

Chapter IX

End User Support Usage

Robin Munkvold

Nord-Trøndelag University College, Norway

ABSTRACT

This study explores how different end user qualities affect actual use of support sources in organizations. It identifies three qualities: information technology-skills; computer self-efficacy; information technology (IT)-involvement. Sources of support are divided in: formal sources of support; informal sources of support; use of internal documentation and use of external documentation. Hypotheses are tested empirically through a cross sectional study in a large Norwegian organization. The results show end user qualities in varying degree may affect the end users' choice of different support sources. The study also shows access to a computer expert and giving collegial support might be important factors for explaining the variation in the end users' choices of support services.

Copyright © 2003, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

INTRODUCTION

Support services are central elements of any organization. To be competitive, organizations need to optimise the use of the information technology (IT)-resources. The problem is, however, end users tend to spend a lot of their working hours fixing IT-related problems that has nothing to do with their actual work assignments. The employee's expertise and skills in using computer systems have become a critical factor for successful use of information technology in organizations (Cheney, Mann & Amoruso, 1986; Nelson & Cheney, 1987; Mirani & King, 1994). Gartner Group found that about 60 percent of the time end users spend in front of a computer will be to make it work satisfactorily and to learn how to use different programs (Kirwin, 1995). The solutions for solving these problems usually are to offer the employees training, education, assistance or guidance. Do these solutions solve our problems?

Some information systems (IS) researchers have studied the antecedents of variation in the support needs of end users so that these needs can be better explained, predicted and fulfilled (Mirani & King, 1994). Maybe one should look at the end user's actual use of support and make this the basis for figuring out ways to make end users more effective in their daily work.

Why do end users choose different support services? Is it due to variations in end user qualities (i.e., skills, self-efficacy, involvement, etc.)? Is it the qualities of the actual support (context, vicinity, sources, etc.)? Or could it be a result of the end user's relation to the support personnel or the competence of the support personnel that makes the end user choose his source of support? These questions are many that must be answered when searching to find causes of variation in the end user's use of different support sources.

Most literature view end user computing (EUC) support from an overall organizational perspective. Information centre (IC) approaches, generally, do not take into account differences among users, when designing and providing support services (Mirani & King, 1994). To make end users more effective, a useful approach could be to map the causes for the end user's need for different kinds of support. By finding these causes one could improve end user qualities and, therefore increase effectiveness. My focus is on end user qualities, and I aim to find out whether basic end user qualities can affect the way end users choose sources of support or solve their IT-related problems. That is, *are there any basic end user qualities that can be of significance when they choose their sources of support?*

The objective of this study is to identify end user qualities (variables) that may be important for explaining differences in usage of different support sources. I will address three different qualities that might be of significance, when end users solve their problems. These qualities include: IT-skills, computer self-efficacy and IT-involvement.

Copyright © 2003, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

THEORY, RESEARCH QUESTIONS, CONCEPTUAL MODEL AND HYPOTHESIS

End User Computing Support

To measure the use of different sources of support, EUC needed a more precise definition. Many studies show different perspectives on EUC support (Arnouldse & Oulette, 1986; Bruton, 1995; Doll & Torkzadeh, 1993; Heie & Heistad, 1998; Larsen, 1989; Smith, 1997; Winter, Chudoba & Gutek, 1997).

Through a thorough analysis of the different perspectives on EUC support, a partitioning of EUC support was needed. Doll and Torkzadeh (1993) divides EUC support into three categories. These are:

- Consultation
- Training
- Documentation

This survey seeks to measure ad hoc support needs. The category *Training* is therefore irrelevant. *Consultation* and *Documentation* were singled out as the types of EUC support that would be tested for in this survey. Further analysis showed that Consultation and Documentation could be divided in formal vs. informal sources of support and personnel vs. impersonal sources of support. This resulted in four different types of EUC support sources:

- Personal and informal consultation with colleagues.
- Personal and formal consultation with computer experts.
- Use of external documentation (impersonal and informal).
- Use of internal documentation (impersonal and formal).

Through this review EUC support was defined to be:

All sorts of IT-help that an end user receives or uses in his work to solve arising problems or acquire expertise and skills within IS-use, so that they easier can achieve organizational goals.

This definition limits the perspective on EUC support and makes it somewhat easier to measure.

End User Qualities

As the purpose of this study is to find out whether different end user qualities can explain the differences in their choice of support sources, it is equally important to find these qualities.

There exists some literature on EUC support, but not very much on the end user's choices of support depending on his basic qualities (i.e., skills, etc.). Winter

Copyright © 2003, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

Table 1: EUC Support Categorization

EUC support	Informal	Formal
Personal	Consultation with colleagues, or other non professional IT workers	Consultation with IS-professionals
Impersonal	Use of external documentation not developed by the local IC. This could be manuals, periodicals, etc.	Use of internal documentation developed by the local IC

et al. (1997) concluded in their survey that even though training and support could have improved the end user's computer knowledge, it is clear that it has not lead to high computer knowledge. Their opinion is that it is important for the support personnel to have some knowledge about the end user's computer skills to give them proper support. It then seems reasonably obvious that *computer skills* might affect the end user's choice of different support services. I therefore ask:

Do IT-skills influence the end user's choice of support services?

One would believe that end users with low computer knowledge and skills would need more support than those with high computer knowledge and skills. Øystein Sørebo wrote a paper in 1996 called: "*End-User Computing and the perceived need for support services: Toward an explanation of the independent-user paradox.*" The qualities he believed to affect the perceived need for support services include: IT-involvement, computer self-efficacy, and informational influence (from colleagues).

Sørebo questions whether the end user's *IT-involvement* might have a significant influence on the perceived need for support services. Earlier studies have shown that involvement affects information searching (Laurent & Kapferer, 1985; Zaichkowsky, 1986). Finding the solution to computer related problems, through the use of different support sources, could easily be compared with information searching. Zaichkowsky (1986) also points out that an individual's attention towards and experience of what's important in relation to the execution of a specific behaviour will vary with the individual's involvement. In this context, execution of a specific behaviour can be compared with the use of different sources of support and the individual's involvement could be different aspects of the end user's involvement toward the computer.

On these basis one could ask:

Do IT-involvement influence the end user's choice of support services?

Copyright © 2003, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

Computer Self-Efficacy is an important end user quality. Compaeu and Higgins (1995) argues that this special psychological state will affect the end user's belief about his need for support services. Belief about the need for support services and actual use of different support services are clearly related topics, and therefore my question is:

Do computer self-efficacy influence the end user's choice of support services?

Now I will turn to a more detailed description of each of the three explanatory factors.

IT-Skills

The concept IT-skills is not easily defined. IT is widely used, but often without providing a precise definition. Much work is done on the related concept End User Computing Sophistication. The reason why I have not used the concept, End User Computer Sophistication, is that different authors have defined it differently in different surveys (Blili, Raymond & Rivard, 1994; Huff, Malcolm & Marcolin, 1992; Marcolin, Munro & Compeau, 1993; Rockart & Flannery, 1983; Zinatelli, 1996). It would be difficult to compare the results from the different surveys because of the variations in the definition of the concept.

The subject *skill* is often connected to the subject's *ability*. A few researchers (Cheney & Nelson, 1988; Koohang et al., 1992; Marcolin et al., 1996) have tested end user ability. Both Marcolin (1996) and Koohang (199x) have used Cheney and Nelson's instrument for developing their instruments on end user abilities. Cheney and Nelson identified three clear factors within end user computing abilities: technical abilities, modelling abilities and application abilities. Technical abilities apply to programming, the use of hardware and operating systems. Modelling abilities apply to subjects regarding software engineering. Application abilities apply to skills that are most typically associated with the use of applications systems. All these factors are important for measuring end-users' IT-skills. The aim of this study was, however to measure work-relevant IT-skills. The measure of technical and modelling abilities was therefore less interesting. On this basis, I defined IT-skills to be:

In what degree a person manages to solve different problems with help from different work-relevant information system tools.

IT-Involvement

Earlier research on IT-involvement has mostly been about participator behaviour within IS-development (Ives & Olsen, 1994). The psychological dimension of this participation has been brought to focus in the later years. In spite of Barki and Hartwick (1989), Kappelman (1990) and Kappelman and McLean (1993, 1994) trying to establish a conceptual partitioning between *participation* and *engagement* as two aspects of involvement, it is still common to use end user involvement as a

Copyright © 2003, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

Table 2: End User Involvement Partitioning

End User Involvement	Related to the Phenomenon	Can be Divided Into:
Situational Involvement (End User Participation)	Behaviour	Process Participation or System Usage
Intrinsic Involvement (End User Engagement)	Psychological State	Involvement Towards Information Technology, the Computer and Software or Involvement Towards a Process

description of participant behaviour (Doll & Torkzadeh, 1994; Igarra & Guimaraes, 1994). A solution to this partitioning of behavioural and psychological involvement is to denote them both end user involvement, and to distinguish between the two components *situational involvement* and *intrinsic involvement* (Jackson et al., 1997). One can further divide intrinsic involvement in a *psychological condition* and as *involvement towards information technology, the computer and software* or *involvement towards a process*. My aim with **IT-involvement** is to measure *involvement towards information technology, the computer and software*. Table 2 shows the partitioning of the concept.

With basis in the work of Barki and Hartwick (1989), I have defined IT-Involvement as follows:

The importance and personal relevancy an end user attaches to a computer and the use of it.

Computer Self-Efficacy

Compeau and Higgins (1995) did a survey on the concept of self-efficacy to prove its usability in the attempt to understand individual behaviour towards computers. The term self-efficacy is future-oriented. It does not deal with what a person has done earlier, but rather with a person's beliefs of what can be done in the future (Compeau & Higgins, 1995b, p. 192).

It is "borrowed" from social psychology, where self-efficacy is said to be the user's beliefs about his capability to organize and execute the courses of action required to manage prospective situations (Bandura, 1996).

Self-efficacy has its origin in the writings of Albert Bandura (1986, 1995). He defines it to deal with: "*peoples judgement of their own capabilities to organize and execute courses of action required to attain designated types of performance. It is concern not with the skills one has, but with the judgements of what one can do with whatever skills one possesses*" (Bandura 1986, p. 391). Thus, Computer Self-Efficacy represents an individual's perception of his ability to use computers in the accomplishment of a task (Compeau & Higgins, 1995a).

The concept has three dimensions (Compeau & Higgins, 1995a, 1995b). These dimensions are: *magnitude* — the level of computing task difficulty the user can attain; *strength* — whether the conviction regarding magnitude is strong or weak and

Copyright © 2003, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

generalizability — the degree to which the expectation is generalized across different software packages and different computer systems.

End users with a high magnitude of Computer Self-Efficacy might judge themselves as capable of operating with less support and assistance than those with lower magnitude of self-efficacy (Compeau & Higgins, 1995a, 1995b).

Compeau and Higgins (1995b, p. 195) show that support was negatively related to self-efficacy with a regression coefficient of $-0,16$. The survey thereby showed that the more support given to the end user the less computer self-efficacy he possessed.

Following these research questions, conceptual definitions and discussions, I will utilize the model in Figure 1.

Hypothesis:

H1: The end user's IT-skills will covariate with their respective source of support choices.

H1a: High IT-skills is negatively related to the use of formal sources of support.

H1b: High IT-skills is positively related to the use of informal sources of support.

H1c: High IT-skills is negatively *related to* the use of internal documentation.

H1d: High IT-skills is positively related to the use of external documentation.

H2: The end user's Computer Self-Efficacy will covariate with their respective source of support choices.

H2a: A high degree of Computer Self-Efficacy is negatively related to the use of formal sources of support.

H2b: A high degree of Computer Self-Efficacy is negatively related to the use of informal sources of support.

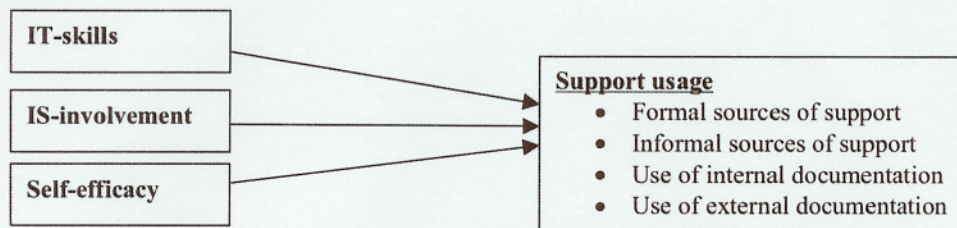
H2c: A high degree of Computer Self-Efficacy is negatively related to the use of internal documentation.

H2d: A high degree of Computer Self-Efficacy is positively related to the use of internal documentation.

H3: The end user's IT-involvement will covariate with their respective source of support choices.

H3a: High IT-involvement is positively related to the use of formal sources of support.

Figure 1: Research Model



Copyright © 2003, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

H3b: High IT-Involvement is positively related to the use of informal sources of support.

H3c: High IT-Involvement is positively related to the use of internal documentation.

H3d: High IT-Involvement is positively related to the use of external documentation.

RESEARCH METHOD

With basis in the requirements to causal research models (Bollen, 1989; Churchill, 1995; Frankfort-Nachmias & Nachmias, 1996), a quantitative approach was chosen, with a cross sectional design. To answer the research questions, a questionnaire was developed to measure the different variables. It was important to find a setting where one would surely find variation in end user's choices of different support sources. It was also important to find a setting that was homogeneous. Homogeneity diminishes the danger with alternative predecessors that might create spurious relations (Mitchell, 1985). To ensure a homogenous setting and variation in the end user's answers, a large organization in Norway was chosen (more than 800 employees).

IS-professionals were not included in the survey. The reason was most IS-professionals seldom utilize support personnel. The population was therefore selected to be all non-IS-professionals in the organization.

The Independent Variable (Support Usage):

Through the studies of Lee (1986), Larsen (1989), Delone and McLean; Compeau and Higgins (1995b); Blili et al. (1997), I found three different aspects on the measure of usage: *time spent*, *frequency* and *exploitation ratio*.

Since this research project had a time limit, time spent would be difficult to measure. To measure time spent, one must be sure that the respondents record the time they spend on support usage for a specific period of time. Most end users don't want to be bothered with these things and their answer to such a survey would probably be an estimate anyway. Exploitation ratio measures if a support service is of any use to the respondent. It will not measure in what degree the respondents utilizes different support-services, which was the aim of this study. Therefore *frequency* seemed the best measure to use. Blili et al.'s instrument was changed to fit the aims of the study. The measure was: *How often do you utilize different support sources when using your computer?* Different sources were divided into these categories: *informal support sources*, *traditional support sources*, *internal documentation* and *external documentation*. Frequency was measured with five categories, from *less than once a month* to *several times a day*.

Since there is limited research on support usage, and since this instrument never had been tested before, I chose to develop an alternative instrument. This alternative instrument tested for different error situations and asked the respondent *which support source would be his first choice if a specific problem were to arise*.

Copyright © 2003, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

Pre-tests and later factor analysis showed the alternative instrument was better, and this instrument was chosen to measure the end users' use of different support sources.

Computer Self-Efficacy was measured with Compeau and Higgins's (1995b) instrument. The different items focus on the degree to which the respondent masters the use of new software with different levels of support.

An instrument on IT-Involvement developed by Barki and Hartwick (1994) was pre-tested in the organization. The scale was difficult to translate to Norwegian and the items that were chosen to measure different aspects of the concept were quite similar. A newly developed instrument developed by my mentor Øystein Sørebo was adopted. This instrument measured the importance and personal relevancy an end user expresses towards the computer and use of it.

The IT-skills instrument was developed based on Cheney and Nelson's (1988) instrument. The respondents were asked *to indicate to what degree they used different software* and *to indicate their level of skill within the different types of software*.

In addition to the variables chosen for measuring different end user qualities, three control variables were included. These were *giving collegial support*, *direct access to IS-professionals* and *IC relationship*. The variable *giving collegial support* measures to what degree the respondent gives collegial support to fellow workers. *Direct access to IS-professionals* shows if the respondents have direct access to IS-professionals in the same office location. *IC relationship* defines the respondents' relationships to the information centre on a scale from very good to very bad. Further reviews (through test-respondents) showed that the questionnaire was missing an alternative choice in problem solving. This was *solving the problem themselves*. I, therefore, added this dependent variable to the questionnaire.

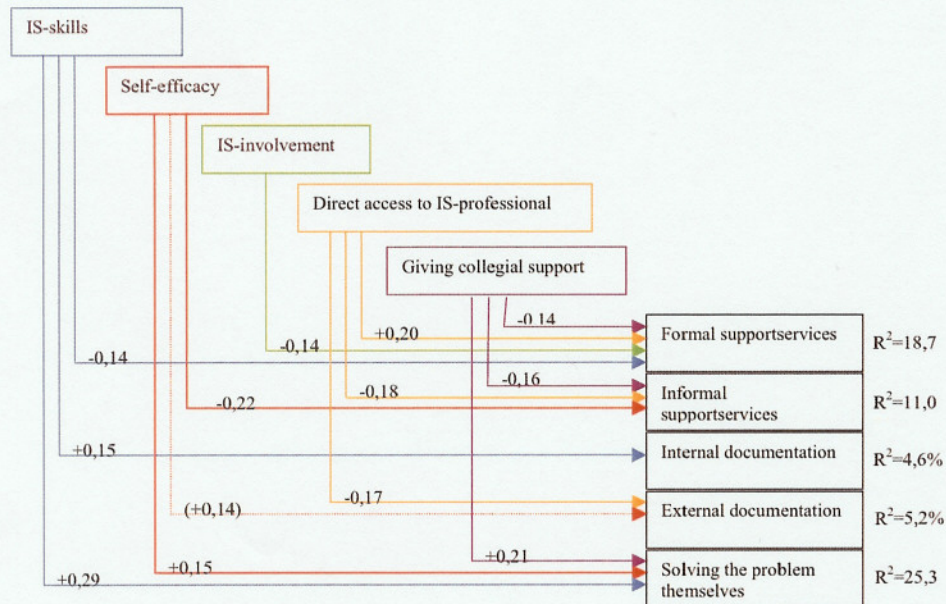
The questionnaire was sent to 670 employees. Two hundred and seventy-seven usable questionnaires were returned, which gave a 41.3 percent response rate.

RESULTS

The various sets of variables that are included in this survey have gone through factor analysis, to filter unwanted items that do not measure the variables well enough. Through convergent and divergent validity analysis some items were rejected. This was to ensure the lack of non-redundant concepts.

The results from the analysis supports the following hypotheses: H1a, H1c, H1e, H2b, H2d, H2e and H3a. In addition, *direct access to IS-professionals* seems to correlate positively with the use of *formal support services*, negatively with the use of *informal support services* and negatively with the use of *external documentation*. Also, *giving collegial support* correlates negatively with the use of both *formal* and *informal support services* and positively with the added dependent

Figure 2: Summarizing the Results



variable *solving the problem themselves*. Figure 2 summarizes the results of the analysis.

The beta (multiple regression) values that are indicated along the arrows apply to the covariance after the inclusion of the control variables. The dashed arrow between Computer Self Efficacy and External Documentation point out there was covariance between the two variables, but this covariance disappeared when the control variables was accounted for. R^2 states explained variance in the dependent variable(s).

IMPLICATIONS, CONCLUSION AND RECOMMENDATIONS

The results show IT-skills might be of importance for the use of formal support services. The negative covariance indicates that formal support services, first of all, would be of use for the novice end users. Earlier discussions point out end users might demand more and better services, from the formal support sources, the higher their IT-skills. My survey does not support these viewpoints. One could expect the enquiries from expert end users would be of such specific nature, the formal support service would not be competent enough to solve such problems. Since I do not have a measure on the actual qualifications possessed by the formal support services in

Copyright © 2003, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

the organization, the answer to this anticipation seems very uncertain. But it might indicate that one, by increasing support qualifications naturally, will be able to help a bigger group of end-users.

The results also show there is a negative covariance between IT-skills and the use of Internal documentation, i.e., the higher IT-skills the less the use of internal documentation. This could imply that the quality of the internal documentation is not good enough. Maybe most internal documents are made for novice users, explaining basic use of different software. The quality of the internal documentation is not measured in this survey, and therefore it will be difficult to point out that documentation quality would impact (indirectly) on the end users' use of internal documentation. Later studies on the subject should therefore contain a measure on the *perceived quality of internal and external documentation*.

An indication that shows the data collected is quite reliable is the result that shows a positive covariance between high IT-skills and the variable *solving the problem themselves*. This covariance is expected, and any other result would be suspicious. Another result that indicates reliability is the result showing the end users giving collegial support negatively covariates with the use of formal support sources.

The hypotheses regarding Computer Self-Efficacy shows a negative covariance towards the *use of informal support sources* (H2b), and a positive covariance towards the *use of external documentation* and towards *solving the problem themselves*. This could imply end users, with a high degree of computer self-efficacy, basically want to solve the problems themselves, either by using external documentation and/or by solving the problems without the use of any support sources. That indicates these end users probably have such high beliefs about themselves they don't see themselves as people needing any help from others. They would expect that no others could solve the problem any faster than themselves anyway.

It is important to notice, when the control variables are included, Computer Self-Efficacy is no longer a valid factor in explaining the use of external documentation. That might indicate a spurious connection. By testing covariance between Computer Self-Efficacy and *access to a computer expert*, I found no covariance. That again might indicate the strong covariance (beta value: -0,17), between *access to a computer expert* and the *use of external documentation*, confounds the effect of Computer Self Efficacy. I would, therefore suggest to test for this in future surveys to clarify the uncertainty around the model.

The results regarding IT-involvement only show covariance with the *use of formal support sources*. Another survey conducted at almost the same time as mine shows the exact same result (Haukedalen, 1998, p. 65). This indicates *end users with a high degree of IT-involvement use formal sources of support more*. The reason why might be, these end users show a bigger interest in computers and computer technology, and therefore are eager to solve IS-related problems. The formal support source might also work as an information channel for these end users.

Copyright © 2003, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

As their involvement towards IT is higher, they show more general interest for IT, and therefore have the need to get answers regarding information technology.

The results of this survey clearly indicate specific end user qualities affect the end user's choice of support source. I, therefore, recommend organizations to improve these basic qualities of the end user, instead of only providing the traditional support services. Not only should the employees attend training courses to improve these basic qualities, one should also seek to improve the end users' Self-Efficacy and involvement towards computers and computer technology. Especially IT-involvement should be increased. By increasing this quality, one will make the end users use formal support services more often, which again can lead to more effective employees. One must take into mind, although an end-user has high IT-skills and a high magnitude of computer self-efficacy, it does not automatically mean that he/she will solve IT-related problems faster than the formal support group can. For example, if end users feel they are sufficiently qualified to solve IT-related problems, they may well spend days doing exactly this, whereas calling the IT support staff could have solved the problem within minutes.

By increasing end users IT-involvement and by improving quality and increasing availability of the IT support staff, employees would likely become more effective in their everyday work.

In addition, support personnel ought to aim to provide the end users relevant knowledge every time they need help to solve a problem. Bento (1996) talks about *doers* and *facilitators*, when speaking of different types of support personnel. It is not enough that support personnel just solve the problem and leave (doers). They must also transfer the knowledge to the end user, so that the end user more easily can confront the next problem situation they face (facilitators).

It is nevertheless important to notice this survey has been done with data materials from one big Norwegian organization. This does not mean the results and recommendations in this survey would apply to any other arbitrary organization. More research is needed to generalize the conclusions made in this survey.

REFERENCES

- Arnoudse, D. M., & Oulette, L.P. (1986). An introduction to the information centre concept. *Information Strategy*, 3(2), 9-12.
- Bandura, A. (1986). Social foundations of thought and action: a social cognitive theory. *Series in social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Barki, H., & Hartwick, J. (1989, March). Participation and concept of user involvement. *MIS Quarterly*, 13, (1), 53-63.
- Barki, H., & Hartwick, J. (1994a, March). Measuring user participation, user involvement and user attitude. *MIS Quarterly*, 59-82.
- Barki, H., & Hartwick, J. (1994b). Explaining the role of user participation in information-System use. *Management Science*, 4(40), 440-465.

Copyright © 2003, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

- Bento, R. F. (1996). Life in the middle: An analysis of information centres from the perspective of their major stakeholders. *Information Management*, 30, 101-109.
- Blili, S., Raymond, L., & Rivard, S. (1994). Definition and measurement of end-user computing sophistication. *Journal of End User Computing*, 2(8), 3-12.
- Blili, S., Raymond, L., & Rivard, S. (1997). Impact of task uncertainty, end user involvement, and competence on the success of end-user computing. *Information Management*, 33, 137-153. (1998).
- Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley.
- Bruton, N. (1995). *Effective user support: How to manage the IT helpdesk*. McGraw-Hill Book Company.
- Cheney, P.H., & Nelson, R. R. (1988). Brief communication: A tool for measuring and analysing end user computing abilities. *Information Processing & Management*, 24(2), 199-203.
- Cheney, P.H., Mann, R.I., & Amoroso, D.L. (1986). Organizational factors affecting the success of end-user computing. *Journal of Management Information Systems*, 1, (3), 65-80.
- Churchill, G. A. (1979). A paradigm for developing better measures for marketing constructs. *Journal of Marketing Research*, Vol. XVI.
- Churchill, G. A. (1996). *Marketing research: Methodological foundations*. Dryden Press; c1995. (6th edition).
- Compeau, D. R., & Higgins, C.A. (1995a). Application of social cognitive theory to training for computer skills. *Information Systems Research* 6, 2. The University of Western Ontario London, Ontario, Canada N6A 5B9.
- Compeau, D. R., & Higgins, C.A. (1995b, June). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, 189-211
- Delone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, 3(1), 60-95.
- Doll, W. J., & Torkzadeh, G. (1988). The measurement of end-user computing satisfaction. *MIS Quarterly*, 2(12), 259-274.
- Doll, W. J., & Torkzadeh, G. (1993). The place and value of documentation in end user computing. *Information and Management*, 24, 147-158.
- Frankfort-Nachmias, C., & Nachmias, D. (1996). *Research methods in the social sciences* (5th Ed.). London: Arnold.
- Haukedalen, K. (1998). Bruk av brukerstøtte: Hvilke egenskaper for sluttbrukeren kan være av betydning for bruk av brukerstøtte? HiBu – Hønefoss.
- Heie, T. H., & Hestad, K. I. (1998). Brukerstøtte: Fra et sluttbrukerperspektiv. HiBu – Hønefoss.
- Huff, S.L., Malcolm, C. & Marcolin, B. (1992) Modelling and measuring end user sophistication. ACM.
- Huff, S. L., Marcolin, B., Munrow, M. C., & Compeau, D. R. (1994, August).

- Understanding and measuring end user sophistication. *Journal of Computing*, 6(1A). The University of Western Ontario, New Zealand.
- Igbaria, M., & Guimaraes, T. (1994). Empirically testing the outcomes of user involvement in DSS development. *Omega, International journal of Management Science*, 22(2), 157-172.
- Ives, B., & Olson, M. H. (1984, May). User involvement and MIS success: A review of research. *Management Science*, 30(5), 586-603.
- Jackson, C.M., Chow, S., & Leitch, R.A. (1997). Toward an understanding of the behavioural intention to use an information system. *Decision Sciences*, 2(28), 357-389.
- Kapferer, & Laurent (1985). Measuring consumer involvement for end user computing support. *Decision Science*, 25(4), 481-498.
- Kappelman, L.A. (1990). The implementation of computer-based information systems: The respective roles of participation and involvement in information system success. Unpublished doctoral dissertation, Georgia State University.
- Kappelman, L. A. (1995). Measuring user involvement with information systems success: The respective roles of user participation and user involvement. *Journal of Information Technology Management*, 3(1), 1-12.
- Kappelman, L. A., & McLean, E. R. (1991, December). The perspective roles of user participation and user involvement in information system implementation success. *Twelfth International Conference on Information Systems* (pp. 339-350). New York.
- Kappelman, L. A., & McLean, E. R. (1993, October). User engagement in information system development, implementation, and use: Towards conceptual clarity. *Proceedings of the IFIP TC8 Working Conference on Diffusion, Transfer and Implementation of Information Technology* (pp. 199-214). Pittsburgh, PA: North-Holland.
- Kappelman, L. A., & McLean, E. R. (1994, January). User Engagement in the development, implementation, and use of information technologies. *Proceedings of the 27th Hawaiian International Conference on the System Sciences*, 4, 512-521. Maui, Hawaii, USA.
- Kirwin, W. (1995, March). The true cost of personal computers. Across The Board.
- Larsen, T. J. (1989). Managers' use of computers: Middle managers' end-user computing utilization levels and support requirements by level innovativeness. A thesis submitted to the Faculty of the graduate School of the University of Minnesota. University of Minnesota: Minneapolis, MN.
- Lee, D. (1986). Usage pattern and sources of assistance for personal computer users. *MIS Quarterly*, 10(4), 313-326.
- Marcolin, B. I., Munro, M. C., & Campbell, K. G. (1996). End user ability: Impact of job and individual differences. *Journal of End User Computing*, 3(9), 3-12. Hershey, PA: Idea Group Publishing.
- Marcolin, B. I., Munro, M. C., & Compeau, D. R. (1993). End user sophistication: A multitrait-multimethod analysis.

Copyright © 2003, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

- Mirani, R., & King, W. R. (1994a). Impacts of end-user and information center characteristics on end-user computing support. *Journal of Management Information Systems*, 11(1), 141-166.
- Mirani, R., & King, W. R. (1994b). The development of a measure for end-user computing support. *Decision Science*, 25(4), 481-498.
- Mitchell, T. R. (1985). An evaluation of the validity of correlational research conducted in organizations. *Academy and Management Review*, 10(2), 192-205.
- Reve, T. (1985) Validitet i økonomisk-administrativ forskning, i metoder og perspektiver i økonomisk-administrativ forskning, 52-72. Oslo, Universitetsforlaget.
- Rockart, J. F., & Flannery, L. S. (1983). The management for end user computing. *Communications at the ACM*, 10(26), 776-784.
- Smith, A. (1997). Human computer factors: A study of users and information systems. McGraw-Hill Book Company.
- Sørebo, Ø. (1996). End user computing and the perceived need for support services: Toward an explanation of the independent-user paradox. Høgskolen i Buskerud, Konferanse: Fifth Edamba Summer School.
- Winter, S. J., Chudoba, K. M., & Gutek, B. A. (1997). Misplaced resources? Factors associated with computer literacy among end-users. *Information & Management*, 32, 29-42.
- Zaichkowsky, J. L. (1986, December). Conceptualising the involvement construct. *Journal of Consumer Research*, (12), 341-351.
- Zinatelli, N., Cragg, P. B., & Cavaye, A. L. M., (1996) "End user computing sophistication and success in small firms." *European Journal of Information Systems*, 3(Vol. 5), 172-181.