument itself (Dillman, 1978),

- To hasten the response, prospective respondents were requested to return their responses by a particular date (Berdie et al, 1986; Emery & Cooper, 1991; Mangione, 1995),

- Questionnaires to systems analysts were printed in green ink on white paper whereas questionnaires to end-users were black ink on white paper to increase appeal (Berdie et al, 1986) and to differentiate one from the other.

- Questionnaires were printed as a booklet with smaller pages to make the questionnaires themselves seem shorter than they really were (Dillman, 1978),

- Stamped self-addressed envelopes (rather than business reply postage) envelopes were provided to prospective respondents (Berdie et al, 1986; deVaus, 1985; Mangione, 1995),

- The return address was printed on each questionnaire in case it was separated from the stamped self-addressed envelope. This address did not include the name of the researcher, but rather was addressed to "End-User Computing Survey". This was done in order to have the respondent view the researcher as an intermediary between the respondent and the accomplishment of the research objective (Dillman, 1978),

- The addressee was offered a summary of the study as a form of motivation, and as a way to increase the response rate (Berdie et al, 1986; Dillman, 1978; Mangione, 1995),

- The cover letter explained the importance of the study (Berdie et al 1986; de Vaus, 1985; Dillman, 1978; Emery & Cooper, 1991),

- The questionnaires were sent in 9 x 11 Concordia University envelopes to immediately indicate the study sponsorship to prospective respondents (Berdie et al, 1986; Emery & Cooper, 1991; Mangione, 1995).

Cover letters (appendices 3 and 4) accompanied the questionnaires (appendices 5, 6, 7 and 8) in the mailing. In Quebec, both the English and French versions of the cover letters and questionnaires were supplied to prospective respondents whereas only English versions were supplied to respondents in the rest of Canada.

The instrument was originally developed in English and translated by a professional translator into French. The French version was then examined by a committee member who is fluently bilingual. Changes were made to reflect industry specific terminology. The French version was then re-examined against the English version by an information technology professional who was also fluently bilingual. Changes were made to the French version to improve readability and compatibility with the English version of the questionnaire. The revised French version was then examined by a professional translator who works within the information technology industry. Changes were made to the grammatical structure of the sentences and phrases in the questionnaire.

Two weeks after the first mailing, telephone calls were made to the respondents reminding them to forward the questionnaire to the appropriate personnel within their organization (see appendix 9 for a copy of the script). Additionally, three weeks after the first mailing, a reminder card was sent to those persons who had not yet responded (see appendix 10 for English and French versions of the reminder card). E-mail was also used to respond to those persons who contacted the researcher with questions.

<u>Sampling</u>

A main association within the information technology industry that boasted a membership of a wide cross-section of information technology professionals throughout Canada was contacted regarding access to their membership list. They suggested that the questionnaire be posted on the Internet and their members be invited to participate via their monthly newsletter. Because of the lack of direct interaction with the membership of this association, it was decided to contact Dun and Bradstreet so that a direct mailing could be obtained.

The target profile provided to Dun and Bradstreet was all industries (excluding public schools) throughout Canada with 50 or more employees. Dun and Bradstreet randomly selected 1000 prospective companies out of a possible 13,000 that fit the target profile. Of the 1000 prospective companies, 750 were randomly selected to participate in the research.

Dun and Bradstreet provided a list of prospective respondents from the functional areas of operations, administration, finance and data processing. Because of the high turnover rate of information technology departments, Dun and Bradstreet could not provide the names of personnel within the information technology or management information systems departments. In response to the limitation imposed by Dun and Bradstreet, the cover letter requested that the questionnaires be forwarded to personnel within the information technology department.

A total of 1100 questionnaires were sent to Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland, Nova Scotia, Northwest Territories, Ontario, Prince Edward Island, Saskatchewan, and Yukon (550 were for systems analysts and 550 were for end-users) and 400 questionnaires were sent within Quebec (200 were for systems analysts and 200 were for end-users). All questionnaires sent had a pre-addressed, stamped envelope enclosed.

Measurement of Variables and Coding

The questionnaire was coded using a 7-point Likert scale with 1 indicating the desirable attribute and 7 the undesirable attributes. An 8 indicated non-applicability and a 0 indicated non-response.

Section II, concerning personal and demographic information, was coded both with scales and an open-ended option to the scale allowing respondents the freedom to provide alternative responses for most questions.

The instrument-coding directory (appendix 11) was compiled to clarify each data element and possible corresponding values. The hypothesized factors and the associated scales are described in appendix 12.

Seven-point semantic scales bound by bipolar adjectives (e.g. sufficient ... insufficient) were used in the instrument and were designed specifically to measure the variables (i.e. participation, involvement, influence, conflict, conflict, conflict resolution and system success). The scales used were "extremely", "very", "slightly", and "neither/nor". An additional scale of "does not apply" was also used.

The bipolar adjectives were previously used in the literature. This was done to ensure scale validity. Details of the various instruments that utilized these adjectives are found in appendix 13. The systems analysts' instrument contained forty-one (41) independent variables and the end-user instrument contained seventy-five (75) independent variables, which theoretically, would be indicators of the underlying factor constructs influencing system success. The instrument was designed so that there were multiple items for the same construct which is "more desirable than one item for one construct" (Goodhue, 1998).

Participation and involvement were measured using five (5) out of eight (8) items contained in Torkzadeh and Doll's (1994) instrument. In keeping with the definition of participation used in this research, items referring to actual activities performed by the respondent were measured as constructs of participation. Items referring to attitudes towards the activities performed were measured as constructs of involvement. To maintain a uniform format throughout the instrument, the Torkzadeh and Doll (1994) instrument was modified to consider bipolar adjective responses.

Influence, conflict and conflict resolution was measured using Robey et al's (1989) instrument. The items were slightly reworded to accommodate the bipolar 7-point Likert scale. The Robey et al (1989) instrument was also used by Barki and Hartwick (1994).

System success was measured by the surrogate measure of end-user satisfaction. The instrument developed by Büyükkurt and Vass (1993) was used. This instrument includes items adapted from Bailey and Pearson (1983) and Torkzadeh and Doll (1988).

DATA ANALYSIS

Description of the Respondents

As previously stated, a total of seven-hundred-and-fifty (750) letters were sent out, each

containing two questionnaires (one for systems analysts and one for end-users) and self-addressed

envelopes for each questionnaire. Twenty-seven (27) were returned because they were sent to the

wrong address and thirty-five (35) were returned because the organizations indicated that the

research was not applicable to them. In addition, when making the initial reminder calls, twenty-

three (23) companies also indicated their non-applicability to the research. This brought the total

sample size to six-hundred-and-sixty-five (665). A total of eighty-seven responses were received,

fifty-three responses (53) were received from systems analysts and thirty-seven (37) responses

were received from end-users. Three (3) questionnaires were discarded (two (2) from systems

analysts and one (1) from an end-user) because they had too many missing values. This yielded a

response rate of 7.9% and 5.5% respectively. The low sample size limits this research to being

exploratory.

The low response rates may be attributed to several factors. Primarily, because the questionnaires

were sent to the heads of finance, administration and operations departments, rather than to the

information systems technology departments, the target prospective respondents were not

contacted directly. Because of the extra step required to get the questionnaires to the target

prospective respondents – many questionnaires may have been lost in the internal forwarding

process. This implies that the questionnaires may not have reached the target prospective

respondents. Further, if the questionnaires were received by the target prospective respondents,

the cover letter may not have been forwarded, the importance and relevance of the survey may

not have been conveyed and this may have contributed to the non-response level. Additionally,

frustration over not having been contacted directly may have prompted non-response from the target prospective respondents.

Secondly, the response time given to target prospective respondents was relatively short (one month). Thirdly, during the pre-test, it took the respondents an average of twenty (20) minutes to complete the questionnaire. Because this is a significant amount of time, the survey may have been discarded.

The eighty-six (86) respondents were, on average forty-one (41) years old (with a standard deviation of 8.5). Sixty-seven percent (67%) were men and thirty-three percent (33%) were women. Table 1 presents a breakdown of the persons who participated in the research by respondent type (either end-user or systems analyst).

Gender N=87			Respondent Type		
			End-User	Systems Analyst	Total
Male	Age Group	Below 31		10.3%	10.3%
		31 - 35	3.4%	8.6%	12.1%
		36 - 40	8.6%	20.7%	29.3%
		41- 45	5.2%	12.1%	17.2%
		45 - 50	8.6%	6.9%	15.5%
		Over 50	8.6%	6.9%	15.5%
	Total		34.5%	65.5%	100.0%
Female	Age Group	Below 31	10.7%	3.6%	14.3%
		31 - 35	7.1%	7.1%	14.3%
		36 - 40	17.9%	7.1%	25.0%
		41- 45	10.7%	21.4%	32.1%
		45 - 50	7.1%	7.1%	14.3%
	Total		53.6%	46.4%	100.0%

Table 1: General demographic information of respondents (% of totals)

A more in-depth analysis of the respondents shows that the most common level of education was a bachelors degree, forty percent (40%) of all end-users and forty-nine percent (49%) of all systems analysts (table 2). The average working experience (table 3) was between six (6) to ten

(10) years with very few respondents having less than two years of work experience (1.2%), and a

large percentage (24%) having over fifteen (15) years of experience.

| | | Respondent Type | | |
		End-User	Systems Analyst	Total
Educational Level	High-school or less	4.8%	6.0%	10.7%
	CEGEP or equivalent	6.0%	3.6%	9.5%
	University Certificate	3.6%	9.5%	13.1%
	Bachelors degree	16.7%	28.6%	45.2%
	Incomplete Masters		4.8%	4.8%
	Complete Masters	9.5%	3.6%	13.1%
	Incomplete Ph.D.	1.2%	1.2%	2.4%
	Complete Ph.D.		1.2%	1.2%
Total		41.7%	58.3%	100.0%

Table 2: Educational levels of respondents (% of totals)

| | | Respondent Type | | |
		End-User	Systems Analyst	Total
Experience Level	Less than 2 years		1.2%	1.2%
	2 - 5 years	9.8%	13.4%	23.2%
	6 - 10 years	15.9%	15.9%	31.7%
	11 - 15 years	3.7%	15.9%	19.5%
	Over 15 years	12.2%	12.2%	24.4%
Total		41.5%	58.5%	100.0%

Table 3: Experience levels of respondents (% of totals)

Respondents came from a variety of companies; 26% of which were manufacturing 16% were

educational institutions. The 36% "Others" belonged to industries such as transportation and

shipping, information technology, distribution, construction and professional services. Table 4

presents a breakdown of the industries of respondents (both end-users and systems analysts) and

the size of the companies. On further examination of table 4, it appears that 27.6% of the grouped

responses were from companies with between fifty and one-hundred-and-fifty (50–150)

employees, 25.3% of the grouped responses were from companies with between one-hundred-and

–fifty one and five hundred (151-500) employees, 18.4% of the grouped responses were from

companies with between five-hundred-and-one and one thousand (501-1000) employees, 20.7%

of the grouped responses were from companies between one-thousand-and-one and five thousand

(1001 and 5000) and 8% from companies with over five thousand (5000) employees.

		Primary Business								
		Manufacturing	Merchandizing	Public Sector	Health Care	Insurance	Educational	Financial Services	Other	Total
Number of employees	50 - 150	9.2%	1.1%	1.1%	2.3%	1.1%	2.3%		10.3%	27.6%
	151-500	5.7%	2.3%	1.1%		2.3%	3.4%	1.1%	9.2%	25.3%
	501 - 1000	4.6%		1.1%		1.1%	3.4%	1.1%	6.9%	16.4%
	1001 - 5000	3.4%		1.1%	1.1%		5.7%		9.2%	20.7%
	over 5000	3.4%			1.1%	1.1%	1.1%		1.1%	8.0%
Total		26.4%	3.4%	4.6%	4.6%	5.7%	18.1%	2.3%	36.8%	100.0%

Table 4: Combined respondent information on companies that participated (% of total business types)

Further analysis shows that while the majority of systems analysts were employed within the

information systems/technology department (50.6%), end-users were employed within several

different departments (table 5). Additionally, database applications (34.5%) and client server

applications (23%) were the end-user computing application projects reported on most. Other

end-user computing applications reported on were SAP management systems and management

accounting systems and were part of the 24.1% "Other" category (table 6).

		Respondent Type		
		End-User	Systems Analyst	Total
Functional Area	Accounting	9.2%	1.1%	10.3%
	Manufacturing/Production	3.4%		3.4%
	Research and Development	1.1%		1.1%
	Finance	4.6%	1.1%	5.7%
	Information Systems/Technology	4.6%	50.6%	55.2%
	Marketing	1.1%		1.1%
	Sales	3.4%		3.4%
	General Management	8.0%	1.1%	9.2%
	Engineering	1.1%	3.4%	4.6%
	Other	4.6%	1.1%	5.7%
Total		41.4%	58.6%	100.0%

Table 5: Functional area of respondents (% of total)

		Respondent Type		
		End-User	Systems Analyst	Total
End-user Application	Spreadsheet	3.4%	3.4%	6.9%
	Database Application	14.9%	19.5%	34.5%
	Communications	1.1%	1.1%	2.3%
	Graphics (Technical Design)	1.1%		1.1%
	Web-Based Applications	3.4%	1.1%	4.6%
	DSS tools	1.1%	2.3%	3.4%
	Client Server Applications	9.2%	13.8%	23.0%
	Other	6.9%	17.2%	24.1%
Total		41.4%	58.6%	100.0%

Table 6: Reported end-user computing applications (% of total)

Treatment of Data

Data often has to be treated or "cleaned" to manage the missing values and process the "does not apply" responses. Data may have been omitted accidentally (i.e. the respondent simply misses a question) or intentionally (i.e. the respondent may not understand the question and leaves it empty, or the respondent may simply decide not to answer that particular question).

There are several methods of handling missing data, two of which were used in this research. One procedure for handling missing values is to remove the cases that contain the missing values. This procedure is "a good alternative if only a few cases have missing data" (Tabachnick and Fidell, 1989) and is the preferred method of handling missing values (Anderson et al, 1983; Norusis, 1998; Tabachnick and Fidell, 1989). Another procedure is to estimate the missing observations and then proceed with the statistical analysis as if it had been complete (Anderson et al, 1983; Tabachnick and Fidell, 1989). The means are calculated from available data and used to replace missing values prior to analysis (Tabachnick and Fidell, 1989). While the estimation procedure is a conservative one in that the mean for the distribution as a whole does not change, the variance of the variable is reduced because the mean is closer to itself than to the missing

value it replaces. The implication of this is that the correlation that this variable may have with other variables is reduced (because of the reduction in overall variance). The extent of the loss in the variance depends on the amount of missing data (Tabachnick and Fidell, 1989).

The low response rate made the deletion strategy of dealing with missing values an unattractive one in this research as we wanted to keep as many cases as possible. The missing values were random (i.e. there was no pattern) and there was a very low percentage of missing values within the complete data set (0.04% for systems analysts and 0.01% for end-users).

The estimation strategy was used on the data set that potentially contained information on the variables. Missing observations within a particular case was estimated by the mean *of the group's* (i.e. the means for data within the systems analysts and end-users groups were calculated separately) non-missing observations for that variable.

Preparing the Data for Factor Analysis

Factor analysis is a multivariate statistical technique that is used to analyse the internal structure of a set of variables to identify any underlying constructs (called factors). This basically means that variables can be grouped by their correlations and that these variables should have relatively small correlations with other variables. Each group of variables may represent a single underlying construct, or factor that is responsible for the observed correlations. Factor analysis can therefore be used to summarise the data and to identify relationships among variables.

Factor analysis requires that particular rules concerning sample size and missing data are adhered to. Additionally normality, linearity, multicollinearity of the data and the factorability of the correlation matrix should be addressed prior to conducting factor analysis.

Sample size and missing data:

Correlation coefficients are less reliable when estimated from small samples. There should also be at least five cases for each observed variable (Tabachnick and Fidell, 1989). The low response rate of this research and the high number of initial variables does not lend well to this limitation of factor analysis. However, a correlation matrix will be created, and those variables that have a correlation of less than 0.30 will be eliminated (Tabachnick and Fidell, 1989). For the cases with missing data, either the missing values must be estimated or the cases deleted.

A correlation matrix was created for each factor: participation, involvement, influence, conflict, conflict resolution and system success. Data concerning system success was gathered only from end-users, and therefore system success had to be analyzed separately. Because the instruments for both the systems analysts and end-users were otherwise similar, they were combined to develop the correlation matrix for each variable.

Table 7 presents the reliability measures for each factor (appendix 14 presents the correlation matrices calculated for each factor and the final correlation once the variables with a correlation of less than 0.30 were removed).

Tabachnick and Fidell (1989) note that a sample size of fifty (50) may be adequate if there are strong, reliable correlations and a few distinct factors. The number of variables (for all but system success, which had to be correlated separately) was decreased from forty-five (45) to nineteen (19). Although a total of eighty-seven (87) cases were included in the analysis with nineteen (19) variables represents only 4.5 cases per variable – because this is an exploratory study, it was decided to proceed.

Factor	Scale	Scale Description	Corrected item-total correlation	Cronbach's Alpha
Participation				.9687
	Q12DE22	Participation in development: interest level	.7316	
	Q12DE23	Participation in development: importance	.7773	
	Q12DE24	Participation in development: usefulness	.7606	
	Q12DE25	Participation in development: desirability	.7536	
Involvement				.8640
	Q13DE26	Others understanding of alternatives: level	.6029	
	Q13DE27	Others understanding of alternatives: sufficiency	.6001	
	Q15DE30	Design consultation: level	.6087	
	Q15DE31	Design consultation: sufficiency	.6587	
Influence				.8170
	Q18DE34	Reliance on others: significance	.4032	
	Q19DE35	Others influence on owns tasks: level	.6668	
	Q19DE36	Others influence on owns tasks: significance	.6637	
Conflict				.9477
	Q22DE39	Relevance of others argument defence	.8429	
	Q22DE40	Value of others argument defence	.7865	
	Q23DE41	Others perception of relevance of defence	.8350	
	Q23DE42	Others perception of value of defence	.8229	
Conflict Resolution				.9132
	Q10DE19	Resolution of differences: frequency	.7446	
	Q10DE20	Resolution of differences: satisfaction	.8062	
	Q11DE21	Satisfaction of resolution: level	.7834	
System Success				.9358
	Q26DE46	EUC application characteristic: ease	.6065	
	Q26DE48	EUC application characteristic: speed	.5539	
	Q26DE49	EUC application characteristic: reliability	.6763	
	Q30DE56	Technical support: competency	.5393	
	Q30DE57	Technical support: availability	.4946	
	Q30DE58	Technical support: cooperativeness	.5112	
	Q33DE66	Output: usefulness	.6130	
	Q33DE67	Output: relevance	.6159	
	Q33DE68	Output: completeness	.6685	
	Q33DE69	Output: flexibility	.6146	

Table 7: Reliability measures

Normality:

"Multivariate normality is the assumption that each variable and all linear combinations of

variables are normally distributed – if there is normality, then the residuals are normally and

independently distributed" (Tabachnick and Fidell, 1989). The coefficient of normality measures

"the symmetry of the distribution where a skewed variable indicates that the mean is not in the centre of the distribution" (Tabachnick and Fidell, 1989). A normal distribution would have a skewness of zero, whereas a positive skewness indicates a high distribution of cases to the left of the mean and the tail is too long to the right. A negative skewness indicates a high distribution of cases to the right and the tail is too long to the left. Kurtosis indicates whether a distribution is peaked (too few cases in the tails) or flat (too many cases in the tails) (Tabachnick and Fidell, 1989).

The skewness and kurtosis values of the variables used indicate a slightly positive skewness for the participation, involvement, influence, conflict and conflict resolution variables. There is a much higher level of positive skewness for the system success variable. Appendices 15 – 20 presents the calculations of skewness and kurtosis, and the distribution of skewness. Because the skewness in the data is slight, and the fact that this research is exploratory, it was decided to continue with the analysis.

Linearity

Tabachnick and Fidell (1989) state that the assumption of multivariate normality implies that there is linearity between all pairs of variables. The linearity of variables can be examined by inspecting bivariate scatterplots where an oval shaped scatterplot/scattergraph indicates normally distributed and linearly related variables. If one of the variables is non-normal, then the scatterplot/scattergraph between the variables is not oval.

A careful examination of the scatterplots/scattergraphs of variables (appendix 21) indicates that there is linearity among some of the variables, but not among all of the variables. Because this is exploratory research, it was decided to continue with the analysis.

Multicollinearity:

Tabachnick and Fidell (1989) state that in order to estimate factor scores, multicollinearity cannot exist. Multicollinearity occurs when the variables are very highly correlated at 0.90 and above. On examination of Table 7, there was no such condition detected.

Factorability of R (Correlation Matrix):

Tests to determine the factorability of the correlation matrix (R) include Bartlett's test of sphericity and the Keiser-Meyer-Olkin measure of sampling adequacy. Additionally, the anti-image correlation matrix and the percentage of distinct correlations in the reproduced correlation matrix should be examined.

Tabachnick and Fidell (1989) state that "a matrix that is factorable should include several sizeable correlations ... and that ... if there is no correlation exceeding 0.30, then the use of factor analysis is questionable because there is probably nothing to group into factors". When determining whether the data was suitable for factor analysis, a correlation matrix was created. All variables with a correlation below 0.30 (Tabachnick and Fidell, 1989) were removed.

Based on the preliminary tests on the suitability of data, Bartlett's test of sphericity and the Keiser-Meyer-Olkin measure of sampling adequacy were performed on the data. Because the instrument provided to systems analysts did not include a measurement of system success, tests on the system success variable had to be performed separately.

Tabachnick and Fidell (1989) state that Bartlett's test of sphericity is significant with samples of substantial size even if the correlations are very low. Because of this, the test is recommended only if there are fewer than five cases per variable – which is the case in this research.

The Keiser-Meyer-Olkin measure of sampling adequacy measures the extent to which the variables belong together and the appropriateness of using factor analysis to examine the data. Tabachnick and Fidell (1989) state that the Kaiser-Meyer-Olkin measure is "a ratio of the sum of squared correlations to the sum of squared correlations plus the sum of squared partial relations ... where values of 0.60 and higher are required for a good factor analysis".

The results of Bartlett's test of sphericity (table 8 and table 9) indicate that the variables are dependent on each other. The low significance level supports the use of factor analysis. Further, the Kaiser-Meyer-Olkin measure of sampling adequacy was calculated to be 0.691 for participation, involvement, influence, conflict and conflict resolution and 0.821 for system success. Both of these results also support the use of factor analysis.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.691
Bartlett's Test of Sphericity	Approx. Chi-Square	1659.082
	df	153
	Sig.	.000

Table 8: Results of the KMO and Bartlett's Test for participation, involvement, influence, conflict and conflict resolution

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.821
Bartlett's Test of Sphericity	Approx. Chi-Square	511.973
	df	45
	Sig.	.000

Table 9: Results of the KMO and Bartlett's Test for system success

Adequacy of the factor model was also examined using the anti-image correlation matrix. The anti-image correlation matrix contains the negatives of partial correlations between pairs of

variables with the effects of other variables removed. This means that the anti-image of a variable is what cannot be predicted from other variables. A low proportion of high values (or conversely, a high proportion of low values) on the off-diagonal elements indicate the applicability of factor analysis.

On examination of the data created by the anti-image correlation matrix for participation, involvement, influence, conflict and conflict resolution (appendix 22), it is clear that some of the variables have a measure of sampling adequacy less than 0.7. Only 7.8% of the coefficients below the diagonal were greater than 0.40 and 61.4% of the coefficients were below 0.10. The anti-image correlation matrix for system success (appendix 23) indicated that none of the variables has a measure of sampling adequacy of less than 0.697. Further, 20.0% of the coefficients below the diagonal were greater than 0.40 and 24.4% of the coefficients were below 0.10.

The reproduced correlation matrix for the participation, involvement, influence, conflict and conflict resolution variables (appendix 24) indicated that there are 11.0% non-redundant residuals with absolute values that are less than 0.05. The reproduced correlation matrix for the system success variables (appendix 25) indicated that there are 28.0% non-redundant residuals with absolute values that are less than 0.05 indicating a difference between the estimated and observed correlations between the variables. This is possibly due to the extremely small sample size.

Bartlett's test of sphericity, the Keiser-Meyer-Olkin MSA, the anti-image correlation matrix and the percentage of distinct correlations in the reproduced correlation matrix all indicate that factor analysis is appropriate, on an exploratory level, to examine the relationship between the participation, involvement, influence, conflict, conflict resolution and system success variables.

Factor Analysis of the Data

The principal axis factoring method of extraction was used to analyze the data. The goal of the analysis is to "extract maximum orthogonal variance from the data set with each succeeding factor" (Tabachnick and Fidell, 1989). An examination of the commonalties and the initial eigenvalues indicates how well the identified factors fit the data obtained from all of the records on any given variable. Any factor with an eigenvalue (table 10 and table 11) of less than one should be discarded.

A scree test of eigenvalues plotted against the factors was also performed. The scree plot is always decreasing negatively where " the eigenvalue is highest for the first factor and moderate but decreasing for the next few factors before reaching small values for the last several factors" (Tabachnick and Fidell, 1989).

Figure 9 indicates that when examining the participation, involvement, influence, conflict and conflict resolution variables, where there is a sharp drop after the fifth factor which indicates that are five factors: participation, involvement, influence, conflict and conflict resolution. This is consistent with the eigenvalues calculated in table 10.
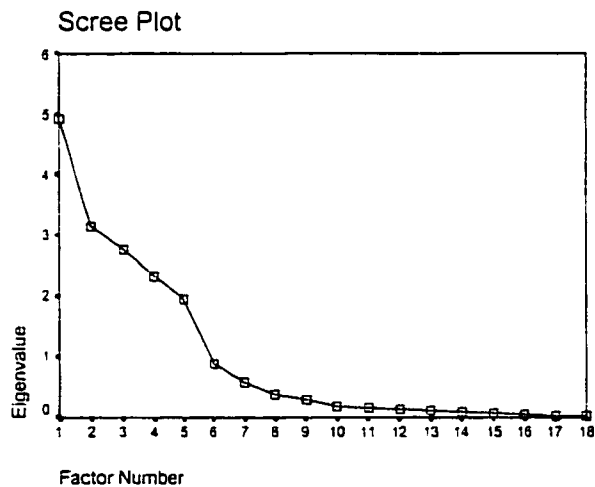
Figure 9: Scree plot for participation, involvement, influence, conflict and conflict resolution (plot of eigenvalues)

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Total Variance Explained

Factor	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.913	27.295	27.295	3.602	20.010	20.010
2	3.140	17.442	44.736	3.361	18.672	38.682
3	2.758	15.322	60.059	2.532	14.065	52.746
4	2.312	12.846	72.904	2.482	13.790	66.536
5	1.951	10.840	83.745	2.126	11.810	78.346
6	.873	4.847	88.592			
7	.574	3.189	91.781			
8	.366	2.035	93.816			
9	.288	1.598	95.414			
10	.181	1.005	96.419			
11	.153	.850	97.269			
12	.134	.743	98.012			
13	.106	.588	98.600			
14	8.640E-02	.480	99.080			
15	6.399E-02	.355	99.435			
16	4.351E-02	.242	99.677			
17	3.289E-02	.183	99.860			
18	2.523E-02	.140	100.000			

Extraction Method: Principal Axis Factoring.

Table 10: Eigenvalues of participation, involvement, influence, conflict and conflict resolution

Each eigenvalue corresponds to a different potential factor, and only factors with large eigenvalues (i.e. over 1.00) are retained for further analysis. Table 10 shows statistics for each factor before and after the components are extracted. The percentage of total variance accounted for by all factors is 83.75%. The first factor, participation, accounts for 27.3% of the variance, the second factor, conflict, accounts for 17.4%, the third factor, involvement, accounts for 15.3% of the variance, the fourth factor, conflict resolution, accounts for 12.8% of the variance and the fifth factor, influence, accounts for 10.8% of the variance.

Büyükkurt and Vass (1993), when describing factors contributing to satisfaction with the end-user computing process identified seven factors: technical support, end-user computing product, user training, timeliness, documentation, end-user application characteristics, and user participation. Figure 10 indicates that within this research, when examining the system success variable, there are only two factors: end-user application characteristics and technical support.

This is also consistent with the initial eigenvalues calculated in table 11. The percentage of total

variance accounted for both factors is 85.1%. Factor 1, end-user application characteristics,

accounts for 65.1% of the variance while factor 2, technical support, accounts for 20.0% of the

variance.
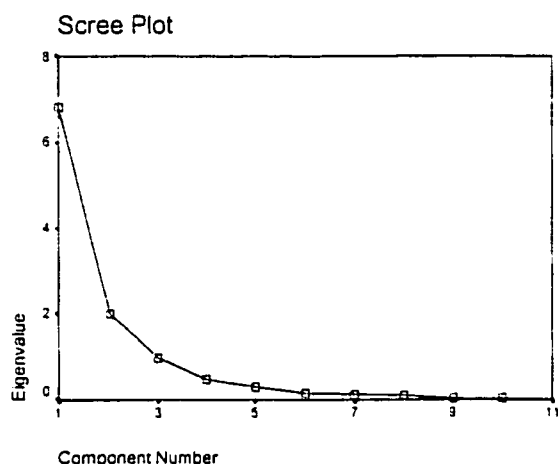
Scree Plot

Figure 10: Scree plot for system success (plot of eigenvalues)

Total Variance Explained

Factor	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulativ e %	Total	% of Variance	Cumulativ e %
1	6.510	65.103	65.103	5.150	51.499	51.499
2	2.002	20.024	85.127	3.107	31.072	82.571
3	.711	7.107	92.234			
4	.304	3.035	95.270			
5	.180	1.799	97.068			
6	.130	1.295	98.363			
7	8.241E-02	.824	99.188			
8	4.004E-02	.400	99.588			
9	3.237E-02	.324	99.912			
10	8.834E-03	8.834E-02	100.000			

Extraction Method: Principal Axis Factoring.

Table 11: Eigenvalues for system success

The rotated fitted structure using the principal axis factoring varimax criterion was then employed

to improve the interpretability of the information. Varimax rotation is one of four orthogonal

rotation techniques, which is used to facilitate the interpretation, description and reporting of results. The goal of varimax rotation is to maximize the variance of factor loadings by making high loadings higher and low loadings lower for each factor. Emphasizing the differences in the loadings facilitates the interpretation of factors by making the variables that correlate with a factor more distinct. The size of each factor loading is a reflection of the extent of the relationship between each observed variable and each factor (Tabachnick and Fidell, 1989).

The factor loadings for the participation, involvement, influence, conflict and conflict resolution variables are presented in table 12. There are no variables with a factor loading of 0.30, which indicates that there are no variables that need to be removed.

Rotated Factor Matrix[a]

	Factor				
	Participation (1)	Conflict (2)	Involvement (3)	Conflict Resolution (4)	Influence (6)
Q12DE22 (Participation in development: interest)	**.884**	6.858E-02	2.273E-02	4.180E-02	5.826E-02
Q12DE23 (Participation in development: importance)	**.978**	9.101E-02	3.745E-02	6.981E-02	-9.54E-04
Q12DE24 (Participation in development: usefulness)	**.967**	.109	4.511E-02	5.755E-02	3.184E-02
Q12DE25 (Participation in development: desirability)	**.911**	.130	3.868E-02	2.116E-02	-2.05E-02
Q13DE26 (Alternative understanding: level)	9.758E-02	-3.39E-02	**.795**	-7.135E-02	.186
Q13DE27 (Alternative understanding: sufficiency)	-8.109E-03	7.197E-02	**.754**	1.967E-02	7.588E-02
Q15DE30 (Design Consultation: level)	4.138E-03	.197	**.746**	.287	-4.78E-02
Q15DE31 (Design Consultation: sufficiency)	4.298E-02	.105	**.832**	.166	-7.78E-02
Q18DE34 (Influence: reliance significance)	.161	-.162	4.117E-02	.175	**.429**
Q19DE35 (Influence of others: level)	-4.078E-02	-5.17E-02	.109	-.150	**.960**
Q19DE36 (Influence of others: significance)	-5.804E-02	5.579E-02	-4.992E-03	-2.684E-02	**.967**
Q22DE39 (Conflict: others defence: relevance)	.114	**.936**	4.470E-02	6.854E-02	-.112
Q22DE40 (Conflict: others defence: value)	9.342E-02	**.848**	7.622E-02	3.163E-02	-3.52E-02
Q23DE41 (Conflict: defence: perceived relevance)	9.402E-02	**.906**	9.443E-02	9.735E-02	-4.78E-02
Q23DE42 (Conflict: defence: perceived value)	9.261E-02	**.885**	.119	.126	1.908E-02
Q10DE19 (Resolution: frequency)	.123	.146	5.879E-02	**.825**	.104
Q10DE20 (Resolution: satisfaction)	3.753E-02	9.251E-02	.109	**.897**	-4.57E-02
Q11DE21 (Resolution: satisfaction level)	-3.034E-04	4.272E-02	.130	**.887**	-6.05E-02

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization.
   a. Rotation converged in 6 iterations.

Table 12: Varimax rotated factor matrix for participation, involvement, influence, conflict and conflict resolution.

The factor loadings for the system success scales are presented in table 13. Analysis confirms that there are two separate factors within the system success variable. End-user application characteristics pertain to the ease of use, speed of operations and reliability of the application as well as the usefulness, relevance, completeness and flexibility of the output. Technical support pertains to the competence, availability and cooperativeness of the technical support received for the end-user application.

Rotated Factor Matrix[a]

	Factor	
	End-user Application Characteristics (1)	Technical Support (2)
Q26DE46 (Application: ease of use)	.794	.229
Q26DE48 (Application: speed)	.641	.306
Q26DE49 (Application: reliability)	.774	.391
Q30DE56 (Technical Support: competence)	.265	.943
Q30DE57 (Technical Support: availability)	.191	.946
Q30DE58 (Technical Support: cooperativeness)	.229	.942
Q33DE66 (Output: usefulness)	.942	.120
Q33DE67 (Output: revelance)	.944	.126
Q33DE68 (Output: completeness)	.899	.282
Q33DE69 (Output: flexibility)	.873	.174

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Table 13: Varimax rotated factor matrix for system success

There are no variables with a factor loading of below 0.30 (Tabachnick and Fidell, 1989) which means that the factor analysis can now proceed.

RESULTS

Regression analysis can only be used with the end-user group since it is only the end-user group that contains information on the dependent variable, system success. The results of the regression model can only be regarded as exploratory because of the small sample size. For more general results, a larger sample size is required.

Tabachnick and Fidell (1989) state that a ratio of 20 cases to one independent variable is favorable, however, a "bare minimum requirement is to have at least 5 times more cases than independent variables, with a higher cases to independent variable ratio being needed when the dependent variable is skewed".

With 36 end-user responses and five independent variables (participation, involvement, influence, conflict and conflict resolution), the ratio is slightly better than the bare minimum required to conduct regression analysis. In this case, however, the items within the dependent variable (system success) are slightly skewed (appendix 20), and therefore it would have been preferable to have a higher case to independent variable ratio.

Regression analysis should indicate the proportion of variation of overall satisfaction (dependent variable: surrogate measure of system success) that is accounted for by participation, involvement, influence, conflict and conflict resolution (the independent variables). The standardized coefficient alpha, an additional result of regression analysis, measures the relative importance of a particular independent variable on the dependent variable and is unaffected by units of measurement.

In this research, regression analysis was performed with aggregate data, rather than the factorized constructs. The reason for this was that none of the results using the factorized data proved significant.

The result of the regression analysis (table 14) implies that there is no relationship between the independent variables and overall satisfaction (dependent variable). The squared multiple regression indicates that participation, involvement, influence, conflict and conflict resolution explains only 4.6% of the variability of system success. Further, on examination of the analysis of variance (ANOVA) (table 15), the f statistic is 0.286 and the level of significance is much greater than 0.05. The small size of the F statistic indicates that the independent variables do not explain the variation of the dependent variable. Table 16 (indicating the coefficients) also indicates that there are no relative importance of the independent variables to the dependent variable (the standardized coefficient beta's are small: participation=-0.011, involvement=0.089, influence = 0.103, conflict=-0.131, conflict resolution=0.123).

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.213ª	.046	-.114	.93	.046	.286	5	30	.917

a. Predictors: (Constant), Conflict Resolution, Influence, Conflict, Participation, Involvement

Table 14: Regression analysis results of participation, involvement, influence, conflict and conflict resolution and the effects on the dependent variable, overall satisfaction (surrogate measure for system success)

ANOVAᵇ

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.228	5	.246	.286	.917ª
	Residual	25.744	30	.858		
	Total	26.972	35			

a. Predictors: (Constant), Conflict Resolution, Influence, Conflict, Participation, Involvement

b. Dependent Variable: Overall satisfaction

Table 15: Analysis of variance for system success

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Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.703	.511		3.333	.002
	Participation	-5.09E-03	.094	-.011	-.054	.957
	Involvement	5.289E-02	.126	.089	.418	.679
	Influence	5.667E-02	.100	.103	.565	.576
	Conflict	-5.12E-02	.081	-.131	-.633	.532
	Conflict Resolution	5.843E-02	.097	.123	.605	.550

a. Dependent Variable: Overall satisfaction

Table 16: Coefficients from the regression of participation, involvement, influence, conflict and conflict resolution on overall satisfaction

Because of the small sample size, the proposed model was broken down into a series of models

for the purpose of performing regression analysis on each model series and attempting to find

relationships between the variables using the entire data set. This means however, that several

hypotheses need to be modified to reflect the change in methodology (i.e. that end-users are no

longer the object of the hypotheses, and that the results pertain to results acquired from both end-

users and systems analysts). The modified hypotheses are as follows:

H1B - Participation is positively associated with involvement.

It is hypothesized that the more one actively partakes in activities pertaining to end-user

application development, the more one perceives the systems relevance and importance.

H2B – Participation is positively associated with Influence

The more one participates in the analysis process, the more influence one has over the

development of the end-user application.

H3B – Participation is positively associated with Conflict

The more participation one has in the development process of an end-user application, the

more there is potential for conflict to occur between the end-user and the systems analyst.

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H4B – Involvement is positively associated with Conflict

The more involvement one has in the development process of an end-user application, the

more there is the potential for conflict to occur between the end-user and the systems

analyst.

H5B – Involvement is positively associated with Conflict Resolution

The more one is involved in the development of an end-user application, the more there is

potential for conflict resolution.

The first part of the model (figure 11) presents conflict as the dependent variable and

involvement, participation and influence as the independent variables.
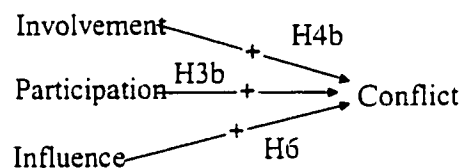
Figure 11: Part 1 of Hypothesized Model

Setwise regression was used to assess the relationship between the variables of part 1 of the

hypothesized model. "In setwise regression, separate regressions are computed for all

independent variables singly, all possible pairs of independent variables, and all possible

independent variables until the best subset of independent variables is identified according to

some criterion, such as maximum R^2 from all possible subsets" (Tabachnick and Fidell, 1989).

The result of the setwise regression analysis (table 17) implies that there is a relationship between

participation and conflict (the dependent variable of the model), but no relationships between

involvement and conflict or influence and conflict. The squared multiple regression indicates that

participation explains 5.6% of the variability of conflict. The f statistic is 5.013 and the level of

significance is .028 (table 18), which indicates that the independent variable (participation) explains the variation of the dependent variable (conflict).

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.236[a]	.056	.045	1.7428	.056	5.013	1	85	.028

a. Predictors: (Constant), Participation

Table 17: Regression analysis results of participation, involvement, influence and the effects on conflict (the dependent variable)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.227	1	15.227	5.013	.028[a]
	Residual	258.186	85	3.037		
	Total	273.414	86			

a. Predictors: (Constant), Participation

b. Dependent Variable: Conflict

Table 18: Analysis of variance for Part 1 of Hypothesized Model

Table 19, which presents statistical data for the excluded variables involvement and influence, shows the significance levels of both independent variables to be above 0.05, which indicates that neither of them explain the variation of the dependent variable conflict.

Excluded Variables[b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Involvement	.184[a]	1.762	.082	.189	.993
	Influence	-.089[a]	-.845	.401	-.092	1.000

a. Predictors in the Model: (Constant), Participation

b. Dependent Variable: Conflict

Table 19: Statistics for excluded variables in Part 1 of Hypothesized Model

Additionally the standardized coefficient (beta) for model 1 (table 20) indicates that the relationship between participation and conflict is a positive one. For every unit change in participation, the unit of conflict will change positively by .236.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.512	.349		7.193	.000
	Participation	.247	.110	.236	2.239	.028

a. Dependent Variable: Conflict

Table 20: Coefficients for Part 1 of Hypothesized Model

The second part of the model (figure 12) presents conflict resolution as the dependent variable and involvement, influence and conflict as the independent variables.

Involvement ⟶ H5b +
Conflict ⟶ H8 ⟶ Conflict Resolution
Influence ⟶ + H7
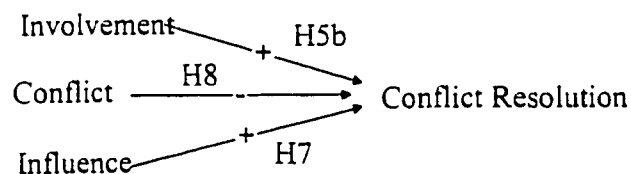
Figure 12: Part 2 of Hypothesized Model

The squared multiple regression (table 21) indicates that involvement does explain 5.6% the variability of conflict resolution. The f statistic is 5.015 and the level of significance is .028, (table 22) also indicates that the independent variable, involvement, explains the variation of the dependent variable, conflict resolution.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.236[a]	.056	.045	1.7510	.056	5.015	1	85	.028

a. Predictors: (Constant), Involvement

Table 21: Regression analysis results of involvement, influence and conflict and the effects on conflict resolution

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ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.377	1	15.377	5.015	.028[a]
	Residual	260.616	85	3.066		
	Total	275.992	86			

a. Predictors: (Constant), Involvement

b. Dependent Variable: Conflict Resolution

Table 22: Analysis of variance for Part 2 of Hypothesized Model

The standardized coefficients of part 2 of the hypothesized model (table 23) also indicates that there is a positive relationship between involvement and conflict resolution and that for every unit increase in involvement, conflict resolution will increase (positively) by .236.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.113	.406		5.203	.000
	Involvement	.260	.116	.236	2.239	.028

a. Dependent Variable: Conflict Resolution

Table 23: Coefficients for Part 2 of Hypothesized Model

Table 24, which presents statistical data for the excluded variables conflict and influence, shows the significance levels of both independent variables to be above 0.05 indicating that neither of them explain the variation of the dependent variable conflict.

Excluded Variables[b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Influence	-.041[a]	-.384	.702	-.042	.994
	Conflict	.155[a]	1.452	.150	.156	.959

a. Predictors in the Model: (Constant), Involvement

b. Dependent Variable: Conflict Resolution

Table 24: Statistics for excluded variables in Part 2 of Hypothesized Model

The third part of the model (figure 13) presents system success as the dependent variable and conflict resolution as the independent variables.

$$\text{Conflict Resolution} \xrightarrow{\quad \overset{\text{H9}}{+} \quad} \text{System Success}$$
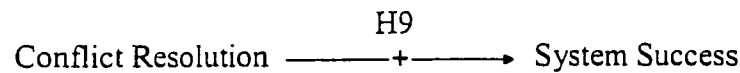
Figure 13: Part 3 of Hypothesized Model

The squared multiple regression (table 25) indicates that conflict resolution only explains 1.6% variability of conflict resolution. The f statistic is 0.558 and the level of significance is .460 (table 26), which indicates that the independent variable does not explain the variation of the dependent variable.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	127ᵃ	016	-013	88	016	558	1	34	460

a. Predictors: (Constant), Conflict Resolution

Table 25: Regression analysis results of conflict resolution and the effects on system success

ANOVAᵇ

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.435	1	.435	.558	.460ᵃ
	Residual	26.537	34	.780		
	Total	26.972	35			

a. Predictors: (Constant), Conflict Resolution

b. Dependent Variable: Overall satisfaction

Table 26: Analysis of variance for conflict resolution and system success

Additional relationships that require examination would be that between participation and involvement (figure 14) and participation and influence (figure 15).

H1b

Participation ————+————► Involvement
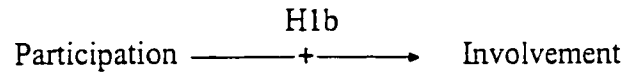
Figure 14: Model depicting Hypothesis 1b

H2b

Participation ————+————► Influence
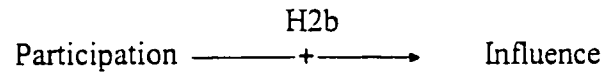
Figure 15: Model depicting Hypothesis 2b

The results of the regression analysis of the relationship between participation and involvement

(table 27) implies that there is no relationship between participation and involvement. The

squared multiple regression (0.007) and the f statistic of 0.600 with a significance of .441 (table

28) indicates that participation does not explain the variability of involvement.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
					Change Statistics				
1	.084[a]	.007	-.005	1.6296	.007	.600	1	85	.441

a. Predictors: (Constant), Participation

Table 27: Regression analysis results of participation and the effects on involvement

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.594	1	1.594	.600	.441[a]
	Residual	225.713	85	2.655		
	Total	227.307	86			

a. Predictors: (Constant), Participation

b. Dependent Variable: Involvement

Table 28: Analysis of variance results of participation and involvement

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The results of the regression analysis of the relationship between participation and involvement (table 29) implies that there is no relationship between participation and influence. The squared multiple regression (0.000) and the f statistic of 0.006 with a significance of .938 (table 30) indicates that participation does not explain the variability of influence.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
					Change Statistics				
1	.008[a]	.000	-.012	1.5859	.000	.006	1	85	.938

a. Predictors: (Constant), Participation

Table 29: Regression analysis results of participation and the effects on influence

ANOVA[b]

| Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.543E-02	1	1.543E-02	.006	.938[a]
	Residual	213.788	85	2.515		
	Total	213.803	86			

a. Predictors: (Constant), Participation

b. Dependent Variable: Influence

Table 30: Analysis of variance of participation and influence

Further Exploration

A step-wise regression analysis was performed on the variables that were excluded due to the factor analysis, demographic variables and the conflict resolution factor to examine whether there are any underlying factors that were not included in the initial analysis. The results (table 31) indicate that the items q6de12 (a participation item), q21de38 (a conflict item) and q9de17 (an involvement item) explain variability to the dependent variable, overall satisfaction.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change	df1	df2	Sig. F Change
1	.424[a]	.179	.154	.66	.179	6.997	1	32	.013
2	.542[b]	.294	.249	.62	.115	5.046	1	31	.032
3	.633[c]	.401	.341	.58	.106	5.328	1	30	.028

a. Predictors: (Constant), q6de12

b. Predictors: (Constant), q6de12, q21de38

c. Predictors: (Constant), q6de12, q21de38, q9de17

Table 31: Regression analysis on the excluded variables

The result of the regression analysis implies that there is a relationship between some of the independent variables, in particular participation, involvement and conflict and the dependent variable (overall satisfaction). The squared multiple regression indicates (table 31) that the participation, involvement and conflict items explain 63.3% of the variability of overall satisfaction. Further, on examination of the analysis of variance (table 32), the f statistic is 6.687 and the level of significance is 0.001. The size of the f statistic indicates that the participation, involvement and conflict items explain some of the variation of the overall satisfaction.

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.003	1	3.003	6.997	.013[a]
	Residual	13.733	32	.429		
	Total	16.735	33			
2	Regression	4.925	2	2.463	6.464	.005[b]
	Residual	11.810	31	.381		
	Total	16.735	33			
3	Regression	6.706	3	2.235	6.687	.001[c]
	Residual	10.029	30	.334		
	Total	16.735	33			

a. Predictors: (Constant), q6de12

b. Predictors: (Constant), q6de12, q21de38

c. Predictors: (Constant), q6de12, q21de38, q9de17

d. Dependent Variable: Overall satisfaction

Table 32: Analysis of variance from the setwise regression analysis of excluded variables

The participation item explains 17.9% of the variability in overall satisfaction. When the conflict item is added to the model, the r^2 increases to 29.4% so the change in r^2 is 11.5%. When the involvement item is added to the model, r^2 increases by 10.6%. The rest of the items do not appear in the models because the r^2 would not have had a significant change if they were added.

If 63.32% variability in overall satisfaction can be attributed to three items, and the regression analysis on the factors containing the remaining items indicate that they (i.e. participation, involvement, influence, conflict and conflict resolution) do not contribute to any variability in overall satisfaction, there is 36.68% variability in overall satisfaction that remains unexplained. This indicates that there may be other factors present in the research that were not adequately tapped.

Additional Tests Measuring the Size and Direction of Relationships Between Variables
By performing bivariate correlation analysis on all factors identified in the factor analysis, one measures the size and direction of the relationship of two variables. Within the bivariate correlation tests is Pearson's correlation, which is "independent of the scale of measurement and is independent of sample size" (Tabachnick and Fidell, 1989). Pearson's correlation ranges between +1 and −1 where 0.00 represents no relationship or predictability between two variables and a value of +1 or −1 indicates perfect predictability (which means that when one variable is known, the other variable is known). A positive correlation indicates that when one variable increases (or when there is more of one variable) the other variable also increases (there is more of the second variable) whereas a negative correlation indicates that when one variable increases (when there is more of one variable), the other variable decreases (there is less of the other variable).

The bivariate regression performed (table 33) indicates that the relationships between

participation and conflict and involvement and conflict resolution are both positive.

Correlations

		Participation	Involvement	Influence	Conflict	Conflict Resolution
Participation	Pearson Correlation	1.000	.084	.008	.236*	.155
	Sig. (2-tailed)	.	.441	.938	.028	.150
	N	87	87	87	87	87
Involvement	Pearson Correlation	.084	1.000	.076	.203	.236*
	Sig. (2-tailed)	.441	.	.487	.060	.028
	N	87	87	87	87	87
Influence	Pearson Correlation	.008	.076	1.000	-.087	-.023
	Sig. (2-tailed)	.938	.487	.	.422	.834
	N	87	87	87	87	87
Conflict	Pearson Correlation	.236*	.203	-.087	1.000	.197
	Sig. (2-tailed)	.028	.060	.422	.	.068
	N	87	87	87	87	87
Conflict Resolution	Pearson Correlation	.155	.236*	-.023	.197	1.000
	Sig. (2-tailed)	.150	.028	.834	.068	.
	N	87	87	87	87	87

*. Correlation is significant at the 0.05 level (2-tailed).

Table 33: Bivariate correlation calculations (independent variables and dependent variable)

When examining the relationships between the independent variables (participation, involvement,

influence, conflict and conflict resolution) and the factors underlying the dependent variable

(technical support and end-user application characteristics), the analysis (table 34) indicates that

that the technical support and end-user application characteristics are highly correlated. This

result is to be expected not only because they are constructs for the same variable, but also on

closer examination of the rotated factor matrix for system success (table 13), two variables

(Q26DE48 and Q26DE49) load on both factors (albeit low loadings on factor 2). Other than the

relationships that have already been established in earlier regression analysis, the analysis does

not indicate any other relationships between variables.

Correlations

		Application Characteristics	Technical Support	Participation	Involvement	Influence	Conflict	Conflict Resolution
Application Characteristics	Pearson Correlation	1 000	.474**	-.105	252	-.156	059	289
	Sig. (2-tailed)		004	542	138	362	735	088
	N	36	36	36	36	36	36	36
Technical Support	Pearson Correlation	.474**	1 000	-075	222	-.153	052	288
	Sig. (2-tailed)	.004		663	192	373	765	089
	N	36	36	36	36	36	36	36
Participation	Pearson Correlation	-.105	-075	1.000	084	008	236*	155
	Sig. (2-tailed)	542	663		441	938	028	150
	N	36	36	87	87	87	87	87
Involvement	Pearson Correlation	252	222	084	1.000	076	203	236*
	Sig. (2-tailed)	138	192	441		487	060	028
	N	36	36	87		87	87	87
Influence	Pearson Correlation	-.156	-.153	008	076	1.000	-087	-023
	Sig. (2-tailed)	362	373	938	487		422	834
	N	36	36	87	87	87	87	87
Conflict	Pearson Correlation	059	052	236*	203	-.087	1.000	197
	Sig. (2-tailed)	735	765	028	060	422		068
	N	36	36	87	87	87		87
Conflict Resolution	Pearson Correlation	289	288	155	236*	-.023	197	1 000
	Sig. (2-tailed)	088	089	150	028	834	068	
	N	36	36	87	87	87	87	87

** Correlation is significant at the 0 01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

Table 34: Bivariate correlation calculations (independent variables and constructs of system success)

Although the analysis has produced scant information, the question remains as to whether there are differences between systems analysts and end-users. To further explore the factors an independent-samples t-test was performed to examine whether the population mean of a particular variable is the same for two groups of cases (Norusis, 1989). The two groups compared are end-users and systems analysts and the variables tested were participation, involvement, influence, conflict and conflict resolution (system success could not be examined because only end-users had measurements for system success).

Table 35 presents the independent-samples t-test performed on the data. Equal variances not assumed (since the number within each group is not equal) are examined and the data indicates that the level of involvement averages do differ significantly (t=-3.539 with significance of less than 0.005). The average difference in involvement is −1.1667, which means that on average, end-users (group 1) tend to have more involvement on end-user application development than systems analysts (group 2).

Independent Samples Test

		t-test for Equality of Means				
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Participation	Equal variances assumed	.463	85	.645	.1722	.3721
	Equal variances not assumed	.444	63.496	.659	.1722	.3881
Involvement	Equal variances assumed	-3.506	85	.001	-1.1667	.3327
	Equal variances not assumed	-3.539	77.893	.001	-1.1667	.3297
Influence	Equal variances assumed	-1.188	85	.238	-.4069	.3424
	Equal variances not assumed	-1.185	74.722	.240	-.4069	.3434
Conflict	Equal variances assumed	1.575	85	.119	.6062	.3848
	Equal variances not assumed	1.448	52.202	.154	.6062	.4187
Conflict Resolution	Equal variances assumed	-.214	85	.831	-8.388E-02	.3921
	Equal variances not assumed	-.212	73.523	.832	-8.388E-02	.3950

Table 35: Independent-samples t-test

The data was probed for a further understanding of any particular correlation or trend with relation to the demographic data. A bivariate correlation test was performed on both the independent and dependent variables along with age, gender, education level, experience level, functional area, primary business and end-user application.

An examination of appendix 26, which presents the results of the bivariate correlation test, indicates that there are no relationships between variables and demographic information. The data also implies that within the demographic data there is a positive relationship between age and educational level, experience and functional area. Gender is negatively associated with functional area and educational level is positively associated with experience.

Further Analysis of the Data – The Relevance of "Does Not Apply" Responses

Because the instrument used was devised by combining several instruments that were used in different environments, the "does not apply" responses may indicate whether or not there are particular issues that are, or are not, relevant or appropriate within the end-user computing environment. To examine any possible phenomenon, frequency analysis was performed.

By performing a frequency distribution test, the number of times that a particular value appears in the distribution scores will become clear. In this case, the value being examined would be that corresponding to "does not apply". When calculating the frequencies, only those items that were relevant in the factor analysis (participation, involvement, influence, conflict and conflict resolution) were examined. Tables 36 to table 40 summarize the frequencies for each factor.

Participation

		Frequency	Percent	Cumulative Percent
Valid	1	99	28.4	28.4
	2	130	37.4	65.8
	3	23	6.6	72.4
	4	36	10.3	82.7
	5	8	2.3	85.0
	6	22	6.3	91.3
	7	5	1.4	92.7
	Does Not Apply	25	7.3	100.0
	Total	348	100.0	

Table 36: Combined frequencies for participation factor

Involvement

		Frequency	Percent	Cumulative Percent
Valid	1	50	14.4	14.4
	2	139	39.9	54.3
	3	62	17.8	72.1
	4	17	4.9	77.0
	5	32	9.2	86.2
	6	19	5.5	91.7
	7	9	2.6	94.3
	Does Not Apply	20	5.7	100.0
	Total	261	100.0	

Table 37: Combined frequencies for involvement factor

Influence

		Frequency	Percent	Cumulative Percent
Valid	1	37	14.2	14.2
	2	85	32.6	46.8
	3	62	23.7	70.5
	4	22	8.4	78.9
	5	13	5.0	83.9
	6	15	5.7	89.6
	7	14	5.4	95.0
	Does Not Apply	13	5.0	100.0
	Total	261	100.0	

Table 38: Combined frequencies for influence factor

Conflict

		Frequency	Percent	Cumulative Percent
Valid	1	26	7.5	7.5
	2	143	41.1	48.6
	3	93	26.7	75.3
	4	31	8.9	84.2
	5	15	4.3	88.5
	6	3	.9	89.4
	7	0	.0	89.4
	Does Not Apply	7	10.6	100.0
	Total	348	100.0	

Table 39: Combined frequencies of conflict factor

Conflict Resolution

		Frequency	Percent	Cumulative Percent
Valid	1	42	16.1	16.1
	2	118	45.2	61.3
	3	40	15.3	76.6
	4	15	5.7	82.3
	5	14	5.4	87.7
	6	9	3.4	91.1
	7	4	1.5	92.6
	Does Not Apply	19	7.3	100.0
	Total	261	100.0	

Table 40: Combined frequencies of conflict resolution factor

The frequency for each factor was calculated by examining the responses for each item within each factor. Within the participation factor 7.3% of the replies belonged to the "Does Not Apply" category. The involvement factor had a 5.7% "Does Not Apply" response rate. The influence factor had a 5.0% "Does Not Apply" response rate. The conflict factor had a 10.6% "Does Not

Apply" response rate and the conflict resolution factor had a 7.3% response rate falling within the "Does Not Apply" category.

With eight (8) possible responses, an equal response rate would have been 12.5%. The low percentages of "Does Not Apply" responses indicates that they have little significance to the overall validity of the instrument. The implications of this is that the factors measured are relevant within the end-user computing environment and can be utilized in future research pertaining to participation, involvement, influence, conflict and conflict resolution within an end-user computing environment.

Summary of Results

Hypotheses

Table 41 presents a summary of regression analysis and the ANOVA.

Hypothesis	Factors Examined	Regression Analysis		ANOVA	
		r^2	Adjusted r^2	F	Significance
H1b	Participation Involvement	0.007	-0.005	0.600	0.441
H2b	Participation Influence	0.000	-0.012	0.006	0.938
H3b	**Participation Conflict**	**0.056**	**0.045**	**5.013**	**0.028**
H4b	Involvement Conflict	0.041	0.030	3.636	0.060
H5b	**Involvement Conflict Resolution**	**0.056**	**0.045**	**5.015**	**0.028**
H6	Influence Conflict	0.008	-0.004	0.651	0.422
H7	Influence Conflict Resolution	0.001	-0.011	0.044	0.834
H8	Conflict Conflict Resolution	0.039	0.027	3.422	0.068
H9	Conflict Resolution System Success	0.016	-0.013	0.558	0.460

Table 41: Result Summary of Regression Analysis and ANOVA

H1b: Participation is positively associated with Involvement

Hypothesis 1b tested the relationship between participation and involvement. No relationship was observed.

H2b: Participation is positively associated with Influence

Hypothesis 2b tested the relationship between participation and influence. No relationship was observed.

H3b: Participation is positively associated with Conflict

Hypothesis 3b tested the relationship between participation conflict. A positive relationship was observed. This replicates the observations of Barki and Hartwick (1994b), which indicated that user participation did affect conflict and that the more a user participated in the application development process, the more conflict was experienced during the process. In this case however, this is observed within an end-user computing environment rather than in a traditional data processing environment.

H4b: Involvement is positively associated with Conflict

Hypothesis 4b tested the relationship between involvement and conflict. No relationship was observed.

H5b: Involvement is positively associated with Conflict Resolution

Hypothesis 5b tested the relationship between involvement and conflict resolution. A positive relationship was observed. This implies that involvement did affect conflict resolution, and that the more an individual was involved the more conflicts were resolved.

H6: Influence is positively associated with Conflict

Hypothesis 6 tested the relationship between influence and conflict. No relationship was observed.

H7: Influence is positively associated with Conflict Resolution

Hypothesis 7 tested the relationship between influence and conflict resolution. No

relationship was observed.

H8: Conflict is positively associated with Conflict Resolution

Hypothesis 8 tested the relationship between conflict and conflict resolution. No

relationship was observed.

H9: Conflict Resolution is positively associated with System Success

Hypothesis 9 tested the relationship between conflict resolution and system success. No

relationship was observed.

Differences Between Systems Analysts and End-users

The results of the independent-samples t-test performed on the data imply that there are

significant differences between the responses from systems analysts and end-users in regards to

involvement.

Relevance of Factor Measurements to End-user Computing

The frequencies of the "Does Not Apply" responses average 7.18% which implies that the "Does

Not Apply" responses has little significance to the overall validity of the instrument.

Unexplained Variability in the Overall Satisfaction Construct

Because none of the factors analyzed produced results that indicated any explanation to the

variability of the overall satisfaction construct, multiple regression analysis was performed on the

excluded variables (i.e. those variables not in the model due to elimination during the data

preparation stage). Three items (participation, involvement and conflict) explained 63.32%

variability in the overall satisfaction construct. This implies that there are underlying constructs

that were not examined in this research.

CONCLUSION

The objective of this research was to determine the interaction between systems analysts and end-users and how this interaction affected system success.

The data collected was put through several tests, the results of which indicated that factor analysis was an appropriate method of collecting data on the factors. An analysis of the initial independent variables indicated that the instrument clearly measured five factors: participation, involvement, influence, conflict and conflict resolution, and that they explained the 78% of total variance. The high percentages of variance imply that in future studies, when measuring any of these five factors, the items that describe the factor can be used. Further, an analysis of the dependent variable, system success, indicated that there were two factors: end-user application characteristics and technical support.

Contributions of the Research

The limited number of cases hindered the results of the regression analysis, however, the results of the regression analysis indicated that

- there is a positive relationship between participation and conflict

- there is a positive relationship between involvement and conflict resolution

- there is a difference between systems analysts and end-users in terms of the measurement of involvement.

On examination of the responses, only a small percentage of responses fell under the "does not apply" category. This implies that the instrument was relevant within the end-user computing environment. This is an important implication since many of the instruments used to comprise

the final instrument were designed to be administered within the traditional data processing environment.

Research Limitations

This research was decidedly exploratory in nature due to the low response rate and small sample sizes. It will be necessary to replicate the research with larger sample sizes and a higher response rate in order to have statistically valid results

Although different samples may produce the same factors, it is not necessarily always true. In this research, the two groups (systems analysts and end-users) were pooled together to increase the sample size. It should be noted, however, that when examining the two groups, the independent samples t-test indicated that they were different in one respect: involvement. In a larger sample size this difference may lead to different factors being observed.

Suggestions for Further Research

Despite the small sample size, the data collected was still able to provide a basis for which further research should be conducted. Some of the items that were discarded during the factor analysis bring to light some possible trends that should be investigated further. While in the traditional data processing environment, participation and involvement in the determination of the objectives, needs and alternatives of the project and the design of user manuals are deemed to be relevant to system success, within an end-user computing environment, these tasks seemed to have had little or no relevance. Research might be able to explain whether or not these items are relevant to end-user computing, and the types of projects that they are relevant to.

Within an end-user computing environment, systems analysts seem to be taking on a supportive role rather than the traditional mediating role between users and programmers. Research into the

changes to the task of the systems analyst may reveal changes in attitude, changes in the level of education of systems analysts and differences in the demographics of the systems analyst with an end-user computing environment and systems analysts in a traditional data processing environment.

Following this train of thought, it is also possible that the interaction between the end-user and the systems analyst is minimal. Since the end-user is often responsible for the initiation and development of the project, the end-user may have had more communication regarding the system being developed with their superior rather than with the systems analyst – and the systems analyst may have had a small supporting role in regards to the entire project. This implies that conflict and conflict resolution may best be measured with regards to the person who oversees the end-user and the applications being developed by the end-user.

Further research should also be conducted on system success within an end-user computing environment. While the data analysis implied that there are two separate factors within system success, other research indicates that there may be more factors. It would be interesting to note whether, with the evolution of end-user computing, factors that were deemed to be a necessary part of system success are still considered to be necessary today.

While end-user computing is an increasingly important part of the business environment, further research might be able to indicate which industries are following the trend faster, and the reasons as to why there is a higher instance in some industries than in others. Related to this would be research pertaining to the functional areas that are following the end-user computing trend versus those departments that are not utilising end-user computing as a means to involve personnel in the streamlining of their everyday tasks.

The model studied in this research was relatively large (five independent variables and one dependent variable). Further research may do well to break the model into several smaller models and examine one model at a time. This will allow not only for a shorter instrument, but also a smaller sample size. Some of the proposed hypotheses may, in turn, have more conclusive results if the variables are isolated into smaller models and the ratio of cases to variables is larger.

When examining excluded variables and their effects on overall satisfaction, 63.3% variability of the dependent variable could be attributed to three (3) items. Further research should be conducted to examine the additional factors that may be present in the current model.

Finally, in this study, factor analysis was used to identify factors present in the research and regression analysis was used to examine the relationships between the constructs. Another method of data analysis such as partial least squares analysis may provide different results than those observed in this research. By performing a combined regression and principle components factor analysis, partial least squares analysis assesses the context of the theoretical model (Thompson et al, 1991) which may provide more conclusive results, particularly since smaller sample sizes are acceptable.

REFERENCES

Allport, G. W. (1935). Attitudes. *A Handbook of Social Psychology*, C. Murchison (ed). Worcester, Massachusetts: Clark University Press.

Amoako-Gyampah, K. & White, K. B. (1993). User Involvement and User Satisfaction. *Information & Management*, 25, 1 – 10.

Anderson, Andy B., Basilevsky, A. & Hum, Derek P. J. (1983). Missing Data: A Review of the Literature. Ed. Peter H. Rossi, James D. Wright, Andy B. Anderson. *Handbook of Survey Research*. New York: Academic Press

Bailey, J.E. & Pearson, S.W. (1984). Development of a Tool for Measuring and Analyzing Computer User Satisfaction. *Management Science*, 5, 530-545.

Barki, H. & Hartwick, J. (1989). Rethinking the Concept of User Involvement. *MIS Quarterly*, 4, 53-63.

Barki, H. & Hartwick, J. (1994a). Measuring User Participation, User Involvement and User Attitude. *MIS Quarterly*, 4, 59 – 82.

Barki, H. & Hartwick, J. (1994b). User Participation, Conflict and Conflict Resolution: The Mediating Roles of Influence. *Information Systems Research*, 5:4, 422-438.

Barki, H. & Huff, S.L. (1990). Implementing Decision Support Systems: Correlates of User Satisfaction and System Usage. *INFOR*, 28:2, 89-100

Baronas, A.K & Louis, M.R. (1988). Restoring a Sense of Control During Implementation: How User Involvement Leads to User Acceptance. *MIS Quarterly*, 3, 111-124.

Baroudi J.J., Olson, M.H. & Ives, B. (1986). An Empirical Study of the Impact of User Involvement of System Usage and Information Satisfaction. *Communications of the ACM*, 3, 232 – 238.

Bergeron, F. & Bérubé, C. (1988). The management of the end-user environment: An empirical investigation. *Information and Management*, 14, 107 – 113.

Blili, S., Raymond, L. & Rivard, S. (1998). Impact of task uncertainty, end-user involvement and competence on the success of end-user computing. *Information & Management*, 33, 137-153.

Bostrom, R. P. (1989). Successful Application of Communication Techniques to Improve the Systems Development process. *Information & Management*, 16, 279 – 295.

Bostrom, R. P., Olfman, L. & Sein, M.K. (1990). The Importance of Learning Style in End-User Training. *MIS Quarterly*, 101-119.

Brancheau & Brown, C.V. (1993). The Management of End-User Computing: Status and Direction. *ACM Computing Surveys*, 23, 437-482.

Büyükkurt, M.D. & Vass, E.C. (1993). An Investigation of Factors Contributing to Satisfaction with End-User Computing Process. *Canadian Journal of Administrative Sciences*, 3, 212-228.

Delone, W. H.& McLean, E. R. (1992). Information Systems Success: The Quest for the Dependent Variable. *Information Systems Research, 3:1*, 60-95.

De Vaus, D. A. (1991). *Surveys in Social Research*. 3rd edition. London: Allen & Unwin Pty Ltd.

Deutsch, M. (1969). Productive and Destructive Conflict. *Journal of Social Issues*, 25, 7-42.

Dillman, D. A. (1978). *Mail and Telephone Surveys: The total design method*. NewYork: John Wiley & Son.

Doll, W.J. & Torkzadeh, G. (1988). The Measurement of End-User Computing Satisfaction. *MIS Quarterly*, 6, 259-273.

Doll, W.J. & Torkzadeh, G. (1989). A Discrepancy Model of End-User Computing Involvement. *Management Science*, 10, 1151-1171.

Doll, W.J. & Torkzadeh, G. (1990). The Measurement of End-User Software Involvement. *OMEGA, International Journal of Management Science*, 4, 399-406.

Drury, D.H. & Farhoomand, A.F. (1998). A Hierarchical Structural Model of Information Systems Success. *INFOR M* 36:2, 25 – 40.

Edstöm, A. (1977). User Influence on the Development of MIS – A Contingency Approach," *Human Relations*, 30-589-607.

Ein-Dor, P. & Segev, E. (1978). Organizational Context and the Success of Management Information Systems. *Management Science* 24:10, 1064-1077.

Emery, C. W. & Cooper, D. R. (1991). *Business Research Methods*. 4th ed. Homewood, Illinois: Irwin Publishing Inc.

Goodhue, D. L. (1995). Understanding User Evaluations of Information Systems. *Management Science*, 41:12, 1897-1843.

Govindarajulu, C. & Reithel, B. J. (1998). Beyond the Information Center: An Instrument To Measure End-User Computing Support from Multiple Sources. *Information & Management*, 33, 241-250.

Guimaraes, T., Yoon, Y. & Clevenson, A. (1996). Factors important to expert systems success: A field test. *Information & Management*, 30, 119-130.

Hartwick, J. & Barki, H. (1994). Explaining the Role of User Participation in Information System Use. *Management Science*, 4, 440-465.

Hawk S.R. & Aldag, R.J. (1990). Measurement Biases in User Involvement Research. *OMEGA International Journal of Management Science* 18:6, 605-613.

Hunton, J.E. & Beeler, J.D. (1997). Effects of User Participation in Systems Development, *MIS Quarterly*, 12, 359–388.

Hunton, J.E. & Price, K. H. (1997). Effects of the User Participation Process and Task Meaningfulness on Key Information Systems Outcome. *Management Science*, 43:6, 797-812.

Igbaria, M. (1990). End-User Computing Effectiveness: A Structural Equation Model. *OMEGA, International Journal of Management Science* 18:6, 637-652.

Igbaria, M. & Nachman, S.A. (1990). Correlates of user satisfaction with end-user computing. *Information & Management*, 19, 73-82.

Ishman, M.D. (1996). Measuring Information Success at the Individual Level in Cross Cultural Environments. *Information Resources Management Journal, 19:4, 16-28.*

Ives, B., Olson, M.H. & Baroudi, J.J. (1983). The Measurement of User Information Satisfaction. *Communications of the ACM*, 10, 785-793.

Ives, B., & Olson, M.H. (1984). User Involvement and MIS Success: A review of research. *Management Science*, 5: 586-603.

Joshi, K. (1992). Interpersonal skills for cooperative user-analyst relationships: Some research issues. *Database*, Winter, 23-25.

Kappelman, L.A. (1995). Measuring User Involvement: A diffusion of Innovation Perspective. *Data Base Advances*, 2&3, 65-86.

Kim, C. & Lee, J. (1986). An Exploratory Contingency Model of User Participation and MIS Use. *Information & Management*, 11, 87-97.

Lawrence, M. & Low, G. (1993). Exploring Individual User Satisfaction Within User-Led Development. *MIS Quarterly*, 6, 195-208.

Lu, H. & Wang, J. (1997). The Relationships Between Management Styles, User Participation and System Success over MIS Growth Stages. *Information & Management*, 32, 203-213.

Lundgren, T. (1998). End-User Support. *Journal of Computer Information Systems*. Fall, 60-64.

Mangione, T. W. (1995). *Mail Surveys: Improving the Quality*. London: Sage Publications.

McHaney, R. & Cronan, T.P. (1998). Computer Simulation Success: On the Use of the End-User Computing Satisfaction Instrument: A comment. *Decision Sciences* 29:2, 525-535.

McKeen, J.D., Guimaraes, T. (1997). Successful Strategies for User Participation in Systems Development. *Journal of Management Information Systems*, 14:2, 113-150.

McKeen, J.D., Guimaraes, T. & Wetherbe, J.C. (1994). The Relationship Between User Participation and User Satisfaction: An Investigation of Four Contingency Factors *MIS Quarterly*, 12, 427-451.

Montazemi, A.R. (1988). Factors Affecting Information Satisfaction in the Context of the Small Business Environment. *MIS Quarterly*, 6, 239-256.

Monro, M.C., Huff, S.L., Marolin, B.L. & Compeau, D.R. (1997). Understanding and Measuring User Competence. *Information & Management*, 33, 45-57.

Norusis, M. J. (1998). *SPSS 8.0 Guide to Data Analysis*. Upper Saddle River, New Jersey: Prentice Hall.

Olson, M. H. and Ives, B. (1981). User Involvement in system design: An empirical test of alternative approaches, *Information Management* 4, 183-195.

Palvia, P.C. (1996). A model and instrument for measuring small business user satisfaction with information technology. *Information Management*, 31, 151 -163.

Raymond, L. (1985). Organizational Characteristics and MIS Success in the Context of Small Business. *MIS Quarterly*, 3, 37–52.

Raymond, L. (1987). Validating and Applying User Satisfaction as a Measure of MIS Success in Small Organizations. *Information & Management*, 12, 173–179.

Rivard, S. & Huff, S.L. (1988). Factors of Success for End-User Computing. *Communications of the ACM*, 5, 552-561.

Robey, D., & Farrow, D. (1982). User Involvement in Information System Development: A conflict model and empirical test. *Management Science*, 28, 73-85.

Robey, D., Farrow D.L., & Franz, C.R. (1989). Group Process and Conflict in System Development. *Management Science*, 10, 1172–1191.

Robey, D., Smith, L.A., & Vijayasarathy, L.R. (1993). Perceptions of Conflict and Success in Information Systems Development Projects. *Journal of Management Information Systems*, 10, 123-139.

Rockart, J.F. & Flannery, L.S. (1983). Perceptions of Conflict and Success in Information Systems Development Projects. *Journal of Management Information Systems*, 10, 123-139.

Rokeach, M. (1968). The Nature of Attitudes. *International Encyclopedia of the Social Sciences*. New York, New York: Macmillan.

Roth, L. & Bartholome, L. (1994). The Relationship Between User Participation in Systems Development and User Satisfaction. *Journal of Computer Information Systems*, Fall, 7–12.

Saarinen, T. (1996). An Expanded Instrument for Evaluating Information System Success. *Information & Management*, 31, 103-118.

Schiffman, S.J., Meile, L.C. &Igbaria, M. (1992). An Examination of End-User Types. *Information & Management*, 22, 207-215.

Shayo, C., Gurthrie, R. & Igbaria, M. (1999). Exploring the Measurement of End-User Computing Success. *Journal of End-User Computing*, 11, 5-14.

Simon, S.J., Grover, V, Teng, J.T.C.& Whitcomb, Kathleen. (1996). The Relationship of Information System Training Methods and Cognitive Ability to End-User Satisfaction, Comprehension, and Skill Transfer: A longitudinal field study. *Information Systems Research*, 7:4, 465-490.

Smith, H. A. & McKeen, J.D. (1992). Computerization and Management: A study of conflict and change. *Information & Management*, 22, 53-64.

Soh, C.P.P., Yap, C.S. & Raman, K.S. (1992), Impact of consultants on computerization success in small businesses. *Information & Management*, 22, 309-319.

Speier, C. & Brown, C.V., (1997). Differences in End-User Computing Support and Control Across User Departments. *Information & Management*, 32, 85-99.

Tabachnick, B. G. and Fidell, L. S., (1989). *Using Multivariate Statistics*. 2nd edition. New York: Harper & Row Publishers.

Tait, P. & Vessey, I. (1988), The Effect of User Involvement on System Success: A Contingency Approach. *MIS Quarterly*, 3, 91-107.

Thompson, R. L., Higgins, C. A & Howell, J. M. (1991). Personal Computing: Toward a Conceptual Model of Utilization. *MIS Quarterly*, 3, 125-142.

Torkzadeh, G. & Doll, W.J. (1994). The test-retest reliability of user involvement instruments. *Information & Management*, 26, 21-31.

Vijayaraman, B. S. and Ramakrishna, H. V. (1990). A Comparative analysis of successful and unsuccessful information centers. *Information & Management*, 19, 199-209.

Wagner, J. L. (1990). What is End-User Computing? *Information Executive*, Fall, 24-26.

Wall, J. & Callister, R.R. (1995). Conflict and Its Management, *Journal of Management*, 21:3, 515-558.

Yap, C.S., Soh, C.P.P., & Raman, K.S. (1992). Information Systems Success Factors in Small Business. *Omega*, 5/6, 597-609.

Zaichowsky, J.L. (1985). Measuring the Involvement Construct. *Journal of Consumer. Research*, 12, 341-352.

Zaichowsky, J.L. (1986). Conceptualizing Involvement. *Journal of Advertising*, 15:2, 4-14,34.

Zmud, R.W. (1979). Individual Differences and MIS Success: A Review of the Empirical Literature. *Management Science*, 25:10, 966-979.

APPENDIX 1

Matrix of Variables

Study	Participation	Involvement	Participation <-> Involvement	Responsibility	User-IS Relationship	Hands-on Activity	Influence	Conflict	Conflict Resolution	System Quality	Info. Quality	System Use	User Sat	Ind Impact	Org Impact	End-User[1]	EUC
Amoako-Gyampah and White, 1993		X	X													N	N
Bailey & Pearson, 1983										X	X		SIG			N	N
Baroudi et al, 1986		X										X	X			N	N
Barki & Huff, 1990	X						X					X	X			N	N
Barki & Hartwick, 1994a		X		X	X	X										N	N
Barki & Hartwick, 1994b				X	X	X	X	X	X							N	N
Baronas & Louis, 1988		X											X			?	N
Doll et al, 1998													X	X		1,2,3[3]	Y
Buyukkurt & Vass, 1993	X												X			.	Y
Doll & Torkzadeh, 1988													X			.	Y
Doll & Torkzadeh, 1989		X	X										X			.	Y
Doll & Torkzadeh, 1990		X														1,2,3	Y
Drury & Farhoomand, 1996													X			.	N
Guimaraes et al, 1996		X		X	X	X							X			.	Y
Hartwick & Barki, 1994		X		X	X	X						X	X	X		N	N
Hawk & Aldag, 1990		X														N	N
Hunton & Beeler, 1997		X				X										.	Y
Igbaria, 1990												X	X			.	Y
Igbaria and Nachman, 1990	X	X								X	X	X	X			N	N
Ishman, 1996												X	X			N	N
Ives et al, 1983	X											X	X			N	N
Kappelman, 1995	X					X										.	Y
Kim & Lee, 1986		X								X		X	X			N	N
Lawrence & Low, 1993	X	X	X							X		X				N	N
Lu and Wang, 1997	X						X									N	N
McKeen et al, 1994	X									X			X			N	N
Montazemi, 1988													X			N	N
Palvia, 1996												X	X			1,2,3	Y
Raymond, 1985												X	X			N	N
Raymond, 1987												X	X			N	N
Rivard & Huff, 1988	X						X	X	X		X		X	X		2,3,4	Y
Robey & Farrow, 1982	X						X	X	X							N	N
Robey et al, 1989	X						X	X	X							N	N
Robey et al, 1993	X															N	N
Roth & Bartholome, 1994	X									X		X	X		X	N	N
Saarinen, 1996													X			.	Y
Simon et al, 1996												X	X			N	N
Shayo et al, 1999										X	X	X	X	X		.	Y
Soh et al, 1992													X		X	N	N
Tait & Vessey, 1988		X	X													N	N
Torkzadeh & Doll, 1994		X											X			.	Y
Yap et al, 1992	X												X			N	N
Zakchkowsky, 1985		X														N	N
Zmud, 1979		X	X										X			N	N

[1] End-user characteristic as defined by Rockart and Flannery (1983)

[2] A Star indicates that end-user characteristics are not defined

[3] Indicates the characteristics defined by the author according to categories as defined by Rockart and Flannery (1983)

APPENDIX 2

Variable and Item Correlations

Variable	Source	Items – Systems Analyst Instrument	Items – End-User Instrument
Participation	Torkzadeh and Doll (1994)	1,2,4,6,8,12	1,2,4,6,8,12
Involvement	Torkzadeh and Doll (1994)	3,5,7,9,13,15	3,5,7,9,13,15
Influence	Robey et al (1989)	14,16,17,18,19,20	14,16,17,18,19,20
Conflict	Robey et al (1989)	21,22,23	21,22,23
Conflict Resolution	Robey et al (1989)	10,11,24,25	10,11,24,25
System Success	Büyükkurt and Vass (1993)		26,27,28,29,30,31, 32,33,34,35,36,37, 38

APPENDIX 3

English Cover Letter

Concordia
U N I V E R S I T Y

October 25, 1999

Dear ,

Currently enrolled in the Masters of Science in Administration program at Concordia University (Management Information Systems option), I am conducting a study that investigates the interaction between end-users and systems analysts within an end-user environment. My thesis, entitled "The Interaction Between End-Users and Systems Analysts – the effects of end-user/analyst conflict on perceived system success", is being supervised by Dr. Meral Demirbag Büyükkurt, and is a partial requirement for the degree.

The research includes two questionnaires – one to be given to end-users and another to be given to systems analysts (at any level) within your organization that have had active participation in some aspect of end-user application development (from idea generation to developing applications). End-user computing is the optional development of computer applications and models by personnel outside the MIS department and is distinguished from traditional data processing in that the end-user interacts directly with application software and has a more direct influence on the determination of information needs and system objectives. I would appreciate your forwarding the questionnaire to the end-users and systems analysts that qualify. The respondents are not asked to identify themselves or your organization anywhere on the questionnaire. Additionally, because there is no need or further interaction, the questionnaires can be returned anonymously via the self-addressed stamped envelopes provided. There is no risk to yourself, your organization or the respondents as all information gathered would remain strictly confidential. Should you need additional copies of the questionnaire, please contact me at sodfa@sodfa.com or photocopy as many copies as you need and return them to the address indicated on the return envelope.

On completion of this research, I would be happy to forward the results of the study to you. It is intended that these studies not only put into perspective desirable end-user and systems analyst characteristics, but also provide an insight as to the relationships between end-users and systems analysts and the effect of this relationship on systems success. If these relationships are known beforehand, then corrective measures can be made to better ensure the chances of system success. To receive the results you may send e-mail to sodfa@sodfa.com, enclose a business card in the response envelope along with the questionnaire or send a note to the address on the return envelope.

Since my study must be completed by December 1999, I would very much appreciate your returning the completed ' questionnaire before the end of November 1999.

Thank you in advance for your cooperation,

Sincerely,

Nadine Wilson, M.Sc. student
Department of Decision Sciences and Management Information
Concordia University

1455, de Maisonneuve Blvd. W., Montreal, Quebec, Canada H3G 1M8

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APPENDIX 4

French Cover Letter

Concordia
U N I V E R S I T Y

Le 1er octobre 1999

Cher M.,

Je suis une étudiante de l'Université Concordia dans le cadre du programme de maîtrise en Sciences administratives (option – Système d'information et de gestion - SIG). J'effectue présentement une étude qui permettra de mieux comprendre l'interaction entre l'utilisateur final et les gestionnaires des systèmes d'information dans un environnement dominé par l'utilisateur final. Ma thèse intitulée "Interactions entre utilisateurs et gestionnaires des systèmes d'information – les impacts du conflit appréhendé entre l'utilisateur et le gestionnaire des systèmes d'information sur la bonne marche du système", est effectuée sous la supervision du Dr Meral Demirbag Buyukkurt, et fait partie intégrante du programme de maîtrise.

Cet envoi inclut deux questionnaires – un qui doit être remis à l'utilisateur, l'autre au gestionnaire des systèmes d'information (...à tous les niveaux) de l'entreprise qui ont déjà participé de façon active en tout ou en partie, au développement des solutions pour l'utilisateur final (de la conception de l'idée jusqu'au développement des solutions). L'environnement d'un utilisateur final est le cadre de développement optionnel des solutions informatiques et des modèles d'applications par des employés qui travaillent en dehors du département des SIG. Il est différent du traitement traditionnel parce que l'utilisateur interagit directement avec le logiciel d'application et détient une grande influence sur l'identification des besoins ainsi que sur les objectifs du système. Je vous remercie à l'avance de faire parvenir ces questionnaires aux utilisateurs ou aux gestionnaires des systèmes qui répondent aux critères de sélection.

Les répondants ainsi que l'entreprise n'ont pas à s'identifier dans aucune des sections du questionnaire. De plus, du fait qu'il n'y aura pas un suivi systématique, les questionnaires peuvent être retournés de façon anonyme avec l'enveloppe de retour préadressée et suffisamment affranchie qui vous est fournie. Soyez assuré qu'il n'existe aucun risque pour vous même ou votre entreprise car les informations recueillies seront traitées de façon strictement confidentielle. Si vous avez besoin de copies additionnelles, veuillez me contacter par courriel à sodfa@sodfa.com ou vous pouvez en reproduire autant de copies que nécessaires et les retourner complétés à l'adresse indiquée sur l'enveloppe de retour.

Une fois complétée, il me fera plaisir de vous envoyer les résultats de l'étude. Il est prévu que cette étude non seulement mettra en perspective des caractéristiques attendues de l'utilisateur et du gestionnaire des systèmes, mais aussi, fournira une meilleure indication sur les relations entre les utilisateurs et les gestionnaires des systèmes et l'effet de cette relation sur la bonne marche du système. Si ces relations sont connues à l'avance, des mesures correctives peuvent être prises afin de mieux assurer les chances de réussite du système. Pour obtenir ces résultats, vous pouvez soit, envoyer un courriel à sodfa@sodfa.com, soit insérer une carte d'affaires dans l'enveloppe de retour avec le questionnaire complété, ou envoyer une note à l'adresse de retour indiquée sur l'enveloppe.

Etant donné que l'étude doit être complétée au plus tard en décembre 1999, j'aimerais si possible, recevoir les questionnaires remplis avant le mois de novembre 1999.

Je vous remercie à l'avance pour votre prompte coopération.

Sincèrement vôtre,

Nadine Wilson, Étudiante au programme de maîtrise
Départment des Sciences de décision et de gestion de l'information
Université Concordia à Montréal

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APPENDIX 5

English Instrument for Systems Analysts

THE INTERACTION BETWEEN END-USERS AND SYSTEMS ANALYSTS WITHIN AN END-USER COMPUTING ENVIRONMENT: A SURVEY FOR SYSTEMS ANALYSTS

The objective of this research is to investigate end-user and systems analyst interaction during end-user application development.

Where the term "systems analyst" is used, it is meant to represent the person (or persons) responsible for conducting system support in any phase (analysis, design, development, implementation, maintenance) of end-user application development. This person may be a representative of the Information Systems Department.

Where the term "end-user" is used, it is meant to represent the person who has had active participation in some aspect of end-user application development (from idea generation to developing applications).

It is intended that systems analysts that have participated in the end-user application development (from beginning to end) respond to this questionnaire

Please check the applicable box:

End-user ☐   Systems Analyst ☐   Neither end-user nor system's analyst ☐

If you have checked "end-user" or "neither end-user nor system's analyst", please return the questionnaire to the person who gave it to you so that it can be forwarded to a systems analyst.

PLEASE ANSWER THE FOLLOWING QUESTIONS STATING YOUR **VERY FIRST IMPRESSION** REGARDING THE **MOST RECENT END-USER APPLICATION** DEVELOPMENT YOU TOOK PART IN.

Instructions:

Please read the following instructions carefully and then answer the sections that relate to you - making sure to answer each scale within an item.

	Extremely	Very	Slightly	Neither / nor	Slightly	Very	Extremely		Does not apply
The scale positions are defined as follows Adjective *X*	__	__	__	__	__	__	__	Adjective *Y*	__

The following example illustrates the scale positions and their meanings:

My vacation in the Bahamas was:									
restful	__	__	__	__	__	__	X	hectic	__
long	__	__	__	__	__	X	__	short	__
wonderful	__	__	__	X	__	__	__	terrible	__
cheap	__	X	__	__	__	__	__	costly	__
safe	__	__	__	__	__	__	__	dangerous	X

According the responses, the persons vacation was extremely hectic, very short, neither wonderful nor terrible, very cheap and there were no applicable safety issues.

Please check each scale in the position that describes your evaluation of the factor being judged, checking only one position for each scale.

The responses to these questions will be kept strictly confidential

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*PLEASE ANSWER THE FOLLOWING QUESTIONS STATING YOUR **VERY FIRST IMPRESSION** REGARDING THE **MOST RECENT END-USER APPLICATION** DEVELOPMENT YOU TOOK PART IN.*

Scale columns: Extremely — Very — Slightly — Neither / nor — Slightly — Very — Extremely — Does not apply

Question	Left anchor	Scale	Right anchor	Does not apply
In your opinion, your participation in the development of the end-user application was...	appealing	___ ___ ___ ___ ___ ___ ___	unappealing	___
	fascinating	___ ___ ___ ___ ___ ___ ___	mundane	___
	exciting	___ ___ ___ ___ ___ ___ ___	unexciting	___
	essential	___ ___ ___ ___ ___ ___ ___	nonessential	___
Your level of participation in the initiation of the project was...	sufficient	___ ___ ___ ___ ___ ___ ___	insufficient	___
	significant	___ ___ ___ ___ ___ ___ ___	insignificant	___
Compared to the level of participation that you wanted to have, the level of participation that you actually had in the initiation of the project was...	sufficient	___ ___ ___ ___ ___ ___ ___	insufficient	___
	significant	___ ___ ___ ___ ___ ___ ___	insignificant	___
The amount of time that you spent determining the applications objectives was...	sufficient	___ ___ ___ ___ ___ ___ ___	insufficient	___
Compared to the amount of time that you wanted to spend determining the application's objectives, the amount of time that you actually spent was...	sufficient	___ ___ ___ ___ ___ ___ ___	insufficient	___
Your level of participation in developing reports was...	high	___ ___ ___ ___ ___ ___ ___	low	___
	significant	___ ___ ___ ___ ___ ___ ___	insignificant	___
Compared to the level of participation that you wanted to have to develop reports, the level of participation that you actually had was...	high	___ ___ ___ ___ ___ ___ ___	low	___
	sufficient	___ ___ ___ ___ ___ ___ ___	insufficient	___
Your level of participation in creating user procedural manuals was...	high	___ ___ ___ ___ ___ ___ ___	low	___
	significant	___ ___ ___ ___ ___ ___ ___	insignificant	___
Compared to the level of participation that you wanted to have in creating user procedural manuals, the level of participation that you actually had was...	high	___ ___ ___ ___ ___ ___ ___	low	___
	sufficient	___ ___ ___ ___ ___ ___ ___	insufficient	___
Differences in opinion were resolved ...	frequently	___ ___ ___ ___ ___ ___ ___	infrequently	___
	satisfactorily	___ ___ ___ ___ ___ ___ ___	unsatisfactorily	___
The degree to which differences in opinion were resolved to your satisfaction was...	high	___ ___ ___ ___ ___ ___ ___	low	___
In your opinion, your participation in the development of the end-user application was NOT...	interesting	___ ___ ___ ___ ___ ___ ___	boring	___
	important	___ ___ ___ ___ ___ ___ ___	unimportant	___
	useful	___ ___ ___ ___ ___ ___ ___	useless	___
	desirable	___ ___ ___ ___ ___ ___ ___	undesirable	___
The degree to which you believe the end-user(s) understood the requirements of the alternatives proposed regarding the design of the end-user application was...	high	___ ___ ___ ___ ___ ___ ___	low	___
	sufficient	___ ___ ___ ___ ___ ___ ___	insufficient	___

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	Extremely	Very	Slightly	Neither / nor	Slightly	Very	Extremely		Does not apply

The degree to which you believe the end-user(s) seriously considered the requirements of the alternatives proposed in the design of the end-user application was...   high / sufficient — — — — — — — low / insufficient —

The degree to which you believe the end-user(s) consulted you in the design of the end-user application was...   high / sufficient — — — — — — — low / insufficient —

Once you had completed your part of a task, your reliance on the end-user(s) to perform the next steps in the process before the total task or service was completed was...   significant — — — — — — — insignificant —

The extent to which the end-user(s) needed your services, resources and/or support to accomplish their goals and responsibilities that pertained to the development of the new end-user application was...   significant — — — — — — — insignificant —

The extent to which you needed the services, resources and/or support of the end-user(s) to accomplish your goals and responsibilities that pertained to the development of the new end-user application was...   significant — — — — — — — insignificant —

The level of influence that the end-user(s) had on the internal operations of your department is...   high / significant — — — — — — — low / insignificant —

The extent that your department had changed or influenced the services and/or operations of the end-user(s) during the last application development period was...   significant — — — — — — — insignificant —

Differences in opinion between you and the end-user(s) occurred...   frequently — — — — — — — infrequently —

When differences arose between you and the end-user(s), you perceived the argument defended by the end-user(s) to be...   relevant / valuable — — — — — — — irrelevant / worthless —

When differences arose between you and the end-user(s), you felt that the end-user(s) perceived your defense as...   relevant / valuable — — — — — — — irrelevant / worthless —

When differences arose between you and the end-user(s), mutually agreeable solutions were reached ...   frequently — — — — — — — infrequently —

The number of differences that arose between you and the end-user(s) that were not resolved to your satisfaction were...   significant / relevant — — — — — — — insignificant / irrelevant —

The remaining questions on this survey are concerned with the end-user application itself, your company, your background and your work experience. This information is to be used for statistical analysis only and will be kept confidential.

1. What is your organization's primary business? (please check one)

    ____ Manufacturing   ____ Merchandizing   ____ Public Sector
    ____ Health care   ____ Insurance   ____ Educational
    ____ Financial Services   ____ Other (please specify) _____

2. What was the end-user application being developed? *(Please indicate the tool that the application was developed in - if the end-user application was custom built, please indicate the programming language that the application was written in).* Below are examples of end-user applications that may have been developed ...

    ____ Spreadsheet (e.g. Excel, Lotus 1-2-3, Quattro Pro, etc.)   _____
    ____ Data Base Application (e.g.dBase, Access, FoxPro, Paradox, etc.) _____
    ____ Simulation (e.g. GPSS/H, etc.)   _____
    ____ Communications (e.g. DoubleView, etc.)   _____
    ____ Graphics (technical design-e.g. CAD, Corel Draw, Photoshop, etc.) _____
    ____ Graphics (presentation-e.g. PowerPoint, Freelance Graphics, etc.) _____
    ____ Time/Resource Monitoring (e.g. Outlook, Organizer, etc.) _____
    ____ Web Based Application (e.g. Java, HTML, Perl, etc.) _____
    ____ DSS Tools (e.g. Cognos, Business Objects, etc.) _____
    ____ Client Server Applications (e.g. Oracle, Sybase, Visual Basic etc.) _____
    ____ Other (please specify) _____ _____

3. How many employees does your company employ? _____

4. What is your functional area? (please check one)

    ____ Accounting   ____ Personnel   ____ Manufacturing/Production
    ____ Research & Development ____ Finance   ____ Information Systems/Technology
    ____ Marketing   ____ Sales   ____ General Management
    ____ Engineering   ____ Other (please specify) _____

5. What is your present title? _____

6. How many years have you been in your present position? _____

7. How many years have you been with this company? _____

8. How many years of experience do you have as a systems analyst? _____

9. Please indicate the highest level of education you have achieved:

    ____ High school or less   ____ CEGEP or equivalent   ____ University certificate
    ____ Bachelors degree   ____ Incomplete Masters   ____ Completed Masters
    ____ Incomplete Ph.D.   ____ Completed Ph.D.

10. Age: _____

11. Gender: Male____   Female ____

Thank you for taking the time to fill out this questionnaire. Should you have any comments or questions about issues that this questionnaire may have brought up, please use the following space to express them:

If you would like to receive a copy of the results of this questionnaire you may either send e-mail to sodfa@sodfa.com, or enclose a business card in the response envelope along with the questionnaire or send a note to: End User Computing Survey, care of DS/MIS Department Faculty of Commerce and Administration   Concordia University 1455 de Maisonneuve Blvd. W, Montreal Quebec H3G 1M8 (completed copies of the questionnaire may also be sent to this address)

APPENDIX 6

French Instrument for Systems Analysts

ÉTUDE SUR LES INTERACTIONS ENTRE LES UTILISATEURS ET LES ANALYSTES DE SYSTÈMES DANS UN ENVIRONNEMENT DOMINÉ PAR L'UTILISATEUR FINAL.

L'objectif de cette étude est d'évaluer les interactions entre les utilisateurs finaux et l'analyste de système au cours de la période de développement des applications informatiques.

Lorsque le terme "analyste de sytèmes" est utilisé, il définit la personne ou les personnes qui sont impliquées lors d'une ou plusieurs des phases suivantes de développement des applications pour l'utilisateur final: analyse, conception, développement, implantation, entretien. Cette personne peut être un représentant ou un employé du service des systemes d'information.

Le terme "utilisateur final" définit la personne qui a participé de façon active à un des aspects du développement des applications (...de la conception de l'idée jusqu'au développement des solutions).

Ce questionnaire s'adresse à l'analyste de systèmes.

S'il vous plaît veuillez cocher la case appropriée:
          Utilisateur final ☐   Analyste de systèmes ☐   Ni l'un, ni l'autre ☐

Si vous avez coché la case "Utilisateur final" ou "Ni l'un, ni l'autre", veuillez s'il vous plaît retourner le présent questionnaire à la personne qui vous l'a remis afin qu'elle puisse l'acheminer aux analystes de systèmes.

VEUILLEZ RÉPONDRE AUX QUESTIONS SUIVANTES EN INDIQUANT VOTRE TOUTE PREMIÈRE IMPRESSION SUR LE PLUS RÉCENT DÉVELOPPEMENT DES APPLICATIONS AUQUELS VOUS AVEZ PARTICIPÉS

Directives:

Veuillez lire attentivement les directives qui suivent et répondre aux questions qui vous concernent en vous assurant d'utiliser l'échelle d'appréciation pour chacun des sujets mentionnés:

Veuillez cocher les cases en fonction de la position qui décrit le mieux votre évaluation du sujet traité en ne cochant qu'une seule position pour chaque échelle d'appréciation.

	Extrêmement	Très	Un peu	Ni l'un, ni l'autre	Un peu	Très	Extrêmement		Ne s'applique pas

Les positions indiquées sur l'échelle sont déterminées comme suit: _Adjectif X_ __ __ __ __ __ __ __ _Adjectif Y_ __

L'exemple qui suit illustre bien les positions utilisées sur l'échelle d'appréciation ainsi que leur degré d'importance:

Mes vacances au Bahamas étaient:

Reposantes	__	__	__	__	__	__	**X**	_Mouvementées_	__
Longues	__	__	__	__	__	**X**	__	_Courtes_	__
Merveilleuses	__	__	__	**X**	__	__	__	_Terribles_	__
Modestes	**X**	__	__	__	__	__	__	_Coûteuses_	__
Sécuritaires	__	__	__	__	__	__	__	_Non sécuritaires_	**X**

Selon les réponses indiquées sur l'échelle, ces personnes ont passé des vacances extrêmement mouvementées, très courtes, ni merveilleuses ni terribles, très modestes et il n'y avait aucun lien avec des questions de sécurité.

**Les réponses à ces questions seront traitées de façon strictement confidentielle.**

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Échelle : Extrêmement — Très — Un peu — Ni l'un, ni l'autre — Un peu — Très — Extrêmement — Ne s'applique pas

Selon votre opinion, votre participation dans le développement d'applications pour l'utilisateur final était...
- tentante _____ non tentante ___
- fascinante _____ banale ___
- excitante _____ non excitante ___
- comblée _____ non comblée ___

Votre niveau de participation dans la conception du projet était...
- suffisant _____ insuffisant ___
- significatif _____ insignifiant ___

Comparé au niveau de participation que vous désiriez avoir, le niveau de participation que vous avez finalement obtenu dans la conception du projet était...
- suffisant _____ insuffisant ___
- significatif _____ insignifiant ___

Le temps que vous avez utilisé pour déterminer les objectifs de l'application envisagée était...
- suffisant _____ insuffisant ___

Comparé au temps que vous désiriez passer à déterminer les objectifs de l'application envisagée, le temps que vous avez finalement utilisé à déterminer les objectifs pour l'application envisagée était...
- suffisant _____ insuffisant ___

Votre niveau de participation dans le développement des rapports était...
- élevé _____ faible ___
- significatif _____ insignifiant ___

Comparé au niveau de participation desire pour développer des rapports, le niveau actuel de participation était...
- élevé _____ faible ___
- suffisant _____ insuffisant ___

Votre niveau de participation dans la production des manuels de procédures pour l'utilisateur final était...
- élevé _____ faible ___
- significatif _____ insignifiant ___

Comparé au niveau de participation désiré dans la production des manuels de procédures pour l'utilisateur final, le niveau actuel de votre implication était...
- élevé _____ faible ___
- suffisant _____ insuffisant ___

Des divergences d'opinion étaient résolues ...
- fréquemment _____ rarement ___
- de façon satisfaisante _____ de façon insatisfaisante

Le taux de conflits resolus de façon satisfaisante était...
- élevé _____ faible ___

Selon votre opinion, votre implication dans le développement de l'application pour l'utilisateur final N'ÉTAIT PAS...
- intéressant _____ ennuyeuse ___
- importante _____ sans importance ___
- utile _____ inutile ___
- recherchée _____ non recherchée ___

Le degré de compréhension, atteint par l'utilisateur, concernant de vos exigences dans la conception de l'application aux utilisateurs finaux était...
- élevé _____ faible ___
- suffisant _____ insuffisant ___

	Extrêmement	Très	Un peu	Ni l'un, ni l'autre	Un peu	Très	Extrêmement		Ne s'applique pas

Le degré de condideration atteint par l'utilisateur final concernant de vos exigence dans la conception de l'application aux utilisateurs finaux était...

élevé   _____ _____ _____ _____ _____ _____   faible   ___

suffisant   _____ _____ _____ _____ _____ _____   insuffisant   ___

Le degré de consultation atteint par l'utilisateur final dans la conception de l'application aux utilisateurs finaux était...

élevé   _____ _____ _____ _____ _____ _____   faible   ___

suffisant   _____ _____ _____ _____ _____ _____   insuffisant   ___

Une fois votre partie du travail complétée, votre dépendance face à l'utilisateur final afin de compléter les étapes subséquentes du processus global avant que le travail termines ou le service ne soit complété était...

significatif   _____ _____ _____ _____ _____ _____   insignifiant   ___

Le degré auquel l'utilisateur final avait besoin de vos services, ressources et/ou de votre soutien pour atteindre les buts et prendre ses responsabilités face au développement de l'application aux utilisateurs finaux était...

significatif   _____ _____ _____ _____ _____ _____   insignifiant   ___

Le degré auquel vous aviez besoin des services, ressources et/ou du soutien de l'utilisateur final pour atteindre vos buts et prendre vos responsabilités face au le développement de l'applicationsaux utilisateurs finaux était...

significatif   _____ _____ _____ _____ _____ _____   insignifiant   ___

Le niveau d'influence que l'utilisateur final avait sur les opérations internes de votre service était...

élevé   _____ _____ _____ _____ _____ _____   faible   ___

significatif   _____ _____ _____ _____ _____ _____   insignifiant   ___

Le degré auquel votre service a changé ou a influencé les services et /ou opérations de l'utilisateur final durant la dernière période de développement de l'application est...

significatif   _____ _____ _____ _____ _____ _____   insignifiant   ___

Des divergences d'opinion entre vous et l'utilisateur final sont survenues...

fréquemment   _____ _____ _____ _____ _____ _____   rarement   ___

Lorsque des divergences d'opinion sont survenues entre vous et l'utilisateur final, l'argumentation soulevée par l'utilisateur final était...

pertinente   _____ _____ _____ _____ _____ _____   non pertinente   ___

précieuse   _____ _____ _____ _____ _____ _____   sans valeur   ___

Lorsque des divergences d'opinion sont survenues entre vous et l'utilisateur final, vous aviez l'impression que l'utilisateur final perçevait votre réaction comme étant...

pertinente   _____ _____ _____ _____ _____ _____   non pertinente   ___

précieuse   _____ _____ _____ _____ _____ _____   sans valeur   ___

Des solutions mutuellement acceptables ont été obtenues lors des divergences d'opinion entre vous et l'utilisateur final...

fréquemment   _____ _____ _____ _____ _____ _____   rarement   ___

Le nombre de conflits qui sont survenue entre vous et l'utilisateur final qui n'étaient pas réglés à votre satisfaction était...

significatif   _____ _____ _____ _____ _____ _____   insignifiants   ___

pertinent   _____ _____ _____ _____ _____ _____   non pertinent   ___

Les questions suivantes portent sur les solutions pertinentes à l'utilisateur final, sur l'entreprise, sur votre profil et sur votre expérience de travail. Cette information sera utilisée seulement pour des fins statistiques et sera traitée de façon confidentielle.

1. Quelle est la nature principale des activités de l'entreprise? (veuillez s'il vous plait ne cocher qu'une seule case)
   - ____ Fabrication
   - ____ Soins de santé
   - ____ Services financiers
   - ____ Commercialisation
   - ____ Assurances
   - ____ Autre (spécifiez) _____
   - ____ Secteur public
   - ____ Éducation

2. Quel était l'application pour l'utilisateur final qui a été développée? *(S'il vous plaît veuillez indiquer les outils ou languages de programmation utilise)*. Ci-dessous, vous trouver des exemples de solutions à l'utilisateur final qui peuvent être considérées...
   - ____ Chiffrier (ex.: Excel, Lotus 1-2-3, Quattro Pro, etc.)
   - ____ Base de données (ex.: dBase, Access, FoxPro, Paradox, etc.)
   - ____ Simulateur (ex.: GPSS/H, etc.)
   - ____ Communications (ex.: DoubleView, etc.)
   - ____ Graphiques (conception technique - ex.: CAD, Corel Draw, etc.)
   - ____ Graphiques (présentation - ex.: PowerPoint, Freelance Graphics, etc.)
   - ____ Gestion de temps, Allocation de ressources(ex.: Outlook, Organizer, etc.)
   - ____ Applications basées sur l'Internet (ex.: Java, HTML, Perl, etc.)
   - ____ Utils DSS (ex.: Cognos, Business Objects, etc.)
   - ____ Applications Client Server(ex.: Oracle, Sybase, Visual Basic etc.)
   - ____ Autre (S.V.P. spécifiez) _____

3. Combien d'employés travaillent au sein de l'entreprise? ____

4. Quelle est votre champ de compétence? (S'il vous plaît, ne cocher qu'une seule case)
   - ____ Comptabilité
   - ____ Recherche & Développement
   - ____ Marketing
   - ____ Ingénérie
   - ____ Ressources humaines
   - ____ Finance
   - ____ Ventes
   - ____ Autre (spécifiez) _____
   - ____ Fabrication/Production
   - ____ Systèmes d'information
   - ____ Administration

5. Quelle est votre occupation (titre)? _____

6. Depuis combien d'années occupez-vous ce poste? ____

7. Depuis combien d'années êtes-vous à l'emploi de cette entreprise? ____

8. Depuis combien d'années êtes-vous un système analyste? ____

9. Veuillez indiquer le plus haut niveau de scolarité que vous avez complété?
   - ____ Niveau secondaire ou moins
   - ____ Baccalauréat
   - ____ Doctorat non complété
   - ____ CEGEP ou équivalent
   - ____ Maîtrise non complétée
   - ____ Doctorat complété
   - ____ Certificate Universitaire
   - ____ Maîtrise complétée

10. Age: ____

11. Sexe: Homme ____   Femme ____

Nous vous remercions de votre temps précieux consacré à remplir ce questionnaire. Vos questions ou commentaires on seront très appréciés. Si vous le désirez, vous pouvez utiliser l'espace ci-dessous pour vos questions et commentaires.

English Instrument for End-users

THE INTERACTION BETWEEN END-USERS AND SYSTEMS ANALYSTS WITHIN AN END-USER COMPUTING ENVIRONMENT: A SURVEY FOR END-USERS

The objective of this research is to investigate end-user and systems analyst interaction during end-user application development.

Where the term "systems analyst" is used, it is meant to represent the person (or persons) responsible for conducting system support in any phase (analysis, design, development, implementation, maintenance) of end-user application development. This person may be a representative of the Information Systems Department.

Where the term "end-user" is used, it is meant to represent the person who has had active participation in some aspect of end-user application development (from idea generation to developing applications).

It is intended that end-users that have participated in the end-user application development (from beginning to end) respond to this questionnaire

Please check the applicable box:

    End-user ☐   Systems Analyst ☐   Neither end-user nor system's analyst ☐

If you have checked "systems analyst" or "neither end-user nor system's analyst", please return the questionnaire to the person who gave it to you so that it can be forwarded to an end-user.

PLEASE ANSWER THE FOLLOWING QUESTIONS STATING YOUR **VERY FIRST IMPRESSION** REGARDING THE **MOST RECENT END-USER APPLICATION** DEVELOPMENT YOU TOOK PART IN.

Instructions:

Please read the following instructions carefully and then answer the sections that relate to you - making sure to answer each scale within an item.

	Extremely	Very	Slightly	Neither / nor	Slightly	Very	Extremely		Does not apply
The scale positions are defined as follows _Adjective X_								_Adjective Y_	

The following example illustrates the scale positions and their meanings:

My vacation in the Bahamas was:									
restful							X	_hectic_	
long						X		_short_	
wonderful				X				_terrible_	
cheap	X							_costly_	
safe								_dangerous_	X

According the responses, the persons vacation was extremely hectic, very short, neither wonderful nor terrible, very cheap and there were no applicable safety issues.

Please check each scale in the position that describes your evaluation of the factor being judged, checking only one position for each scale.

1307   _The responses to these questions will be kept strictly confidential_

PLEASE ANSWER THE FOLLOWING QUESTIONS STATING YOUR _VERY FIRST IMPRESSION_ REGARDING THE _MOST RECENT END-USER APPLICATION_ DEVELOPMENT YOU TOOK PART IN.

On the following scale, how would you classify yourself at the time the end-user application was being developed? (Circle the corresponding number)

1. _Non-programming End-User_: You access data through a limited menu driven environment or a set of standard procedures and do not create tailored procedures or use a report generator.

2. _Command Level User_: You understand the available databases and can perform simple inquiries and generate unique reports as your needs dictate.

3. _End-User Programmer_: You use both command and procedural languages to develop your own applications, some of which are used by other end-users.

4. _Functional Support Personnel_: Your expertise in end-user computing tools have caused you to become an informal center of system design within your functional area. You may also provide tools and processes for other users to get at and analyze data.

5. _End-User Computing Support Personnel_: You are located in a central support position in which you assist other end-users and develop applications of support software.

6. _Data Processing Programmer:_ You are part of a central pool of programmers that provides programming services to departments within the organization.

7. _Other:_____.

		Extremely	Very	Slightly	Neither / nor	Slightly	Very	Extremely			Does not apply
In your opinion, your participation in the development of the end-user application was...	appealing								unappealing		___
	fascinating								mundane		___
	exciting								unexciting		___
	essential								nonessential		___
Your level of participation in the initiation of the project was...	sufficient								insufficient		___
	significant								insignificant		___
Compared to the level of participation that you wanted to have, the level of participation that you actually had in the initiation of the project was...	sufficient								insufficient		___
	significant								insignificant		___
The amount of time that you spent determining the applications objectives was...	sufficient								insufficient		___
Compared to the amount of time that you wanted to spend determining the application's objectives, the amount of time that you actually spent was...	sufficient								insufficient		___
	high								low		___
Your level of participation in developing reports was...	significant								insignificant		___

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Scale headers (left to right): **Extremely | Very | Slightly | Neither / nor | Slightly | Very | Extremely** .... **Does not apply**

Compared to the level of participation that you wanted to have to develop reports, the level of participation that you actually had was... — high / sufficient ——————— low / insufficient ___

Your level of participation in creating user procedural manuals was... — high / significant ——————— low / insignificant ___

Compared to the level of participation that you wanted to have in creating user procedural manuals, the level of participation that you actually had was... — high / sufficient ——————— low / insufficient ___

Differences in opinion were resolved ... — frequently / satisfactorily ——————— infrequently / unsatisfactorily ___

The degree to which differences in opinion were resolved to your satisfaction was... — high ——————— low ___

In your opinion, your participation in the development of the end-user application was NOT... — interesting ——————— boring ___ / important ——————— unimportant ___ / useful ——————— useless ___ / desirable ——————— undesirable ___

The degree to which you believe the systems analyst(s) understood your requirements in the design of the end-user application was... — high / sufficient ——————— low / insufficient ___

The degree to which you believe the systems analyst(s) seriously considered your requirements in the design of the end-user application was... — high / sufficient ——————— low / insufficient ___

The degree to which you believe the systems analyst(s) consulted you in the design of the end-user application was... — high / sufficient ——————— low / insufficient ___

Once you had completed your part of a task, your reliance on the systems analyst(s) to perform the next steps in the process before the total task or service was completed was... — significant ——————— insignificant ___

The extent to which the systems analyst(s) needed your services, resources and/or support to accomplish their goals and responsibilities that pertained to the development of the end-user application system was... — significant ——————— insignificant ___

The extent to which you needed the services, resources and/or support of the systems analyst(s) to accomplish your goals and responsibilities that pertained to the development of the end-user application was... — significant ——————— insignificant ___

The level of influence that the systems analyst(s) had on the internal operations of your department was... — high / significant ——————— low / insignificant ___

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The extent that your department had changed or influenced the services and/or operations of the systems analyst(s) during the last end-user application development period was...   significant   ___ ___ ___ ___ ___ ___ ___   insignificant   ___

Differences in opinion between you and the systems analyst(s) occurred...   frequently   ___ ___ ___ ___ ___ ___ ___   infrequently   ___

When differences arose between you and the systems analyst(s), you perceived the argument defended by the systems analyst(s) to be...   relevant   ___ ___ ___ ___ ___ ___ ___   irrelevant   ___
  valuable   ___ ___ ___ ___ ___ ___ ___   worthless   ___

When differences arose between you and the systems analyst(s), you felt that the systems analyst(s) perceived your defense as...   relevant   ___ ___ ___ ___ ___ ___ ___   irrelevant   ___
  valuable   ___ ___ ___ ___ ___ ___ ___   worthless   ___

When differences arose between you and the systems analyst(s), mutually agreeable solutions were reached...   frequently   ___ ___ ___ ___ ___ ___ ___   infrequently   ___

The number of differences that arose between you and the systems analyst(s) that were not resolved to your satisfaction were...   significant   ___ ___ ___ ___ ___ ___ ___   insignificant   ___
  relevant   ___ ___ ___ ___ ___ ___ ___   irrelevant   ___

The end-user application that you are presently using is...   easy to use   ___ ___ ___ ___ ___ ___ ___   difficult to use   ___
  versatile   ___ ___ ___ ___ ___ ___ ___   limited   ___
  fast   ___ ___ ___ ___ ___ ___ ___   slow   ___
  reliable   ___ ___ ___ ___ ___ ___ ___   unreliable   ___

The training that you received on the operation of the computer and its peripherals (e.g. terminal, printer) was...   complete   ___ ___ ___ ___ ___ ___ ___   incomplete   ___
  sufficient   ___ ___ ___ ___ ___ ___ ___   insufficient   ___

The training that you received on the use of the end-user application was...   complete   ___ ___ ___ ___ ___ ___ ___   incomplete   ___
  sufficient   ___ ___ ___ ___ ___ ___ ___   insufficient   ___

The amount of time it took the technical support group to develop and put into operation the system was...   short   ___ ___ ___ ___ ___ ___ ___   long   ___
  reasonable   ___ ___ ___ ___ ___ ___ ___   unreasonable   ___

The technical personnel supporting the end-user application were...   competent   ___ ___ ___ ___ ___ ___ ___   incompetent   ___
  available   ___ ___ ___ ___ ___ ___ ___   unavailable   ___
  cooperative   ___ ___ ___ ___ ___ ___ ___   uncooperative   ___
  responsive   ___ ___ ___ ___ ___ ___ ___   unresponsive   ___

The amount of time that it took the technical support group to respond to your requests for changes in the end-user application was ...   short   ___ ___ ___ ___ ___ ___ ___   long   ___
  reasonable   ___ ___ ___ ___ ___ ___ ___   unreasonable   ___

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		Extremely	Very	Slightly	Neither / nor	Slightly	Very	Extremely		Does not apply

The documentation you received on the use of the end-user application software was...
- complete ___ ___ ___ ___ ___ ___ ___ incomplete ___
- current ___ ___ ___ ___ ___ ___ ___ obsolete ___
- available ___ ___ ___ ___ ___ ___ ___ unavailable ___

The output that the end-user application offers you (e.g. reports, statements, documents, graphics) is...
- accurate ___ ___ ___ ___ ___ ___ ___ inaccurate ___
- useful ___ ___ ___ ___ ___ ___ ___ useless ___
- relevant ___ ___ ___ ___ ___ ___ ___ irrelevant ___
- complete ___ ___ ___ ___ ___ ___ ___ incomplete ___
- flexible ___ ___ ___ ___ ___ ___ ___ inflexible ___

When you compare yourself to colleagues who do not use any automated systems you believe you are...
- more productive ___ ___ ___ ___ ___ ___ ___ less productive ___
- more independent ___ ___ ___ ___ ___ ___ ___ less independent ___

Your chances for promotion owing to your experience with a computer based system are...
- good ___ ___ ___ ___ ___ ___ ___ bad ___

Your level of familiarity with the manual operation before it was automated on a computer based system was...
- high ___ ___ ___ ___ ___ ___ ___ low ___

Your degree of understanding of computer based information systems before being involved in this one was...
- high ___ ___ ___ ___ ___ ___ ___ low ___

Your overall satisfaction as a user of a computer based system and the end-user application software is...
- satisfied ___ ___ ___ ___ ___ ___ ___ dissatisfied ___

The remaining questions on this survey are concerned with the end-user application itself, your company, your background and your work experience. This information is to be used for statistical analysis only and will be kept confidential.

1. What is your organization's primary business? (please check one)
   - ___ Manufacturing
   - ___ Health care
   - ___ Financial Services
   - ___ Merchandizing
   - ___ Insurance
   - ___ Other (please specify) _____
   - ___ Public Sector
   - ___ Educational

2. What was the end-user application being developed? *(Please indicate the tool that the application was developed in - if the end-user application was custom built, please indicate the programming language that the application was written in).* Below are examples of end-user applications that may have been developed ...
   - ___ Spreadsheet (e.g. Excel, Lotus 1-2-3, Quattro Pro, etc.) _____
   - ___ Data Base Application (e.g.dBase, Access, FoxPro, Paradox, etc.) _____
   - ___ Simulation (e.g. GPSS/H, etc.) _____
   - ___ Communications (e.g. DoubleView, etc.) _____
   - ___ Graphics (technical design-e.g. CAD, Corel Draw, Photoshop, etc.) _____
   - ___ Graphics (presentation-e.g. PowerPoint, Freelance Graphics, etc.) _____
   - ___ Time/Resource Monitoring (e.g. Outlook, Organizer, etc.) _____
   - ___ Web Based Application (e.g. Java, HTML, Perl, etc.) _____
   - ___ DSS Tools (e.g. Cognos, Business Objects, etc.) _____
   - ___ Client Server Applications (e.g. Oracle, Sybase, Visual Basic etc.) _____
   - ___ Other (please specify) _____

3. How many employees does your company employ? _____

4. What is your functional area? (please check one)

____ Accounting	____ Personnel	____ Manufacturing/Production
____ Research & Development	____ Finance	____ Information Systems/Technology
____ Marketing	____ Sales	____ General Management
____ Engineering	____ Other (please specify) _____	

5. What is your present title? _____

6. How many years have you been in your present position? _____

7. How many years have you been with this company? _____

8. How many years of experience do you have as an end-user? _____

9. Please indicate the highest level of education you have achieved:

____ High school or less	____ CEGEP or equivalent	____ University certificate
____ Bachelors degree	____ Incomplete Masters	____ Completed Masters
____ Incomplete Ph.D.	____ Completed Ph.D.	

10. Age: _____

11. Gender: Male_____   Female_____

Thank you for taking the time to fill out this questionnaire. Should you have any comments or questions about issues that this questionnaire may have brought up, please use the following space to express them:

APPENDIX 8

French Instrument for End-users

ÉTUDE SUR LES INTERACTIONS ENTRE LES UTILISATEURS ET LES ANALYSTES DE SYSTÈMES DANS UN ENVIRONNEMENT DOMINÉ PAR L'UTILISATEUR FINAL.

L'objectif de cette étude est d'évaluer les interactions entre les utilisateurs finaux et l'analyste de système au cours de la période de développement des applications informatiques.

Lorsque le terme "analyste de sytèmes" est utilisé, il définit la personne ou les personnes qui sont impliquées lors d'une ou plusieurs des phases suivantes de développement des applications pour l'utilisateur final: analyse, conception, développement, implantation, entretien. Cette personne peut être un représentant ou un employé du service des systèmes d'information.

Le terme "utilisateur final" définit la personne qui a participé de façon active à un des aspects du développement des applications (de la conception de l'idée jusqu'au développement des solutions).

Ce questionnaire s'adresse à l'utilisateur final.

S'il vous plaît veuillez cocher la case appropriée:
                     Utilisateur final ❑   Analyste de systèmes ❑   Ni l'un, ni l'autre ❑

Si vous avez coché la case "Analyste des systèmes" ou "Ni l'un, ni l'autre", veuillez s'il vous plaît retourner le présent questionnaire à la personne qui vous l'a remis afin qu'elle puisse l'acheminer aux utilisateurs fineaux.

VEUILLEZ RÉPONDRE AUX QUESTIONS SUIVANTES EN INDIQUANT VOTRE TOUTE PREMIÈRE IMPRESSION SUR LE PLUS RÉCENT DÉVELOPPEMENT DES APPLICATIONS AUQUELS VOUS AVEZ PARTICIPÉS

Directives:

Veuillez lire attentivement les directives qui suivent et répondre aux questions qui vous concernent en vous assurant d'utiliser l'échelle d'appréciation pour chacun des sujets mentionnés:

Veuillez cocher les cases en fonction de la position qui décrit le mieux votre évaluation du sujet traité en ne cochant qu'une seule position pour chaque échelle d'appréciation.

	Extrêmement	Très	Un peu	Ni l'un, ni l'autre	Un peu	Très	Extrêmement		Ne s'applique pas

Les positions indiquées sur l'échelle sont déterminées comme suit: _Adjectif X_ ___ ___ ___ ___ ___ ___ ___ _Adjectif Y_   ___

L'exemple qui suit illustre bien les positions utilisées sur l'échelle d'appréciation ainsi que leur degré d'importance:

Mes vacances au Bahamas étaient:		Extrêmement	Très	Un peu	Ni l'un, ni l'autre	Un peu	Très	Extrêmement		Ne s'applique pas
	Reposantes							X	_Mouvementées_	___
	Longues						X		_Courtes_	___
	Merveilleuses				X				_Terribles_	___
	Modestes	X							_Coûteuses_	___
	Sécuritaires								_Non sécuritaires_	X

Selon les réponses indiquées sur l'échelle, ces personnes ont passé des vacances extrêmement mouvementées, très courtes, ni merveilleuses ni terribles, très modestes et il n'y avait aucun lien avec des questions de sécurité.

**Les réponses à ces questions seront traitées de façon strictement confidentielle.**

1922

VEUILLEZ RÉPONDRE AUX QUESTIONS SUIVANTES EN INDIQUANT VOTRE TOUTE PREMIERE IMPRESSION SUR LE PLUS RÉCENT DÉVELOPPEMENT DES APPLICATIONS AUQUELS VOUS AVEZ PARTICIPÉS

Dans le cadre de l'échelle d'appréciation suivante, quel attribut décrit le mieux votre fonction au moment du développement des solutions pour l'utilisateur final? (veuillez encercler le chiffre qui correspond à votre réponse)

1. *Utilisateur final - sans fonction de programmation* : Vous accédez aux données à l'aide d'un menu spécifique ou par voie de procédures standards. Vous ne créez aucune procédure spéciale ni utilisez de générateur de rapport.

2. *Utilisateur du niveau d'interrogateur* : Vous comprenez les bases de données disponibles, vous pouvez effectuer des requêtes simples et vous pouvez générer des rapports spécifiques en fonction de vos besoins.

3. *Utilisateur final - avec fonction de programmation* : Vous programmez vos propres applications dont certaines sont utilisées par d'autres utilisateurs.

4. *Personnel de soutien technique* : Votre expertise en informatique vous a amené à jouer un rôle informel lors de la conception des applications des autres utilisateurs finaux.

5. *Personnel du centre de soutien aux utilisateurs:* Vous faites partie du service des systèmes d'information et vous assistez les utilisateurs finaux dans le développement de leurs applications.

6. *Programmeur de traitement de données:* Vous faites partie d'un groupe de programmeurs qui fournit des services aux autres services de l'entreprise.

7. *Autre:*_____.

		Extrêmement	Très	Un peu	Ni l'un, ni l'autre	Un peu	Très	Extrêmement		Ne s'applique pas
Selon votre opinion, votre participation dans le développement de l'application pour l'utilisateur final était...	tentante								non tentante	___
	fascinante								banale	___
	excitante								non excitante	___
	comblée								non comblée	___
Votre niveau de participation dans la conception du projet était...	suffisant								insuffisant	___
	significatif								insignifiant	___
Comparé au niveau de participation que vous désiriez avoir, le niveau de participation que vous avez finalement obtenu dans la conception du projet était...	suffisant								insuffisant	___
	significatif								insignifiant	___
Le temps que vous avez utilisé pour déterminer les objectifs de l'application envisagée était...	suffisant								insuffisant	___
Comparé au temps que vous désiriez passer à déterminer les objectifs de l'application envisagée, le temps que vous avez finalement utilisé était...	suffisant								insuffisant	___
Votre niveau de participation dans le développement des rapports était...	élevé								faible	___
	significatif								insignifiant	___
Comparé au niveau de participation désiré pour développer des rapports, le niveau actuel de participation était...	élevé								faible	___
	suffisant								insuffisant	___

	Extrêmement	Très	Un peu	Ni l'un, ni l'autre	Un peu	Très	Extrêmement		Ne s'applique pas

Votre niveau de participation dans la production des manuels de procédures pour l'utilisateur final était...

élevé ___ ___ ___ ___ ___ ___ ___ faible ___
significatif ___ ___ ___ ___ ___ ___ ___ insignifiant ___

Comparé au niveau de participation désiré dans la production des manuels de procédures pour l'utilisateur final, le niveau actuel de votre implication était...

élevé ___ ___ ___ ___ ___ ___ ___ faible ___
suffisant ___ ___ ___ ___ ___ ___ ___ insuffisant ___

Des divergences d'opinion étaient résolues ...

fréquemment ___ ___ ___ ___ ___ ___ ___ rarement ___
de façon satisfaisante ___ ___ ___ ___ ___ ___ ___ de façon insatisfaisante ___

Le taux de conflits resolus de façon satisfaisante était...

élevé ___ ___ ___ ___ ___ ___ faible ___

Selon votre opinion, votre implication dans le développement de l'application pour l'utilisateur final N'ÉTAIT PAS...

intéressant ___ ___ ___ ___ ___ ___ ___ ennuyeuse ___
importante ___ ___ ___ ___ ___ ___ ___ sans importance ___
utile ___ ___ ___ ___ ___ ___ ___ inutile ___
recherchée non recherchée

Le degré de compréhension, atteint par l'analyste de systèmes, concernant de vos exigences dans la conception de l'application aux utilisateurs finaux était...

élevé ___ ___ ___ ___ ___ ___ ___ faible ___
suffisant ___ ___ ___ ___ ___ ___ ___ insuffisant ___

Le degré de consideration atteint par l'analyste de systèmes concernant de vos exigence dans la conception de l'application aux utilisateurs finaux était...

élevé ___ ___ ___ ___ ___ ___ ___ faible ___
suffisant ___ ___ ___ ___ ___ ___ ___ insuffisant ___

Le degré de consultation atteint par l'analyste de systèmes dans la conception de l'application aux utilisateurs finaux était...

élevé ___ ___ ___ ___ ___ ___ ___ faible ___
suffisant ___ ___ ___ ___ ___ ___ ___ insuffisant ___

Une fois votre partie du travail complétée, votre dépendance envers l'analyste de systèmes pour la poursuite des étapes nécessaires dans le processus global avant que le travail ou le service ne soit complété était...

significatif ___ ___ ___ ___ ___ ___ ___ insignifiant ___

Le degré auquel l'analyste de systèmes avait besoin de vos services, ressources et/ou de votre soutien pour atteindre les buts et prendre en charge ses responsabilités face au développement de l'application aux utilisateurs finaux était...

significatif ___ ___ ___ ___ ___ ___ ___ insignifiant ___

Le degré auquel vous aviez besoin des services, ressources et/ou du soutien de l'analyste de systèmes pour atteindre vos buts et prendre vos responsabilités face au développement de l'application aux utilisateurs finaux était...

significatif ___ ___ ___ ___ ___ ___ ___ insignifiant ___

	Extrêmement	Très	Un peu	Ni l'un, ni l'autre	Un peu	Très	Extrêmement		Ne s'applique pas

Le niveau d'influence que l'analyste de systèmes avait sur les opérations internes de votre service était...

élevé ___ ___ ___ ___ ___ ___ faible
significatif ___ ___ ___ ___ ___ ___ insignifiant ___

Le degré auquel votre service a changé ou influencé les services et/ou opérations de l'analyste de systèmes durant la dernière période de développement de l'application était...

significatif ___ ___ ___ ___ ___ ___ insignifiant ___

Des divergences d'opinion entre vous et l'analyste de systèmes sont survenues...

fréquemment ___ ___ ___ ___ ___ ___ rarement ___

Lorsque des divergences d'opinion sont survenues entre vous et l'analyste de systèmes, l'argumentation soulevée par l'analyste de systèmes était...

pertinente ___ ___ ___ ___ ___ ___ non pertinente ___
précieuse ___ ___ ___ ___ ___ ___ sans valeur ___

Lorsque des divergences d'opinion sont survenues entre vous et l'analyste de systèmes, vous pensez que l'analyste de système perçevait votre argumentation comme étant...

pertinente ___ ___ ___ ___ ___ ___ non pertinente ___
précieuse ___ ___ ___ ___ ___ ___ sans valeur ___

Des solutions mutuellement acceptables ont été obtenues lors des divergences d'opinion entre vous et l'analyste de systèmes...

fréquemment ___ ___ ___ ___ ___ ___ rarement ___

Le nombre de conflits qui sont survenue entre vous et l'analyste de systèmes qui n'étaient pas réglés à votre satisfaction était...

significatif ___ ___ ___ ___ ___ ___ insignifiants ___
pertinent ___ ___ ___ ___ ___ ___ non pertinent ___

L'application que vous utilisez présentement est...

facile d'utilisation ___ ___ ___ ___ ___ ___ difficile d'utilisation ___
polyvalente ___ ___ ___ ___ ___ ___ limitée ___
rapide ___ ___ ___ ___ ___ ___ lente ___
fiable ___ ___ ___ ___ ___ ___ non fiable ___

La formation que vous avez reçue pour l'utilisation de l'ordinateur et des périphériques de sortie (ex.: écran de visualisation, imprimante, etc.) était...

complète ___ ___ ___ ___ ___ ___ incomplète ___
suffisante ___ ___ ___ ___ ___ ___ insuffisante ___

La formation reçue pour l'utilisation de l'application était...

complète ___ ___ ___ ___ ___ ___ incomplète ___
suffisante ___ ___ ___ ___ ___ ___ insuffisante ___

Le temps requis par le service des systèmes d'information pour développer et mettre en opération l'application était...

court ___ ___ ___ ___ ___ ___ long ___
raisonnable ___ ___ ___ ___ ___ ___ déraisonnable ___

Le personnel de service des systèmes d'information qui supporte l'application est...

compétent ___ ___ ___ ___ ___ ___ incompétent ___
disponible ___ ___ ___ ___ ___ ___ non disponible ___
coopératif ___ ___ ___ ___ ___ ___ non coopératif ___
attentionné ___ ___ ___ ___ ___ ___ non attentionné ___

Le temps requis par le service des systèmes d'information pour répondre à vos requêtes de modifications de l'application était...

court ___ ___ ___ ___ ___ ___ long ___
raisonnable ___ ___ ___ ___ ___ ___ déraisonnable ___

	Extrêmement	Très	Un peu	Ni l'un, ni l'autre	Un peu	Très	Extrêmement		Ne s'applique pas

La documentation reçue sur l'utilisation de l'application était...
- complète ___ ___ ___ ___ ___ ___ ___ incomplète ___
- à jour ___ ___ ___ ___ ___ ___ ___ dépassée ___
- disponible ___ ___ ___ ___ ___ ___ ___ non disponible ___

Les choix de sorties de l'application qui vous sont offertes (ex.: rapports, états des dossiers, documents, graphiques, etc.) sont...
- précis ___ ___ ___ ___ ___ ___ ___ vagues ___
- utiles ___ ___ ___ ___ ___ ___ ___ inutiles ___
- pertinents ___ ___ ___ ___ ___ ___ ___ non pertinents ___
- complets ___ ___ ___ ___ ___ ___ ___ incomplets ___
- flexibles ___ ___ ___ ___ ___ ___ ___ rigides ___

Lorsque vous vous comparez à des collègues qui n'utilisent pas d'applications informatiques, vous croyez que vous êtes...
- plus productif ___ ___ ___ ___ ___ ___ ___ moins productif ___
- plus indépendant ___ ___ ___ ___ ___ ___ ___ moins indépendant ___

Vos chances de promotion basées sur votre expérience de travail avec une application composée avec des ordinateurs sont...
- bonnes ___ ___ ___ ___ ___ ___ ___ mauvaises ___

Votre niveau de familiarité avec les opérations manuelles avant l'application informatique était...
- élevé ___ ___ ___ ___ ___ ___ faible ___

Votre degré de compréhension des applications informatique avant d'être impliqué dans le projet était...
- élevé ___ ___ ___ ___ ___ ___ ___ faible ___

Votre satisfaction générale en tant qu'utilisateur du système et d'application pour l'utilisateur final est...
- satisfaisante ___ ___ ___ ___ ___ ___ insatisfaisante ___

Les questions suivantes portent sur les solutions pertinentes à l'utilisateur final, sur l'entreprise, sur votre profil et sur votre expérience de travail. Cette information sera utilisée seulement pour des fins statistiques et sera traitée de façon confidentielle.

1. Quelle est la nature principale des activités de l'entreprise? (veuillez s'il vous plaît ne cocher qu'une seule case)

___ Fabrication	___ Commercialisation	___ Secteur public
___ Soins de santé	___ Assurances	___ Éducation
___ Services financiers	___ Autre (spécifiez) _____	

2. Quel était l'application pour l'utilisateur final qui a été développée? *(S'il vous plaît veuillez indiquer les outils ou langages de programmation utilise).* Ci-dessous, vous trouver des exemples de solutions à l'utilisateur final qui peuvent être considérées...

- ___ Chiffrier (ex.: Excel, Lotus 1-2-3, Quattro Pro, etc.) _____
- ___ Base de données (ex.: dBase, Access, FoxPro, Paradox, etc.) _____
- ___ Simulateur (ex.: GPSS/H, etc.) _____
- ___ Communications (ex.: DoubleView, etc.) _____
- ___ Graphiques (conception technique - ex.: CAD, Corel Draw, etc.) _____
- ___ Graphiques (présentation - ex.: PowerPoint, Freelance Graphics, etc.) _____
- ___ Gestion de temps, Allocation de ressources (ex.: Outlook, Organizer, et _____
- ___ Applications basées sur l'Internet (ex.: Java, HTML, Perl, etc.) _____
- ___ Utils DSS (ex.: Cognos, Business Objects, etc.) _____
- ___ Applications Client Server(ex.: Oracle, Sybase, Visual Basic etc.) _____
- ___ Autre (S.V.P. spécifiez) _____

3. Combien d'employés travaillent au sein de l'entreprise? _____

4. Quelle est votre champ de compétence? (S'il vous plaît, ne cocher qu'une seule case)

____ Comptabilité	____ Ressources humaines	____ Fabrication/Production
____ Recherche & Développement	____ Finance	____ Systèmes d'information
____ Marketing	____ Ventes	____ Administration
____ Ingénérie	____ Autre (spécifiez) _____	

5. Quelle est votre occupation (titre)? _____

6. Depuis combien d'années occupez-vous ce poste? _____

7. Depuis combien d'années êtes-vous à l'emploi de cette entreprise? _____

8. Depuis combien d'années êtes-vous une utilisateur final? _____

9. Veuillez indiquer le plus haut niveau de scolarité que vous avez complété?

____ Niveau secondaire ou moins	____ CEGEP ou équivalent	____ Certificate Universitaire
____ Baccalauréat	____ Maîtrise non complétée	____ Maîtrise complétée
____ Doctorat non complété	____ Doctorat complété	

10. Age: _____

11. Sexe: Homme _____   Femme _____

Nous vous remercions de votre temps précieux consacré à remplir ce questionnaire. Vos questions ou commentaires on seront très appréciés. Si vous le désirez, vous pouvez utiliser l'espace ci-dessous pour vos questions et commentaires.

APPENDIX 9

Telephone Script

Good afternoon,

My name is Nadine Wilson and I'm a graduate student at Concordia University in Montréal. Three weeks ago, I sent an envelope detailing research I am conducting to complete my Masters Thesis. I am examining the interaction between end-users and systems analysts within an end-user computing environment. Consequently, the package I sent included a questionnaire for end-users and another for systems analysts.

The purpose of this call is simply to re-iterate the importance of this research to me – without it, I can't complete my thesis. I'd like to ask, please if you have not yet forwarded the questionnaire to please do so. I really appreciate any help that you can offer me.

Should you need further information, have any questions, or need more questionnaires, please do not hesitate to contact me at xxx-xxx-xxxx.

Thank you.

APPENDIX 10

English and French Reminder Cards

October 27, 1999
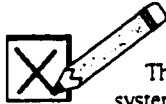
Three weeks ago, two questionnaires regarding the interaction between end-users and systems analysts were sent to you. The purpose of this reminder is to simply re-iterate the importance of this research to me - and the possible effect that the results of this study may have on future end-user computing projects throughout Canada.

If you have already forwarded the questionnaires and they have been returned to me, please accept my sincere thanks. If you are unsure whether they were returned or not, I would appreciate your double-checking. It is extremely important that your organization be included in the study if the results are to accurately represent the opinions of end-users and systems analysts throughout Canada.

If by some chance, you did not receive the questionnaire, or it got misplaced, please call (514) 570-5936 and I will mail copies of both the cover letter and the questionnaires immediately.

Thank you for your assistance,

Nadine Wilson
MSc. Student, Concordia University

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27 Octobre, 1999

La présente fait suite à deux questionnaires qui vous furent parvenus récemment et qui vous ont permis de participer à un sondage traitant de l'interraction entre les utilisateurs et les analystes de votre système d'informatique ainsi que l'implication de cette relation sur la réussite de ce système. Il va sans dire que la participation de votre entreprise est d'une grande importance à la réalisation de ce projet et affecte directement l'effet que produira cette étude sur les programmes d'informatique partout au Canada.

Si vous avez déjà répondu aux questionnaires et savez qu'ils furent dument retournés, je vous en suis très reconnaissante. Si par ailleurs vous n'en êtes pas certain, auriez-vous l'obligeance de vérifier. Je ne puis que vous réitérer l'importance d'inclure vos réponses à cette étude afin d'obtenir les résultats de la plus haute fidélité, représentant les opinions précis des utilisateurs et analystes à travers le Canada.

Si vous n'avez pas encore reçu ces questionnaires, ou encore s'ils sont égarés, veuillez me contacter au (514) 570-5936 et il me fera plaisir de vous en faire parvenir une copie dans le plus bref délai, ainsi que la lettre qui l'accompagne.

Grand merci pour votre prompte coopération.

Nadine Wilson, candidate à la maîtrise, Université Concordia

APPENDIX 11

<u>Survey Instrument Coding Directory</u>

Section 1 - Systems Analysts responses

Data Element #	Field Description	Values	
1	(Participation)	appealing	0-8
2	"	fascinating	0-8
3	"	exciting	0-8
4	"	essential	0-8
5	(Participation in initiation of project)	sufficient	0-8
6	"	significant	0-8
7	(Actual Participation in initiation of project)	sufficient	0-8
8	"	significant	0-8
9	(Actual Objective Definition)	sufficient	0-8
10	(Desired Objective Definition)	sufficient	0-8
11	(Actual Report Development)	high	0-8
12	"	significant	0-8
13	(Desired Report Development)	high	0-8
14	"	sufficient	0-8
15	(Actual Manual Development)	high	0-8
16	"	significant	0-8
17	(Desired Manual Development)	high	0-8
18	"	sufficient	0-8
19	(Difference Resolution)	frequently	0-8
20	"	satisfactorily	0-8
21	(Resolution Satisfaction)	high	0-8
22	(Participation)	boring	0-8
23	"	unimportant	0-8
24	"	useless	0-8
25	"	undesirable	0-8
26	(Alternative Understanding)	high	0-8
27	"	sufficient	0-8
28	(Alternative Consideration)	high	0-8
29	"	sufficient	0-8
30	(Design Consultation)	high	0-8
31	"	sufficient	0-8
32	(Reliance of End-Users)	significant	0-8
33	(Reliance on Systems Analyst)	significant	0-8
34	(Influence of End-Users)	significant	0-8
35	(Influence of End-Users)	high	0-8
36	(Influence of End-Users)	significant	0-8
37	(Influence on Systems Analyst)	significant	0-8
38	(Conflict)	frequently	0-8
39	(Conflict)	relevant	0-8
40	"	valuable	0-8
41	(Conflict – SA defense)	relevant	0-8
42	"	valuable	0-8

43	(Conflict Resolution)	frequently	0-8
44	(Conflict Resolution)	significant	0-8
45	(Conflict Resolution)	relevant	0-8

Section 1 – End-Users responses

Data Element #	Field Description		Values
Part 1 1	End-user Description [a]		0-7

The end-user definition was coded under the following scheme...

0: Empty variable
1: Non-programming end-user
2: Command-level user
3: End-user programmer
4: Functional support personnel
5: End-user computing support personnel
6: Data processing programmer
7: Other

Part 2 1	(Participation)	appealing	0-8
2	"	fascinating	0-8
3	"	exciting	0-8
4	"	essential	0-8
5	(Actual Initiation Participation)	sufficient	0-8
6	"	significant	0-8
7	(Desired Initiation Participation)	sufficient	0-8
8	"	significant	0-8
9	(Actual Objective Definition)	sufficient	0-8
10	(Desired Objective Definition)	sufficient	0-8
11	(Actual Report Development)	high	0-8
12	"	significant	0-8
13	(Desired Report Development)	high	0-8
14	"	sufficient	0-8
15	(Actual Manual Development)	high	0-8
16	"	significant	0-8
17	(Desired Manual Development)	high	0-8
18	"	sufficient	0-8
19	(Difference Resolution)	frequently	0-8
20	"	satisfactorily	0-8
21	(Resolution Satisfaction)	high	0-8
22	(Participation)	boring	0-8
23	"	unimportant	0-8
24	"	useless	0-8
25	"	undesirable	0-8
26	(Requirement Understanding)	high	0-8
27	"	sufficient	0-8
28	(Requirement Consideration)	high	0-8

29	"	sufficient	0-8
30	(Design Consultation)	high	0-8
31	"	sufficient	0-8
32	(Reliance on Systems Analysts)	significant	0-8
33	(Reliance of Systems Analysts)	significant	0 8
34	(Reliance on Systems Analysts)	significant	0-8
35	(Influence of Systems Analyst)	high	0-8
36	(Influence on Systems Analyst)	significant	0-8
37	(Influence on Systems Analyst)	significant	0-8
38	(Conflict)	frequently	0-8
39	(Conflict – SA defense)	relevant	0-8
40	"	valuable	0-8
41	(Conflict – EU defense)	relevant	0-8
42	"	valuable	0-8
43	(Conflict Resolution)	frequently	0-8
44	(Lack of Conflict Resolution)	significant	0-8
45	"	relevant	0-8
46	(System)	easy to use	0-8
47	"	versatile	0-8
48	"	fast	0-8
49	"	reliable	0-8
50	(Training – hardware)	complete	0-8
51	"	sufficient	0-8
52	(Training – software)	complete	0-8
53	"	sufficient	0-8
54	(Technical Support time)	short	0-8
55	"	reasonable	0-8
56	(Technical Support)	competent	0-8
57	"	available	0-8
58	"	cooperative	0-8
59	"	responsive	0-8
60	(Technical Support Response)	short	0-8
61	"	reasonable	0-8
62	(Documentation)	complete	0-8
63	"	current	0-8
64	"	available	0-8
65	(Output)	accurate	0-8
66	"	useful	0-8
67	"	relevant	0-8
68	"	complete	0-8
69	"	flexible	0-8
70	(Colleague comparison)	more productive	0-8
71	"	more independent	0-8
72	(Promotion possibility)	good	0-8
73	(Job familiarity)	high	0-8
74	(Job understanding)	high	0-8
75	(Overall satisfaction)	satisfied	0-8

Section 2

Data Element #	Field Description	Values
1	Organizations Primary Business[a]	0-8
2	End-User Application[b]	0-11
3	Employees within the organization	0-9999
4	Functional area[c]	0-11
5	Title	
6	Experience at position	0-99.99
7	Length of service	0-99.99
8	Experience as systems analyst/end-user	0-99.99
9	Educational Level[d]	0-8
10	Age	0-99
11	Gender [e]	0-2

a. The respondents organization's primary business was coded using the following scheme...

     0: Empty variable
     1: Manufacturing
     2: Merchandizing
     3: Public Sector
     4: Health Care
     5: Insurance
     6: Educational
     7: Financial Services
     8: Other

b. The end-user application being developed was coded using the following scheme...

     0: Empty variable
     1: Spreadsheet
     2: Database Application
     3: Simulation
     4: Communications
     5: Graphics (Technical Design)
     6: Graphics (Presentation)
     7: Time/Resource Monitoring
     8: Web-based Applications
     9: DSS tools
     10: Client Server Applications
     11: Other

c. The functional area of the respondent was coded using the following scheme...

     0: Empty variable
     1: Accounting
     2: Personnel
     3: Manufacturing/Production
     4: Research and Development

5: Finance
6: Information Systems/Technology
7: Marketing
8: Sales
9: General Management
10: Engineering
11: Other

d. The level of education of the respondent was coded using the following scheme...

0: Empty variable
1: High school or less
2: CEGEP or equivalent
3: University certificate
4: Bachelors degree
5: Incomplete masters
6: Completed masters
7: Incomplete Ph.D.
8: Complete Ph.D.

e. The gender of the respondent was coded using the following scheme...

0: Empty variable
1: Male
2: Female

APPENDIX 12

Hypothesized Factors and Associated Scales

Hypothesized factor description		Scale	
		Code	**Description**
Participation	Participation in development	Q1DE1	appeal
		Q1DE2	fascination
		Q1DE3	excitement
		Q1DE4	essentiality
	Level of participation in initiation of project	Q2DE5	sufficiency
		Q2DE6	significance
	Comparison of actual and desired participation	Q3DE7	sufficiency
		Q3DE8	significance
	Time spent determining objectives	Q4DE9	sufficiency
	Comparison of actual and desired time	Q5DE10	sufficiency
	Level of participation developing reports	Q6DE11	high
		Q6DE12	significance
	Comparison of actual and desired time developing reports	Q7DE13	high
		Q7DE14	sufficiency
	Creation of user manuals	Q8DE15	high
		Q8DE16	significance
	Comparison of actual and desired in creation of user manuals	Q9DE17	high
		Q9DE18	sufficiency
Conflict Resolution	Resolution of differences	Q10DE19	frequency
		Q10DE20	satisfaction
	Satisfaction of resolutions	Q11DE21	high
Participation	Participation in development	Q12DE22	interesting
		Q12DE23	importance
		Q12DE24	usefulness
		Q12DE25	desirability
Involvement	Understanding of alternatives requirements	Q13DE26	high
		Q13DE27	sufficiency
	Consideration of alternatives requirements	Q14DE28	high
		Q14DE29	sufficiency
	Design consultation	Q15DE30	high
		Q15DE31	sufficiency
Influence	Reliance	Q16DE32	significance
		Q17DE33	significance
		Q18DE34	significance
	Level of influence on operations	Q19DE35	high
		Q19DE36	sufficiency
	Extent of influence on operations	Q20DE37	significance
Conflict	Differences in opinion	Q21DE38	frequency
	Argument defence	Q22DE39	relevancy
		Q22DE40	value
		Q23DE41	relevancy
		Q23DE42	value
Conflict Resolution	Reaching of mutually agreeable solutions	Q24DE43	frequency
	Number of differences not resolved	Q25DE44	significance
		Q25DE45	relevancy
System Success	EUC application characteristics	Q26DE46	ease of use
		Q26DE47	versatility

		Q26DE48	speed
		Q26DE49	reliability
	User training (hardware)	Q27DE50	completeness
		Q27DE51	sufficiency
	User training (end-user application)	Q28DE52	completeness
		Q28DE53	sufficiency
	Time for technical support	Q29DE54	amount
		Q29DE55	reasonableness
	Technical support	Q30DE56	competency
		Q30DE57	availability
		Q30DE58	cooperativness
		Q30DE59	responsiveness
	Timeliness (modification time)	Q31DE60	amount
		Q31DE61	reasonableness
	Documentation	Q32DE62	completeness
		Q32DE63	currency
		Q32DE64	availability
	Output	Q33DE65	accuracy
		Q33DE66	usefulness
		Q33DE67	relevancy
		Q33DE68	completeness
		Q33DE69	flexibility
	Perceived effect on job	Q34DE70	productivity
		Q34DE71	independence
	Perceived effect on career	Q35DE72	chance for advancement
	Familiarity	Q36DE73	with manual operation
	Experience	Q37DE74	with computers
	Overall satisfaction	Q38DE75	satisfaction

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Scale Matrix

Bipolar Adjectives			Bailey & Pearson (1983)	Barki & Huff (1990)	Baroudi & Orlikowski (1988)	Bilili et al (1998)	Büyükkurt & Vass (1993)	Hunton & Beeler (1997)	Kappelman (1995)	Raymond (1985)	Zaichkowsky (1985)
accurate	...	inaccurate	X		X	X	X			X	
appealing	...	unappealing							X		X
available	...	unavailable	X				X				
competent	...	incompetent					X				
complete	...	incomplete	X		X	X	X			X	
cooperative	...	uncooperative			X	X	X			X	
current	...	obsolete	X			X	X			X	
easy to use	...	difficult to use	X				X				
essential	...	nonessential						X			X
exciting	...	unexciting									X
familiar	...	unfamiliar					X				
fascinating	...	mundane									X
fast	...	slow	X		X		X				
flexible	...	inflexible					X				
frequently	...	infrequently									X
good	...	bad	X		X	X		X			
high	...	low	X	X	X	X	X				
important	...	unimportant						X			X
interesting	...	boring									X
more dependent	...	less independent					X				
more productive	...	less productive					X				
reasonable	...	unreasonable	X		X	X	X			X	
relevant	...	irrelevant			X	X	X		X	X	X
reliable	...	unreliable					X				
responsive	...	unresponsive					X				
satisfied	...	dissatisfied[1]					X				
short	...	long	x				X				
significant	...	insignificant	X					X	X		X
sufficient	...	insufficient	X		X	X	X			X	
useful	...	useless	X	X	X	X	X	X	X	X	X
valuable	...	worthless						X	X		X
versatile	...	limited	X				X				

APPENDIX 14

Correlation Matrices

FACTOR: PARTICIPATION

R E L I A B I L I T Y   A N A L Y S I S - S C A L E (A L P H A)

Initial Correlation Matrix

	Q1DE1	Q1DE2	Q1DE3	Q1DE4	Q2DE5
Q1DE1	1.0000				
Q1DE2	.5418	1.0000			
Q1DE3	.6230	.6550	1.0000		
Q1DE4	.4464	.5436	.5591	1.0000	
Q2DE5	.1561	.2185	.0435	.2552	1.0000
Q2DE6	.1643	.2190	.0157	.2823	.8413
Q4DE9	.2978	.2592	.3183	.4702	.3447
Q6DE11	.1683	.3051	.2166	.3192	.2372
Q6DE12	.2439	.2420	.2167	.3278	.2058
Q8DE15	.0732	.0618	.0998	.1715	-.0945
Q8DE16	.1217	.1623	.1951	.2370	-.0231
Q12DE22	.3213	.3955	.2515	.2805	.0154
Q12DE23	.1789	.2719	.1420	.3669	.0362
Q12DE24	.2096	.2742	.1606	.3175	.0658
Q12DE25	.2468	.2671	.1503	.4010	.0394

	Q2DE6	Q4DE9	Q6DE11	Q6DE12	Q8DE15
Q2DE6	1.0000				
Q4DE9	.3114	1.0000			
Q6DE11	.2131	.3587	1.0000		
Q6DE12	.1968	.3031	.8392	1.0000	
Q8DE15	-.0510	.0225	.2386	.3295	1.0000
Q8DE16	-.0177	.0672	.2334	.3091	.9632
Q12DE22	.0943	.0581	.1939	.1995	.3133
Q12DE23	.1289	.1407	.2394	.2122	.3784
Q12DE24	.1276	.1234	.2460	.2006	.3422
Q12DE25	.1403	.1420	.2212	.2119	.3635

	Q8DE16	Q12DE22	Q12DE23	Q12DE24	Q12DE25
Q8DE16	1.0000				
Q12DE22	.2929	1.0000			
Q12DE23	.3485	.8747	1.0000		
Q12DE24	.3194	.8710	.9612	1.0000	
Q12DE25	.3286	.8139	.9066	.8928	1.0000

N of Cases = 87.0

Reliability Coefficients   15 items
Alpha = .8542   Standardized item alpha = .8579

FACTOR: PARTICIPATION

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

Final Correlation Matrix

	Q12DE22	Q12DE23	Q12DE24	Q12DE25
Q12DE22	1.0000			
Q12DE23	.8747	1.0000		
Q12DE24	.8710	.9612	1.0000	
Q12DE25	.8139	.9066	.8928	1.0000

N of Cases =   87.0

Reliability Coefficients   4 items

Alpha =   .9687   Standardized item alpha =   .9690

FACTOR: INVOLVEMENT

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

Initial Correlation Matrix

	Q3DE7	Q3DE8	Q5DE10	Q7DE13	Q7DE14
Q3DE7	1.0000				
Q3DE8	.9062	1.0000			
Q5DE10	.3030	.2395	1.0000		
Q7DE13	.3156	.3374	.3788	1.0000	
Q7DE14	.2506	.3100	.3909	.8730	1.0000
Q9DE17	.0280	.0514	-.0556	.2116	.2129
Q9DE18	.0852	.0815	.0213	.2351	.2504
Q13DE26	.2160	.1199	-.0501	.1655	.0487
Q13DE27	.3202	.1975	.1910	.1513	.0660
Q15DE30	.2817	.1870	.0439	.2278	.1224
Q15DE31	.3181	.2162	.0944	.2733	.1946

	Q9DE17	Q9DE18	Q13DE26	Q13DE27	Q15DE30
Q9DE17	1.0000				
Q9DE18	.9492	1.0000			
Q13DE26	-.0082	.0419	1.0000		
Q13DE27	-.0051	.0797	.7947	1.0000	
Q15DE30	.0773	.1168	.4820	.4529	1.0000
Q15DE31	.0324	.1097	.5319	.5527	.8914

	Q15DE31
Q15DE31	1.0000

N of Cases =   87.0

Reliability Coefficients   11 items

Alpha =   .7858   Standardized item alpha =   .7883

FACTOR: INVOLVEMENT

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

Final Correlation Matrix

	Q13DE26	Q13DE27	Q15DE30	Q15DE31
Q13DE26	1.0000			
Q13DE27	.7947	1.0000		
Q15DE30	.4820	.4529	1.0000	
Q15DE31	.5319	.5527	.8914	1.0000

N of Cases =   87.0

Reliability Coefficients   4 items

Alpha =   .8640   Standardized item alpha =   .8660

FACTOR: INFLUENCE

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

Initial Correlation Matrix

	Q14DE28	Q14DE29	Q16DE32	Q17DE33	Q18DE34
Q14DE28	1.0000				
Q14DE29	.7914	1.0000			
Q16DE32	.2643	.2260	1.0000		
Q17DE33	.2241	.1464	.2283	1.0000	
Q18DE34	.0300	-.0096	-.0089	.5103	1.0000
Q19DE35	.1002	.0038	-.0665	.1441	.4064
Q19DE36	.0616	.0738	-.1062	.1212	.4001
Q20DE37	.0431	.1445	-.0212	.1839	.1197

	Q19DE35	Q19DE36	Q20DE37
Q19DE35	1.0000		
Q19DE36	.9273	1.0000	
Q20DE37	.2089	.2485	1.0000

N of Cases =   87.0

Alpha =   .6647   Standardized item alpha =   .6563

FACTOR: INFLUENCE

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

Final Correlation Matrix

	Q18DE34	Q19DE35	Q19DE36
Q18DE34	1.0000		
Q19DE35	.4064	1.0000	
Q19DE36	.4001	.9273	1.0000

N of Cases =   87.0

Reliability Coefficients   3 items

Alpha =   .8170   Standardized item alpha =   .8042

FACTOR: CONFLICT

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

Initial Correlation Matrix

	Q21DE38	Q22DE39	Q22DE40	Q23DE41	Q23DE42
Q21DE38	1.0000				
Q22DE39	.2064	1.0000			
Q22DE40	.1927	.9067	1.0000		
Q23DE41	.1721	.8218	.7337	1.0000	
Q23DE42	.1814	.8001	.7192	.9494	1.0000

N of Cases =   87.0

Reliability Coefficients   5 items

Alpha =   .8744   Standardized item alpha =   .8681

FACTOR: CONFLICT

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

Final Correlation Matrix

	Q22DE39	Q22DE40	Q23DE41	Q23DE42
Q22DE39	1.0000			
Q22DE40	.9067	1.0000		
Q23DE41	.8218	.7337	1.0000	
Q23DE42	.8001	.7192	.9494	1.0000

N of Cases =   87.0

Reliability Coefficients   4 items

Alpha =   .9477   Standardized item alpha =   .9486

FACTOR: CONFLICT RESOLUTION

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

Initial Correlation Matrix

	Q10DE19	Q10DE20	Q11DE21	Q24DE43	Q25DE44
Q10DE19	1.0000				
Q10DE20	.7674	1.0000			
Q11DE21	.7218	.8450	1.0000		
Q24DE43	.2952	.2929	.2538	1.0000	
Q25DE44	.0820	-.0875	-.1181	.1890	1.0000
Q25DE45	.1991	.0252	.0088	.3652	.8390

	Q25DE45
Q25DE45	1.0000

N of Cases =   87.0

Reliability Coefficients   6 items

Alpha =   .7294   Standardized item alpha =   .7312

FACTOR: CONFLICT RESOLUTION

R E L I A B I L I T Y   A N A L Y S I S - S C A L E   (A L P H A)

Final Correlation Matrix

	Q10DE19	Q10DE20	Q11DE21
Q10DE19	1.0000		
Q10DE20	.7674	1.0000	
Q11DE21	.7218	.8450	1.0000

N of Cases =   87.0

Reliability Coefficients   3 items

Alpha =   .9132   Standardized item alpha =   .9132

FACTOR: SYSTEM SUCCESS

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

Initial Correlation Matrix

	Q26DE46	Q26DE47	Q26DE48	Q26DE49	Q27DE50
Q26DE46	1.0000				
Q26DE47	.5002	1.0000			
Q26DE48	.6507	.6584	1.0000		
Q26DE49	.7901	.5234	.8073	1.0000	
Q27DE50	.2129	.1006	.1841	.3183	1.0000
Q27DE51	.2080	.2083	.2555	.2854	.9556
Q28DE52	.3079	.2104	.3606	.4687	.7850
Q28DE53	.3446	.1831	.3243	.4530	.7417
Q29DE54	.5815	.2274	.5014	.6080	.3627
Q29DE55	.4458	.1834	.4029	.5262	.1980
Q30DE56	.4189	.4971	.4355	.5458	-.0354
Q30DE57	.3407	.4355	.3726	.5247	-.0435
Q30DE58	.3927	.4913	.4196	.5090	-.0552
Q30DE59	.2399	.3175	.2459	.3582	.0108
Q31DE60	.4583	.1148	.4407	.5689	.2785
Q31DE61	.3620	.3478	.6159	.4745	.1446
Q32DE62	-.0100	.3297	.1647	.0623	.4346
Q32DE63	.2827	.3891	.3238	.3478	.3815
Q32DE64	.0549	.1836	.0460	.0961	.3944
Q33DE65	.5556	.6849	.6823	.5928	.0318
Q33DE66	.7489	.7104	.5405	.7078	.2196
Q33DE67	.7488	.7099	.5496	.6980	.1433
Q33DE68	.7770	.6062	.7140	.8092	.1076
Q33DE69	.6781	.6901	.5511	.7004	.2447
Q34DE70	.1056	.0692	.1396	.1617	.2522
Q34DE71	-.0797	-.0933	-.1075	-.0564	.0127
Q35DE72	.2125	.2757	.2322	.2783	.5211
Q36DE73	.5188	.2707	.5402	.7034	.1458
Q37DE74	-.1225	.1265	.0261	-.0287	-.0387

	Q27DE51	Q28DE52	Q28DE53	Q29DE54	Q29DE55
Q27DE51	1.0000				
Q28DE52	.7692	1.0000			
Q28DE53	.7366	.9764	1.0000		
Q29DE54	.3588	.4622	.4799	1.0000	
Q29DE55	.2186	.3038	.3283	.7279	1.0000
Q30DE56	-.0243	.0691	.0592	.4073	.4861
Q30DE57	-.0633	.0234	-.0069	.2819	.3602
Q30DE58	-.0730	-.0036	-.0269	.3330	.4100
Q30DE59	.0051	.0669	.0537	.1874	.2246
Q31DE60	.2470	.3801	.3680	.5477	.6169
Q31DE61	.2598	.2476	.2250	.4581	.5605

Q32DE62	.4986	.5438	.5365	.2402	.0732
Q32DE63	.4186	.4948	.4978	.4437	.3376
Q32DE64	.3798	.5196	.5320	.3060	.1166
Q33DE65	.1005	.1828	.1902	.4293	.4342
Q33DE66	.2199	.2674	.2655	.4989	.3496
Q33DE67	.1458	.1807	.1794	.4547	.3454
Q33DE68	.0922	.1905	.1914	.5496	.4483
Q33DE69	.2176	.2711	.2386	.4216	.2602
Q34DE70	.2742	.3755	.3650	.0436	.1938
Q34DE71	.0252	.0674	.0651	-.1384	-.0085
Q35DE72	.5090	.4299	.3786	.2226	.1629
Q36DE73	.1546	.3316	.3431	.3357	.2429
Q37DE74	-.0659	.0287	-.0261	-.2192	-.2480

	Q30DE56	Q30DE57	Q30DE58	Q30DE59	Q31DE60
Q30DE56	1.0000				
Q30DE57	.9489	1.0000			
Q30DE58	.9596	.9400	1.0000		
Q30DE59	.8531	.8808	.8484	1.0000	
Q31DE60	.5990	.5415	.5030	.4585	1.0000
Q31DE61	.5767	.4496	.4570	.3787	.8037
Q32DE62	.0226	-.0478	-.0094	.0246	-.0201
Q32DE63	.3214	.2464	.2656	.2305	.2758
Q32DE64	.0352	-.0246	.0085	.0524	.0211
Q33DE65	.2641	.1414	.2331	.0078	.1200
Q33DE66	.3829	.3014	.3464	.1500	.2706
Q33DE67	.3895	.3099	.3516	.1568	.2770
Q33DE68	.5007	.4219	.4803	.3018	.3848
Q33DE69	.3963	.3705	.3617	.1622	.2682
Q34DE70	.2773	.2655	.2784	.4643	.2232
Q34DE71	.0301	.0314	.0510	.1588	-.0589
Q35DE72	-.0227	-.0648	-.0315	-.2193	.0846
Q36DE73	.2689	.3144	.2176	.3088	.2158
Q37DE74	-.0687	.0086	-.0253	.0449	-.2484

	Q31DE61	Q32DE62	Q32DE63	Q32DE64	Q33DE65
Q31DE61	1.0000				
Q32DE62	.1337	1.0000			
Q32DE63	.3281	.7352	1.0000		
Q32DE64	.0128	.9115	.8231	1.0000	
Q33DE65	.3102	.3046	.4692	.2792	1.0000
Q33DE66	.2561	.1348	.4173	.1888	.7563
Q33DE67	.2718	.0704	.3492	.1164	.7634
Q33DE68	.3780	.0828	.3654	.1324	.8374
Q33DE69	.2335	.0659	.2937	.0793	.6592
Q34DE70	.1352	.1500	.0964	.0533	-.0264
Q34DE71	-.1071	-.1449	-.1825	-.1977	-.2372
Q35DE72	.1024	.2019	.3763	.1952	.2563
Q36DE73	.1647	.0270	.0678	.0252	.2983
Q37DE74	-.2149	-.0514	-.1393	-.0906	-.0795

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	Q33DE66	Q33DE67	Q33DE68	Q33DE69	Q34DE70
Q33DE66	1.0000				
Q33DE67	.9879	1.0000			
Q33DE68	.8645	.8843	1.0000		
Q33DE69	.9134	.9099	.8154	1.0000	
Q34DE70	-.0832	-.0992	.0238	-.0809	1.0000
Q34DE71	-.1905	-.1919	-.1877	-.2164	.4358
Q35DE72	.4267	.3738	.2354	.4316	-.2155
Q36DE73	.3493	.3632	.4856	.3462	.2560
Q37DE74	-.0589	-.0511	-.0895	.1272	.0991

	Q34DE71	Q35DE72	Q36DE73	Q37DE74
Q34DE71	1.0000			
Q35DE72	.1940	1.0000		
Q36DE73	.0728	-.0475	1.0000	
Q37DE74	.5390	.1452	.0690	1.0000

N of Cases =   36.0

Alpha =   .9206   Standardized item alpha =   .9220

FACTOR: SYSTEM SUCCESS

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

Final Correlation Matrix

	Q26DE46	Q26DE48	Q26DE49	Q30DE56	Q30DE57
Q26DE46	1.0000				
Q26DE48	.6507	1.0000			
Q26DE49	.7901	.8073	1.0000		
Q30DE56	.4189	.4355	.5458	1.0000	
Q30DE57	.3407	.3726	.5247	.9489	1.0000
Q30DE58	.3927	.4196	.5090	.9596	.9400
Q33DE66	.7489	.5405	.7078	.3829	.3014
Q33DE67	.7488	.5496	.6980	.3895	.3099
Q33DE68	.7770	.7140	.8092	.5007	.4219
Q33DE69	.6781	.5511	.7004	.3963	.3705

	Q30DE58	Q33DE66	Q33DE67	Q33DE68	Q33DE69
Q30DE58	1.0000				
Q33DE66	.3464	1.0000			
Q33DE67	.3516	.9879	1.0000		
Q33DE68	.4803	.8645	.8843	1.0000	
Q33DE69	.3617	.9134	.9099	.8154	1.0000

N of Cases =   36.0

Reliability Coefficients   10 items

Alpha =   .9358   Standardized item alpha =   .9389

Participation Data Dispersion and Distribution Information and Graphs
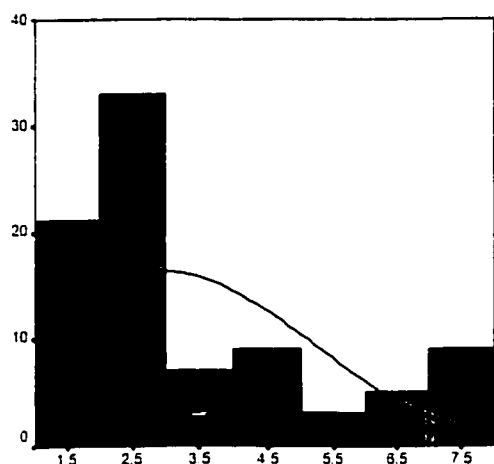
Participation: Q12DE22
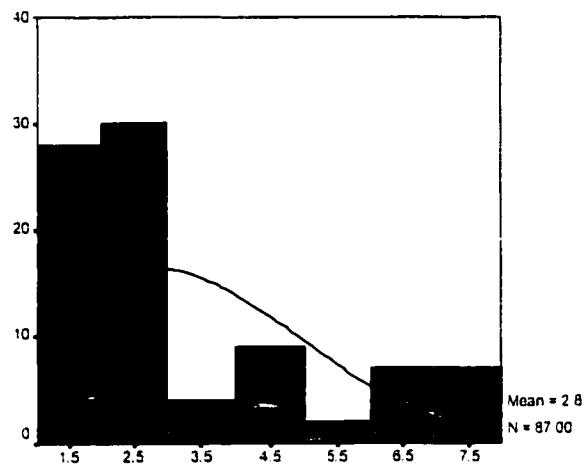
Participation: Q12DE23
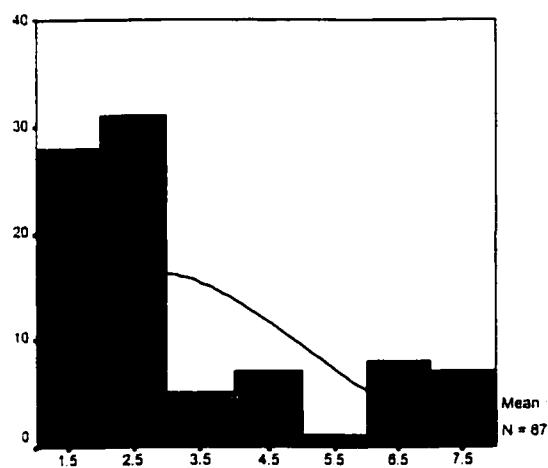
Participationl Q12DE24
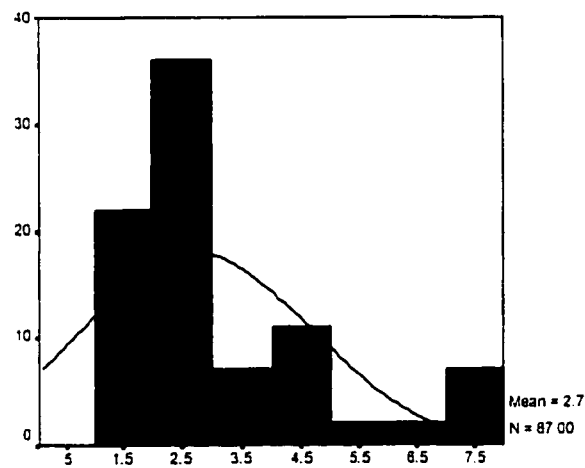
Participation: Q12DE25

Descriptive Statistics

	N	Mean	Std.	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q12DE22: Participation	87	2.98	2.13	1.229	.258	.415	.511
Q12DE23: Participation	87	2.79	2.11	1.277	.258	.534	.511
Q12DE24: Participation	87	2.77	2.12	1.317	.258	.583	.511
Q12DE25: Participation	87	2.71	1.93	1.594	.258	1.891	.511
Valid N (listwise)	87						

Involvement Data Dispersion and Distribution Information and Graphs
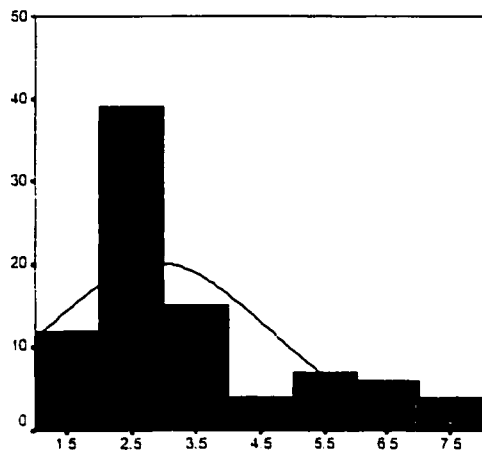
Involvement: Q13DE26
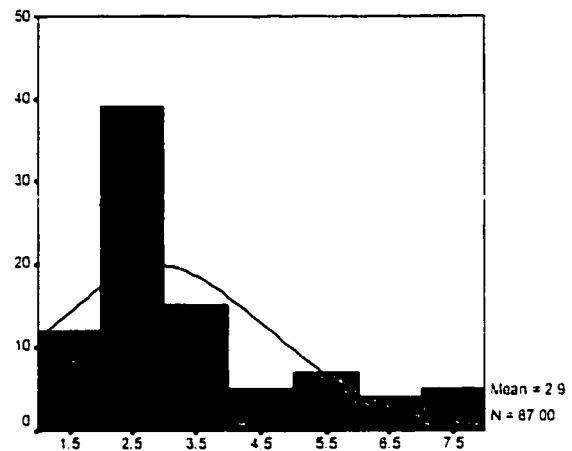
Involvement: Q13DE27
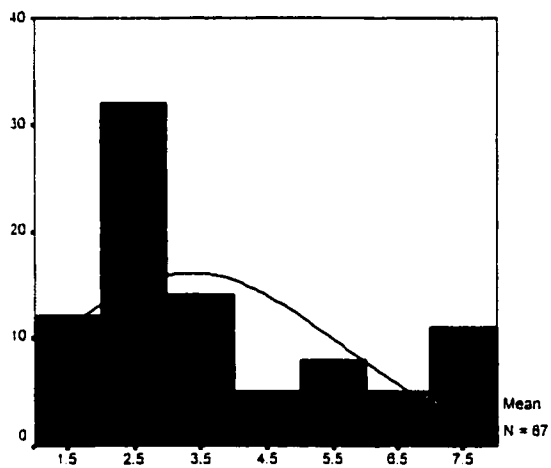
Involvement: Q15DE30
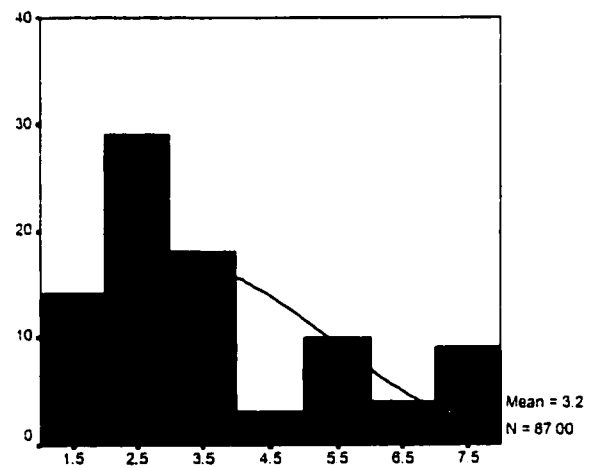
Involvement: Q15DE31

Descriptive Statistics

	N	Mean	Std.	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q13DE26: Involvement	87	2.90	1.72	1.275	.258	.898	.511
Q13DE27: Involvement	87	2.90	1.75	1.384	.258	1.321	.511
Q15DE30: Involvement	87	3.37	2.15	.984	.258	-.205	.511
Q15DE31: Involvement	87	3.24	2.06	1.067	.258	.156	.511
Valid N (listwise)	87						

Influence Data Dispersion and Distribution Information and Graphs
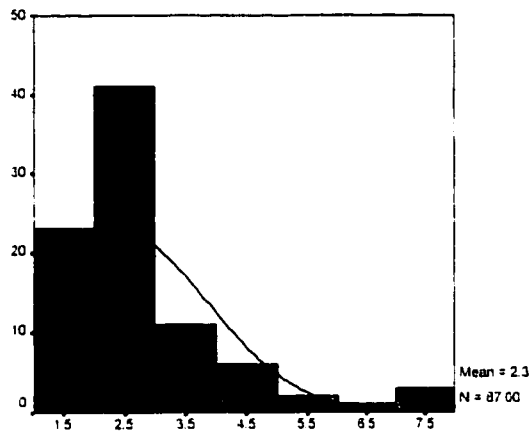
Influence: Q18DE34
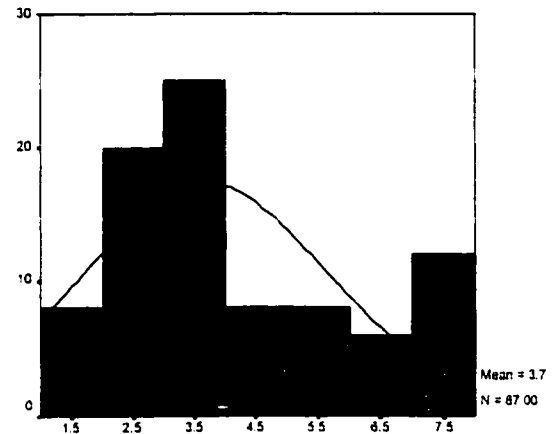
Influence: Q19DE35
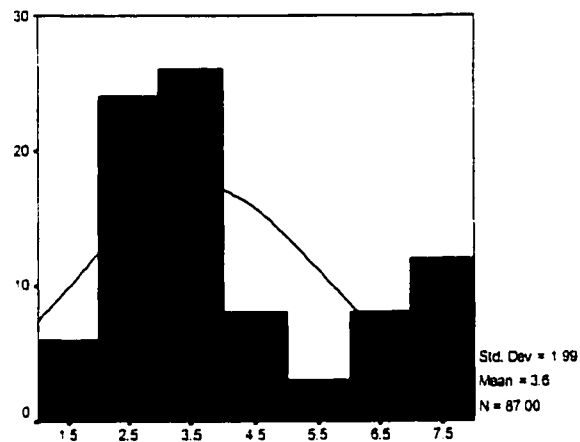
Influence: Q19DE36

Descriptive Statistics

	N	Mean	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q18DE34: Influence	87	2.32	2.211	.258	5.804	.511
Q19DE35: Influence	87	3.68	.744	.258	-.465	.511
Q19DE36: Influence	87	3.63	.867	.258	-.395	.511
Valid N (listwise)	87					

Conflict Data Dispersion and Distribution Information and Graphs
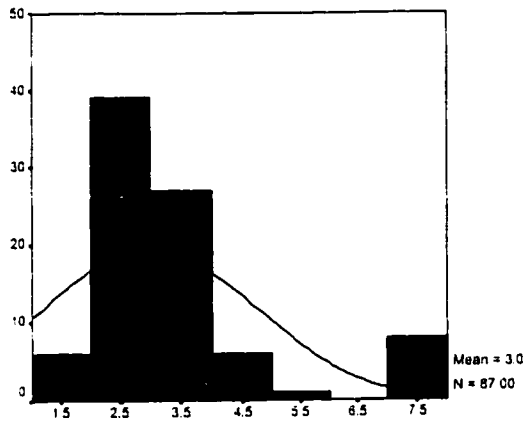
Conflict: Q22DE39
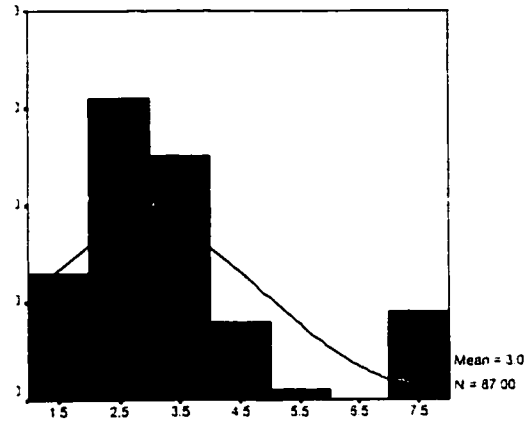
Conflict: Q22DE40
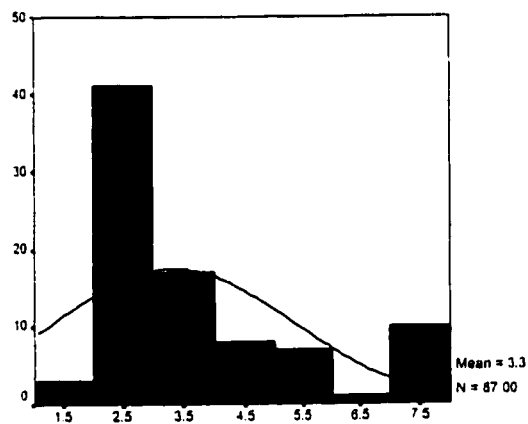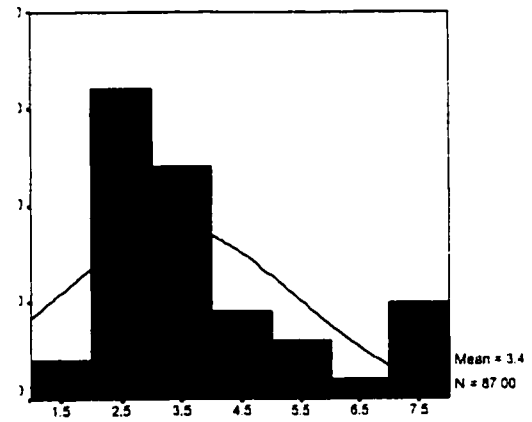
Conflict: Q23DE41

Conflict:Q23DE42

Descriptive Statistics

	N	Mean	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q22DE39: Conflict	87	2.97	2.011	.258	3.439	.511
Q22DE40: Conflict	87	2.98	1.705	.258	2.281	.511
Q23DE41: Conflict	87	3.32	1.438	.258	.994	.511
Q23DE42: Conflict	87	3.43	1.350	.258	.859	.511
Valid N (listwise)	87					

Conflict Resolution Data Dispersion and Distribution Information and Graphs
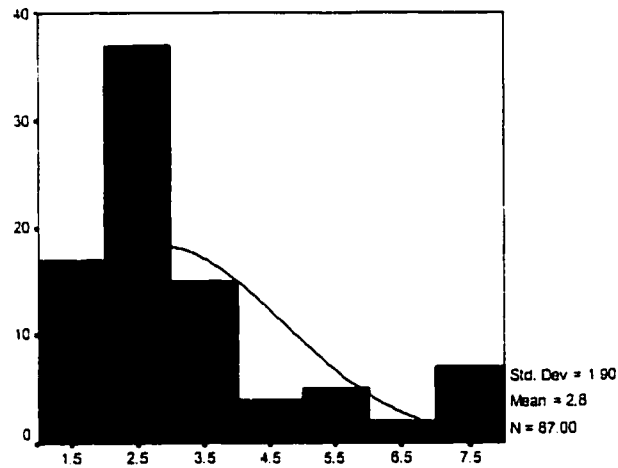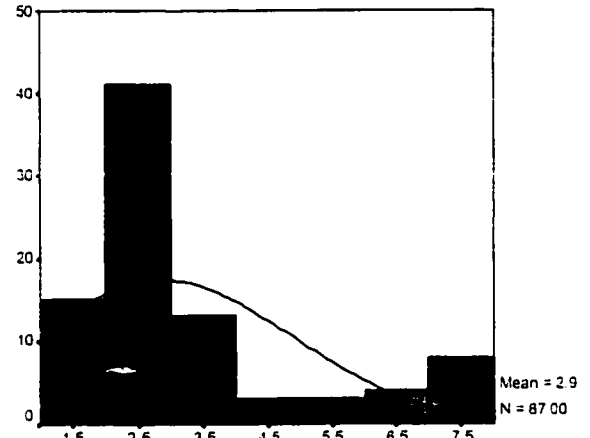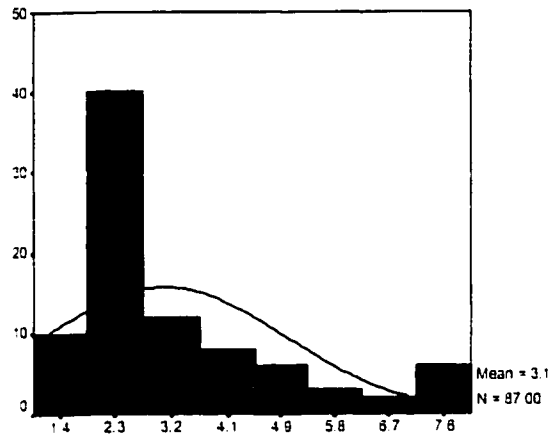
Conflict Resolution: Q10DE19

Conflict Resolution: Q10DE20

Conflict Resolution: Q11DE21

Descriptive Statistics

	N	Mean	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q10DE19: Conflict Resolution	87	3.08	1.353	.258	.964	.511
Q10DE20: Conflict Resolution	87	2.87	1.568	.258	1.461	.511
Q11DE21: Conflict Resolution	87	2.80	1.604	.258	1.902	.511
Valid N (listwise)	87					

System Success Data Dispersion and Distribution Information and Graphs
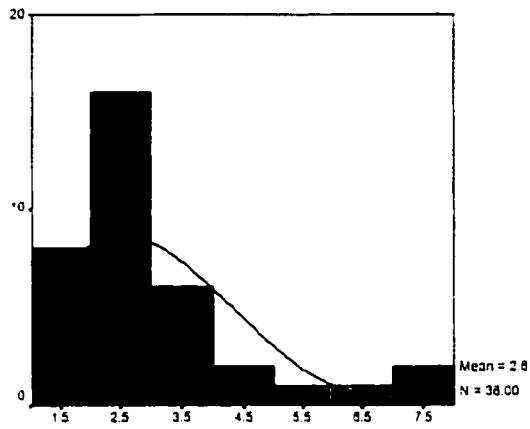
System Success: Q26DE46
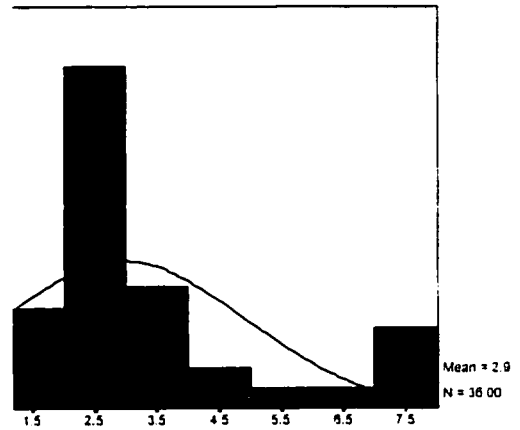
ystem Success: Q26DE48
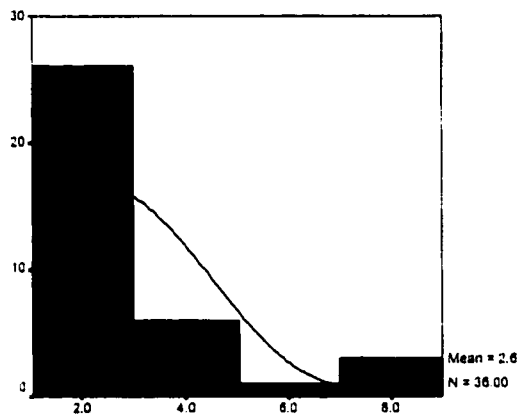
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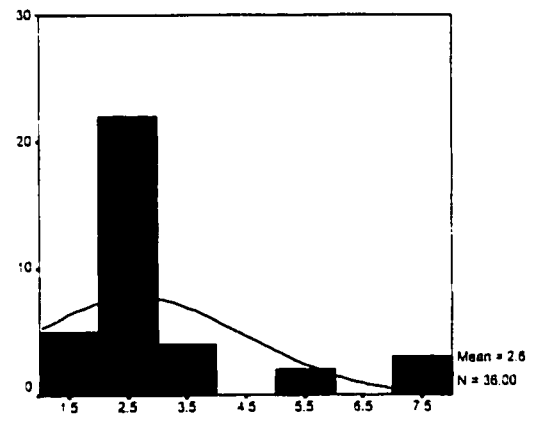
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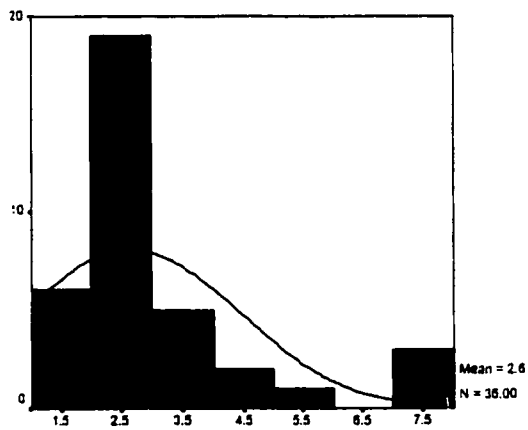
System Success: Q30DE57
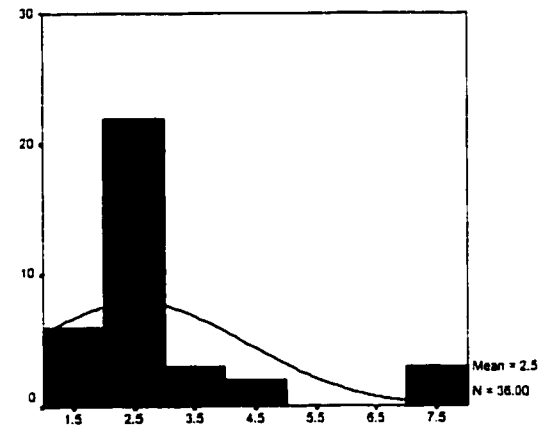
System Success:Q30DE58
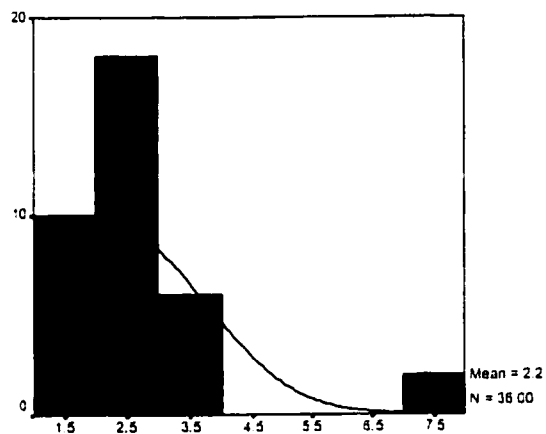
System Success:Q33DE66
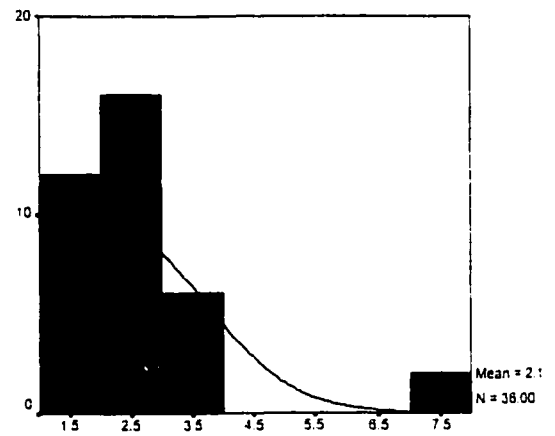
System Success:Q33DE67
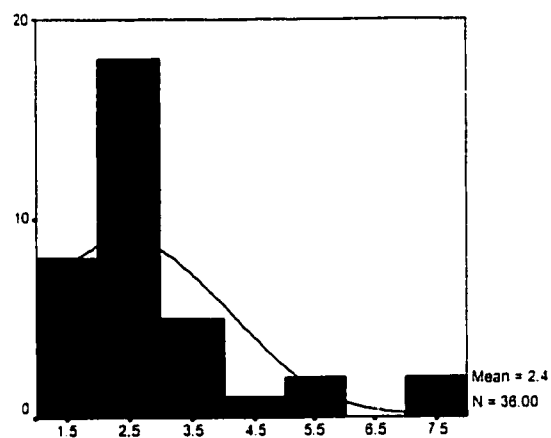
System Success:Q33DE68
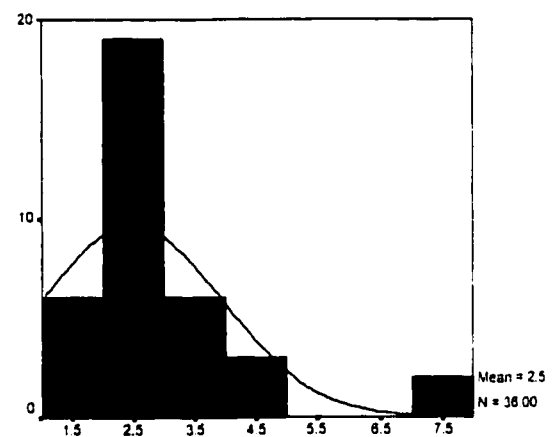
System Success:Q33DE69

Descriptive Statistics

	N	Mean	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q26DE46	36	2.56	1.828	.393	3.375	.768
Q26DE48	36	2.94	1.538	.393	1.453	.768
Q26DE49	36	2.61	2.215	.393	4.293	.768
Q30DE56	36	2.64	2.189	.393	4.132	.768
Q30DE57	36	2.64	2.045	.393	3.890	.768
Q30DE58	36	2.53	2.407	.393	5.319	.768
Q33DE66	36	2.19	2.786	.393	9.014	.768
Q33DE67	36	2.14	2.733	.393	8.664	.768
Q33DE68	36	2.44	2.080	.393	4.668	.768
Q33DE69	36	2.47	2.339	.393	6.542	.768
Valid N (listwise)	36					

APPENDIX 21

Scatter plots of Variables
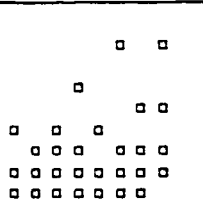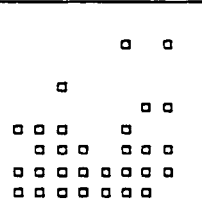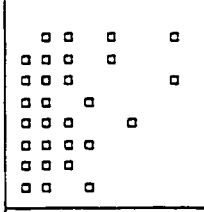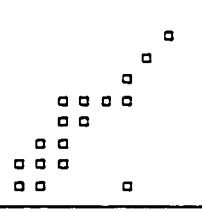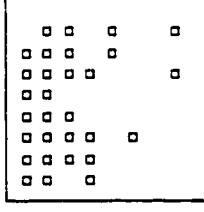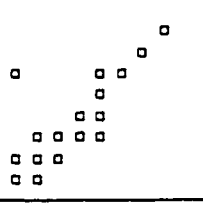
Matrix of participation variable
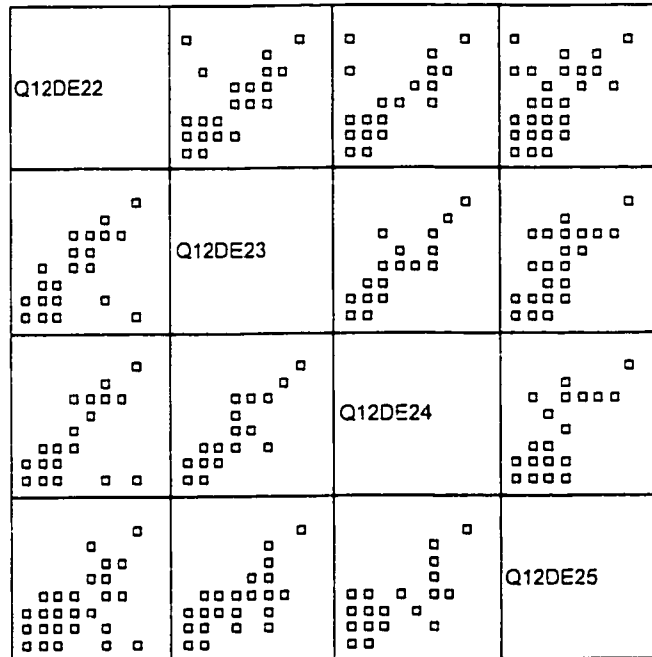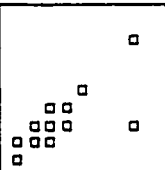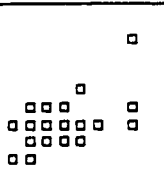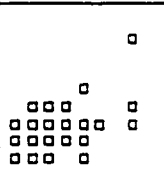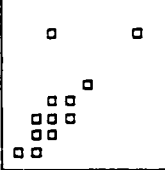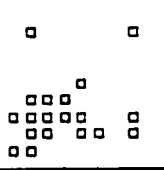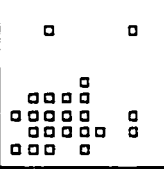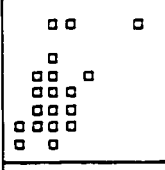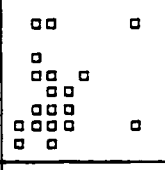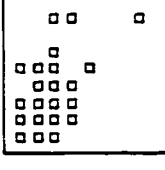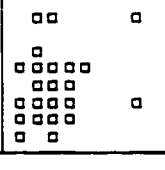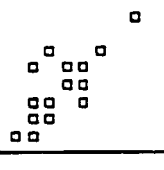
Matrix of involvement variable
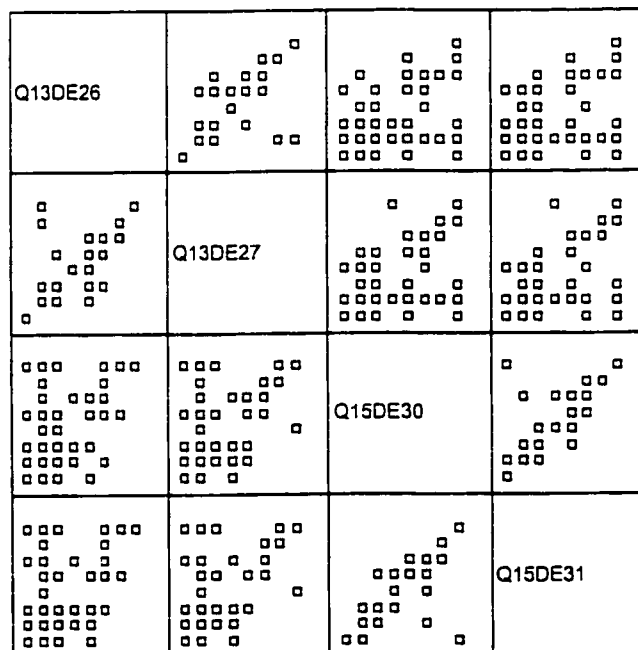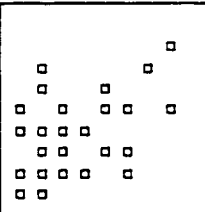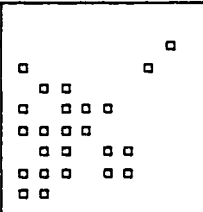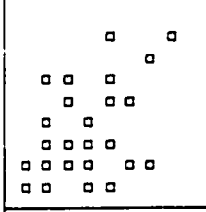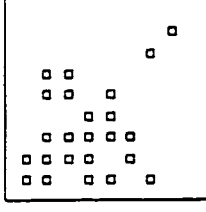
Matrix of influence variable

Matrix of conflict variable

Matrix of conflict resolution variable

Matrix of system success variable

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APPENDIX 22

Anti-Image Matrices for Participation, Involvement, Influence, Conflict and Conflict Resolution

Anti-image Matrices

		Q12DE22	Q12DE23	Q12DE24	Q12DE25	Q13DE26	Q13DE27	Q15DE30	Q15DE31	Q18DE34	Q19DE35	Q19DE36	Q22DE39	Q22DE40	Q23DE41	Q23DE42	Q10DE19	Q10DE20	Q11DE21
Anti-image Correlation	Q12DE22: Participation	.886[a]	-.200	-.240	9.07E-02	2.292E-02	5.269E-04	3.633E-02	-9.41E-02	3.356E-02	-1.09E-02	-3.04E-02	-5.67E-02	5.634E-02	1.890E-02	3.784E-02	-.338	3.217E-02	.158
	Q12DE23: Participation	.776[a]	-.704	-.128	-9.16E-02	-.172	7.82E-02	.194	3.356E-02	-2.89E-02	7.415E-02	-4.60E-02	7.699E-02	5.044E-02	3.74E-02	-6.82E-02	-5.67E-02	3.930E-02
	Q12DE24: Participation	-.240	-.704	.777[a]	-.126	-9.16E-02	.156	.145	.191	-.122	.143	-.164	-7.44E-02	.164	3.076E-02	.115	7.836E-03	-7.76E-02
	Q12DE25: Participation	9.07E-02	-.398	-.126	.888[a]	1.849E-02	.127	-8.08E-02	-9.22E-03	-.113	-.142	3.060E-02	-7.88E-02	-3.47E-02	.121	-9.57E-02	.156	-4.67E-04	-4.62E-02
	Q13DE26: Involvement	2.292E-02	-2.58E-02	-9.16E-02	4.949E-02	.653[a]	.695	-.284	.123	.127	-.164	-2.26E-02	.175	-.175	4.142E-02	3.858E-03	3.649E-02	2.103E-02	4.207E-02
	Q13DE27: Involvement	5.269E-04	-.172	.156	.127	.695	.646[a]	.227	-.289	2.334E-02	.987E-02	-2.26E-02	.175	-.175	-7.48E-02	-5.55E-02	7.119E-02	-4.56E-02	-9.39E-02
	Q15DE30: Involvement	3.633E-02	-7.82E-02	.145	-8.08E-02	-.284	.227	.551[a]	-.883	-1.98E-04	.484	-.491	1.013E-02	3.540E-02	-2.103E-02	5.915E-02	-.237	-3.09E-03	7.430E-02
	Q15DE31: Involvement	-9.41E-02	.194	-.191	-9.22E-03	.123	-.289	-.883	.514[a]	-9.26E-02	-.520	.563	-.126	-6.52E-03	3.644E-02	-4.71E-02	.178	1.620E-02	-.126
	Q18DE34: Influence	.162	3.356E-02	-.122	-9.22E-03	.127	-.289	-.883	-9.26E-02	.735[a]	-3.69E-02	-.105	-1.87E-02	-3.06E-02	3.644E-02	-.193	-.155	3.347E-02	2.72E-02
	Q19DE35: Influence	-1.09E-02	-2.89E-02	.143	.142	-.164	.987E-02	.484	-.520	-3.69E-02	.439[a]	-.944	.103	.103	.157	-.193	-9.81E-02	-4.60E-02	.284
	Q19DE36: Influence	-3.04E-02	7.415E-02	-.164	.159	3.060E-02	-2.26E-02	-.491	.563	-.105	-.944	.404[a]	.419E-02	-.128	8.59E-02	3.300E-02	-.155	-4.60E-02	-.240
	Q22DE39: Conflict	-5.67E-02	-4.60E-02	-.164	-7.60E-02	.175	-2.26E-02	-.128	.563	.169	-1.87E-02	3.419E-02	.765[a]	-.784	-.199	-9.35E-02	-7.69E-02	.141	-7.01E-02
	Q22DE40: Conflict	5.634E-02	7.699E-02	-.164	-3.47E-02	-.175	3.948E-03	3.548E-02	6.52E-03	-3.06E-02	.103	-8.59E-02	-.784	.737[a]	4.713E-02	-5.40E-03	5.741E-02	.214	.188
	Q23DE41: Conflict	1.890E-02	5.044E-02	-.184	-9.57E-02	3.858E-03	-7.48E-02	-2.83E-02	3.664E-02	.157	.103	-.128	-.199	4.713E-02	.742[a]	.854	5.844E-02	4.481E-02	4.88E-02
	Q23DE42: Conflict	3.784E-02	3.74E-02	-.184	9.57E-02	3.849E-02	7.119E-02	5.915E-02	-4.71E-02	-.193	-8.67E-02	5.658E-02	-9.35E-02	-5.40E-03	.854	.750[a]	-9.27E-02	-3.79E-02	4.571E-02
	Q10DE19: Conflict Resolution	-.338	-6.82E-02	.115	.156	3.849E-02	-4.56E-02	-.237	4.71E-02	-.155	-9.81E-02	5.658E-02	-9.35E-02	5.741E-02	5.844E-02	-9.27E-02	.747[a]	-.415	-.255
	Q10DE20: Conflict Resolution	3.217E-02	-5.67E-02	7.836E-03	-4.67E-04	2.103E-02	-4.56E-02	-3.09E-03	1.620E-02	3.347E-02	-4.60E-02	3.300E-02	-7.69E-02	.214	4.481E-02	-3.79E-02	-.415	.724[a]	-.607
	Q11DE21: Conflict Resolution	.158	3.930E-02	-7.76E-02	-4.62E-02	4.207E-02	-9.39E-02	7.430E-02	-.126	2.72E-02	.264	-.240	-7.01E-02	.188	4.48E-02	4.571E-02	-.255	-.607	.699[a]

a. Measures of Sampling Adequacy(MSA)

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APPENDIX 23

Anti-image matrices for system success

Anti-Image Matrices

		Q26DE46	Q26DE48	Q26DE49	Q30DE56	Q30DE57	Q30DE58	Q33DE66	Q33DE67	Q33DE68	Q33DE69
Anti-image Correlation	Q26DE46	.935[a]	2.916E-02	-.419	-6.83E-02	.200	-.121	2.306E-02	-.124	-8.68E-03	6.937E-02
	Q26DE48	2.916E-02	.827[a]	-.575	-.134	.339	-.182	.232	-9.43E-02	-.178	-.180
	Q26DE49	-.419	-.575	.781[a]	.105	-.479	.312	-.366	.341	-.308	6.744E-02
	Q30DE56	-6.83E-02	-.134	.105	.842[a]	-.526	-.477	-.106	-2.46E-03	-1.57E-02	.220
	Q30DE57	.200	.339	-.479	-.526	.697[a]	-.454	.334	-.188	.199	-.411
	Q30DE58	-.121	-.182	.312	-.477	-.454	.801[a]	-.211	.195	-.239	.170
	Q33DE66	2.306E-02	.232	-.366	-.106	.334	-.211	.765[a]	-.892	.261	-.300
	Q33DE67	-.124	-9.43E-02	.341	-2.46E-03	-.188	.195	-.892	.778[a]	-.465	-4.66E-02
	Q33DE68	-8.68E-03	-.178	-.308	-1.57E-02	.199	-.239	.261	-.465	.901[a]	-4.07E-02
	Q33DE69	6.937E-02	-.180	6.744E-02	.220	-.411	.170	-.300	-4.66E-02	-4.07E-02	.913[a]

a. Measures of Sampling Adequacy(MSA)

APPENDIX 24

Reproduced Correlation Matrix for Participation, Involvement, Influence, Conflict and Conflict Resolution

Reproduced Correlations

		Q12DE22	Q12DE23	Q12DE24	Q12DE25	Q13DE26	Q13DE27	Q15DE30	Q15DE31	Q18DE34	Q19DE35	Q19DE36	Q22DE39	Q22DE40	Q23DE41	Q23DE42	Q10DE19	Q10DE20	Q11DE21
Reproduced Correlation	Q12DE22: Participation	.792	.875	.868	.815	.110	.117												
	Q12DE23: Participation		.971	.961	.906	.117	.128												
	Q12DE24: Participation			.953	.898	.128													
	Q12DE25: Participation				.850	.110													
	Q13DE26: Involvement					.642													
	Q13DE27: Involvement						.609												
	Q15DE30: Involvement							.558											
	Q15DE31: Involvement								.636										
	Q18DE34: Influence																		
	Q19DE35: Influence																		
	Q19DE36: Influence																		
	Q22DE39: Conflict																		
	Q22DE40: Conflict																		
	Q23DE41: Conflict																		
	Q23DE42: Conflict																		
	Q10DE19: Conflict Resolution																		
	Q10DE20: Conflict Resolution																		
	Q11DE21: Conflict Resolution																		

Extraction Method: Principal Axis Factoring

a. Residuals are computed between observed and reproduced correlations. There are 17 (11.0%) nonredundant residuals with absolute values > 0.05.

b. Reproduced communalities

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Reproduced Correlation Matrix for System Success

Reproduced Correlations

		Q26DE46	Q26DE48	Q26DE49	Q30DE56	Q30DE57	Q30DE58	Q33DE66	Q33DE67	Q33DE68	Q33DE69
Reproduced Correlation	Q26DE46	.684[b]	.579	.705	.426	.368	.398	.776	.779	.779	.734
	Q26DE48	.579	.504[b]	.615	.458	.411	.435	.640	.643	.662	.612
	Q26DE49	.705	.615	.752[b]	.573	.517	.545	.776	.780	.806	.744
	Q30DE56	.426	.458	.573	.959[b]	.943	.949	.362	.368	.504	.395
	Q30DE57	.368	.411	.517	.943	.932[b]	.936	.293	.299	.439	.331
	Q30DE58	.398	.435	.545	.949	.936	.941[b]	.328	.335	.472	.364
	Q33DE66	.776	.640	.776	.362	.293	.328	.901[b]	.904	.881	.843
	Q33DE67	.779	.643	.780	.368	.299	.335	.904	.906[b]	.884	.846
	Q33DE68	.779	.662	.806	.504	.439	.472	.881	.884	.888[b]	.834
	Q33DE69	.734	.612	.744	.395	.331	.364	.843	.846	.834	.793[b]
Residual[a]	Q26DE46		7.170E-02	8.552E-02	-7.44E-03	-2.76E-02	-5.29E-03	-2.68E-02	-2.98E-02	-1.95E-03	-5.55E-02
	Q26DE48	7.170E-02		.192	-2.21E-02	-3.87E-02	-1.51E-02	-9.95E-02	-9.34E-02	5.173E-02	-6.14E-02
	Q26DE49	8.552E-02	.192		-2.74E-02	7.441E-03	-3.64E-02	-6.82E-02	-8.18E-02	2.871E-03	-4.35E-02
	Q30DE56	-7.44E-03	-2.21E-02	-2.74E-02		6.000E-03	1.046E-02	2.093E-02	2.111E-02	-3.42E-03	1.586E-03
	Q30DE57	-2.76E-02	-3.87E-02	7.441E-03	6.000E-03		4.390E-03	8.669E-03	1.095E-02	-1.67E-02	3.976E-02
	Q30DE58	-5.29E-03	-1.51E-02	-3.64E-02	1.046E-02	4.390E-03		1.797E-02	1.680E-02	8.276E-03	-1.91E-03
	Q33DE66	-2.68E-02	-9.95E-02	-6.82E-02	2.093E-02	8.669E-03	1.797E-02		8.396E-02	-1.60E-02	7.015E-02
	Q33DE67	-2.98E-02	-9.34E-02	-8.18E-02	2.111E-02	1.095E-02	1.680E-02	8.396E-02		2.859E-04	6.388E-02
	Q33DE68	-1.95E-03	5.173E-02	2.871E-03	-3.42E-03	-1.67E-02	8.276E-03	-1.60E-02	2.859E-04		-1.88E-02
	Q33DE69	-5.55E-02	-6.14E-02	-4.35E-02	1.586E-03	3.976E-02	-1.91E-03	7.015E-02	6.388E-02	-1.88E-02	

Extraction Method: Principal Axis Factoring.

a. Residuals are computed between observed and reproduced correlations. There are 13 (28.0%) nonredundant residuals with absolute values > 0.05.

b. Reproduced communalities

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Bivariate Correlations Between Variables and Respondent Demographic Information

Correlations

		Overall satisfaction	Participation	Involvement	Influence	Conflict	Conflict Resolution	Gender	Primary Business	End-user Application	Functional Area	Experience Level	Educational Level	Age Group
Overall satisfaction	Pearson Correlation	1.000	.016	.070	.109	-.097	.127	.157	.063	-.206	-.075	-.025	.016	-.116
	Sig. (2-tailed)	.	.925	.687	.528	.573	.460	.360	.716	.227	.662	.889	.926	.501
	N	36	36	36	36	36	36	36	36	36	36	34	36	36
Participation	Pearson Correlation	.016	1.000	.064	.008	.236*	.155	-.020	-.112	-.054	-.109	.046	-.070	.157
	Sig. (2-tailed)	.925	.	.441	.938	.028	.150	.852	.301	.622	.314	.679	.519	.148
	N	36	87	87	87	87	87	87	87	87	87	85	87	87
Involvement	Pearson Correlation	.070	.084	1.000	.076	.203	.236*	-.058	-.136	.207	.015	-.100	.076	.024
	Sig. (2-tailed)	.687	.441	.	.487	.060	.028	.593	.208	.054	.892	.362	.484	.826
	N	36	87	87	87	87	87	87	87	87	87	85	87	87
Influence	Pearson Correlation	.109	.008	.076	1.000	-.087	-.023	.012	.135	-.026	.012	.084	-.001	.140
	Sig. (2-tailed)	.528	.938	.487	.	.422	.834	.912	.213	.809	.913	.444	.993	.197
	N	36	87	87	87	87	87	87	87	87	87	85	87	87
Conflict	Pearson Correlation	-.097	.236*	.203	-.087	1.000	.197	.002	-.179	-.034	-.010	-.054	-.047	-.018
	Sig. (2-tailed)	.573	.028	.060	.422	.	.068	.982	.097	.757	.930	.623	.663	.867
	N	36	87	87	87	87	87	87	87	87	87	85	87	87
Conflict Resolution	Pearson Correlation	.127	.155	.236*	-.023	.197	1.000	.132	-.040	.126	-.221*	-.105	.036	-.040
	Sig. (2-tailed)	.460	.150	.028	.834	.068	.	.221	.713	.245	.028	.337	.739	.712
	N	36	87	87	87	87	87	87	87	87	87	85	87	87
Gender	Pearson Correlation	.157	-.020	-.058	.012	.002	.132	1.000	.005	.003	-.106	-.094	-.057	-.141
	Sig. (2-tailed)	.360	.852	.593	.912	.982	.221	.	.963	.976	.298	.361	.578	.164
	N	36	87	87	87	87	87	99	99	99	99	97	99	99
Primary Business	Pearson Correlation	.063	-.112	-.136	.135	-.179	-.040	.005	1.000	.003	.084	-.144	-.121	-.024
	Sig. (2-tailed)	.716	.301	.208	.213	.097	.713	.963	.	.976	.409	.160	.234	.810
	N	36	87	87	87	87	87	99	99	99	99	97	99	99
End-user Application	Pearson Correlation	-.206	-.054	.207	-.026	-.034	.126	.003	.003	1.000	-.106	-.092	.099	-.069
	Sig. (2-tailed)	.227	.622	.054	.809	.757	.245	.976	.976	.	.298	.372	.330	.498
	N	36	87	87	87	87	87	99	99	99	99	97	99	99
Functional Area	Pearson Correlation	-.075	-.109	.015	.012	-.010	-.221*	-.106	.084	-.106	1.000	.164	.004	.238*
	Sig. (2-tailed)	.662	.314	.892	.913	.930	.028	.298	.409	.298	.	.108	.968	.018
	N	36	87	87	87	87	87	99	99	99	99	97	99	99
Experience Level	Pearson Correlation	-.025	.046	-.100	.084	-.054	-.105	-.094	-.144	-.092	.164	1.000	.416*	.605*
	Sig. (2-tailed)	.889	.679	.362	.444	.623	.337	.361	.160	.372	.108	.	.000	.000
	N	34	85	85	85	85	85	97	97	97	97	97	97	97
Educational Level	Pearson Correlation	.016	-.070	.076	-.001	-.047	.036	-.057	-.121	.099	.004	.416*	1.000	.259*
	Sig. (2-tailed)	.926	.519	.484	.993	.663	.739	.578	.234	.330	.968	.000	.	.010
	N	36	87	87	87	87	87	99	99	99	99	97	99	99
Age Group	Pearson Correlation	-.116	.157	.024	.140	-.018	-.040	-.141	-.024	-.069	.238*	.605*	.259*	1.000
	Sig. (2-tailed)	.501	.148	.826	.197	.867	.712	.164	.810	.498	.016	.000	.010	.
	N	36	87	87	87	87	87	99	99	99	99	97	99	99

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

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