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The Role of Access to Personal Support in Fostering Frequent Information Systems Use

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ABSTRACT

Recent research has begun to examine some of the factors underlying the continued use of information systems. This paper seeks to contribute to this emerging research stream through a preliminary investigation of the role played by user access to various support resources in encouraging frequent system use in personal use contexts. Although organizations typically provide users with access to formal support resources through help desk services, a body of literature exists which suggests that individuals may rely to a significant extent on resources such as friends and co-workers to support their ongoing use of personal information systems. An examination of this possibility was performed using an archival data set. Analysis of the data using structural equation modeling (SEM) indicates that user perceptions that they can rely on friends, co-workers, and personal abilities to resolve technical difficulties are associated with more frequent system use.

Keywords

user support, user behavior, personal use, information systems continuance

INTRODUCTION

Considerable research has been reported within both the psychological and organizational behavior literature that examines the role played by social support in fostering outcomes such as personal learning (Niessen 2006), work performance (Bhathumnavin 2003), and help seeking (Larose et al. 1999). Although these studies have tended to offer somewhat varied definitions, the notion of social support has been broadly defined as “the perception or experience that one is loved and cared for, esteemed and valued, and part of a social network of mutual assistance and obligations” (Taylor et al. 2004, p. 354). In addition to outcomes such as improved learning and performance, access to social support has also been associated with an increase in persistence behaviors. Gloria and Ho (2003) report, for instance, that perceptions held by students that a friend or family member was available to provide support in times of difficulty was a more significant predictor of academic persistence than either self-efficacy or self esteem. Since the continued use of information systems (IS) can be reasonably conceptualized of as a persistence behavior, these findings suggest that social support may also be important to continued information systems use, particularly in personal use contexts where access to formal support may be limited and where many of the organizational pressures that compel system use are absent (Brown et al. 2002, Moore and Benbasat 1991). In contrast with organizational use contexts, the personal use of information systems is characterized by a much greater degree of voluntariness that can have significant implications. Failure to make full use of personal information systems can, for instance, limit access to government services, impair education and learning, and restrict social mobility. In addition, variability in the extent to which use is made of personal information systems seems to exist even among younger generations suggesting the ongoing importance of understanding how we can better foster the use of these systems.

Social support is thought to consist of the three dimensions of emotional support, informational support, and instrumental support though it is recognized that all three dimensions are at least somewhat interrelated (Bhathumnavin 2003). The latter two dimensions are intended, however, to emphasize those aspects of social support that result from the provision of information and tangible assistance. Given the nature of information systems use, it seems likely that these dimensions of social support will be more salient in the current context. Thus, it is argued here that in usage contexts characterized by some degree of voluntariness such as those found in many personal use situations, access to social support that provides information and tangible assistance can help a user to overcome his or her difficulty and thereby ensure frequent use of a system. This possibility has, however, received only limited attention in the IS literature. Hence, the research presented here explores the possible association between the frequency of technology use and perceived access to social support resources. Specifically, it attempts to provide some understanding of the extent to which the frequency of the use of the Internet to perform certain routine personal activities is associated with user perceptions of their ability to access support from multiple sources including friends and co-workers. The following section develops a research model to address this question and a set

of related hypotheses. Subsequent to model development, the method by which these hypotheses were tested is outlined and the results of the analysis are then reported. Finally, conclusions are drawn and a discussion of the limitations of the current work and of some opportunities for future research is offered for consideration.

THEORY AND HYPOTHESES

Hirschman's (1970) exit, voice, and loyalty model of dissatisfaction suggests that when users encounter difficulties with the use of an information system they will opt to either discontinue the use of the system or to voice a need for improvements or assistance (Kiesler et al. 2000). As one of the most basic strategies for coping with difficulties (Folkman and Lazarus 1980), information seeking behavior is an important starting point in efforts to resolve such difficulties. Access to informational support has also been related to individual motivation to master tasks (Harlow and Cantor 1995) and having access to such support can thus be expected to both help users to resolve their immediate difficulties and to encourage them to generally become more proficient in their use of a system. The comfort fostered by the knowledge that one has access to a convenient, non-threatening source of information might, for instance, encourage users to explore unused system features and these explorations can contribute to greater and more proficient use of a system (Jasperson et al. 2005).

Supplementing informational support, tangible assistance involves the provision of a wide range of practical forms of assistance that can help users to overcome frustration and difficulties and thereby ensure that they quickly return to productive system use (Peeters and Le Blanc 2001). The importance of such assistance is highlighted by Amsel's (1958) behavioral theory of frustration which suggests that a mechanism is needed to encourage users to continue using a system when frustration is encountered. As a convenient, familiar means for overcoming obstacles, social support offers a potentially important mechanism for overcoming user frustration. Behavioral frustration theory further suggests that when social support is available to help overcome user frustration, users will become even more committed to the use of a system over time.

Computer Support Resources

Social support, as defined in the wider literature, is a relatively broad notion that incorporates a range of dimensions and it is therefore necessary to clearly ground the social support construct within the context of information systems use. The extant literature suggests that multiple sources of social support may aggregate to function as a cohesive higher order construct. Research has found, for instance, that individuals tend to develop general support expectations that operate in a manner resembling a cognitive personality construct (Lakey and Cassady 1990). Such general expectations of support can be thought of as an overarching schema that represents the propensity of an individual to use their support network when in need (Larose et al. 1999). This propensity has been found to account for almost half of the individual differences observed in efforts to seek help from teachers and has also been related to help seeking behaviors between strangers (Larose et al. 1999).

Multiple theoretical arguments have been offered to account for the tendency of general expectations of support to function as a cohesive construct. One such explanation argues that individuals have an innate need to achieve a sense of cognitive coherence in their support relationships (Baldwin 1992). This perspective suggests that users will tend to consider their access to support in general terms and then identify those support resources that affirm their general perceptions. Thus, users who perceive that they have access to one form of support will tend to perceive that they also have access to other forms of support, resulting in a higher order support construct that is reflective of perceived access to support from a variety of sources.

As an alternative to arguments based on the need for cognitive coherence, adult attachment orientation has also been offered as an explanation for the tendency of general expectations of support to function as a cohesive construct (Vogel and Wei 2005). Adult attachment orientation is considered a personality trait that represents individual willingness to rely on others for assistance and their level of comfort with this reliance. Although explanations based on adult attachment orientation and those based on the need for cognitive coherence both indicate that support might be better modeled as a multi-level construct, arguments based on adult attachment orientation further suggest that users may rely relatively exclusively on either social support resources or on their independent ability to resolve difficulties. This draws attention to the need to also consider user perceptions of their own ability to independently resolve difficulties when considering social support in the context of IS use. Social support and independent ability are therefore considered to both contribute to a users' set of computer support resources which are defined here as the sources of information and assistance with difficulties related to the use of information systems.

The focus of this study is on those computer support resources not directly linked to formal organizational support systems as these are generally unavailable in personal use contexts. Prior research suggests that such resources can consist of user manuals and online help as well as a wide range of individuals including friends and co-workers (Winter et al. 1997). An

earlier qualitative study (not reported here) also found that people routinely draw on co-workers, including help desk staff, for assistance with their personal computing difficulties. Awareness of and access to computer support resources affords users the opportunity to increase the effectiveness of their use of information systems by drawing on the expertise of others (Nevo and Wand 2005). Users who are able to access such resources are afforded opportunities to use information systems with a degree of proficiency approaching that of an expert user without the need to invest the effort necessary to actually become expert users themselves.

Computer Support Resources and the Use of Technology

The extant literature provides some account of research directed toward understanding the impact of facilitating conditions on the use of information systems. However, most of this work either focuses on initial system adoption rather than frequency of ongoing use or does not consider the impact of informal support resources on use frequency. Work by Thompson et al. (1991) sought, for instance, to understand the role of facilitating conditions in determining the use of personal computers. Although facilitating conditions were not found to significantly impact the decision to use personal computers, facilitating conditions were operationalized in the study as both the provision of training and perceived access to a support person or group. Some of the ambiguity in this operationalization was resolved by subsequent research that excluded perceptions of access to a support person or group from the operationalization of the facilitating conditions construct (Taylor and Todd 1995). The findings of Thompson et al. (1991) were also re-evaluated by Cheung et al. (2000) in the context of Internet use. Facilitating conditions were reported in this context as contributing significantly to frequent use of the Internet at work. The role played by access to the informal resources of interest in the present study was, however, not the focus of Cheung et al. Existing research does, nonetheless, suggest that access to informal computer support resources will be associated with increased personal use of information systems and it is therefore hypothesized that:

- H1: Higher levels of perceived access to computer support resources will be associated with higher frequencies of personal systems use.

Moderating Factors

A range of potential moderators can be expected to impact the relationship hypothesized in H1 with age being one of the most notable. An extensive body of literature has documented the moderating role of age in various IS research contexts (Morris and Venkatesh 2000) while research related to social support suggests that age can moderate the impact that social support has upon certain outcomes. Niessen (2006) found, for instance, that the importance of social support declined with age which might lead one to argue that the association between perceived access to computer support resources and frequency of system use will be weaker for older individuals. The justification offered for the reported finding was, however, based on the assertion that older individuals have better developed skills than younger individuals and this argument is less likely to be relevant in the context of relatively recent technological innovations such as information systems. In such contexts, younger individuals who are likely to have been exposed to similar systems during their education may be less likely to draw on computer support resources than older individuals who have not had the benefit of such exposure. This suggests that age will moderate the strength of the association between perceived access to computer support resources and the frequency of computer system use such that:

- H2: The association between perceived access to computer support resources and frequency of computer system use will be stronger for older individuals.

Considerable research has also been conducted in relation to gender differences surrounding the use of computer technology though the findings have been similarly conflicting and inconclusive (Shaw and Gant 2002). Recent research (Shaw and Gant 2002; Venkatesh et al. 2003) suggests, however, that gender is not a significant determinant of either intentions to use a system or actual system use and it is therefore hypothesized that:

- H3: The association between perceived access to computer support resources and frequency of computer system use will not be impacted by gender.

Finally, literature related to the diffusion of innovations has routinely identified individuals with higher levels of education as being more likely to be early adopters of innovations (Rogers 2003) which suggests that level of education might also impact relationships surrounding the ongoing use of information systems. Since individuals with higher levels of education tend to adopt technology sooner, they will often find themselves as users of technology for which very limited support resources are available. It might therefore be expected that more highly educated individuals will have developed competencies that make them better able to continue using computer systems without access to computer support resources. It is therefore hypothesized that:

H4: The association between perceived access to computer support resources and frequency of computer system use will be stronger for individuals lacking a post secondary education.

METHOD

The research model was testing using cross-sectional data from an archival dataset that includes measures of the frequency with which individual respondents were using the Internet to perform various personal tasks and their perceptions of the extent to which they could ask others for assistance with computer problems. The data set represents a random sample taken from the U.S. population that is sufficiently large to permit robust statistical analysis and the nature of the sample helps to ensure that any findings are relatively generalizable. Use of an archival dataset such as that used here also affords a relatively unique opportunity to perform a preliminary investigation of some research hypotheses prior to conducting more expensive survey research.

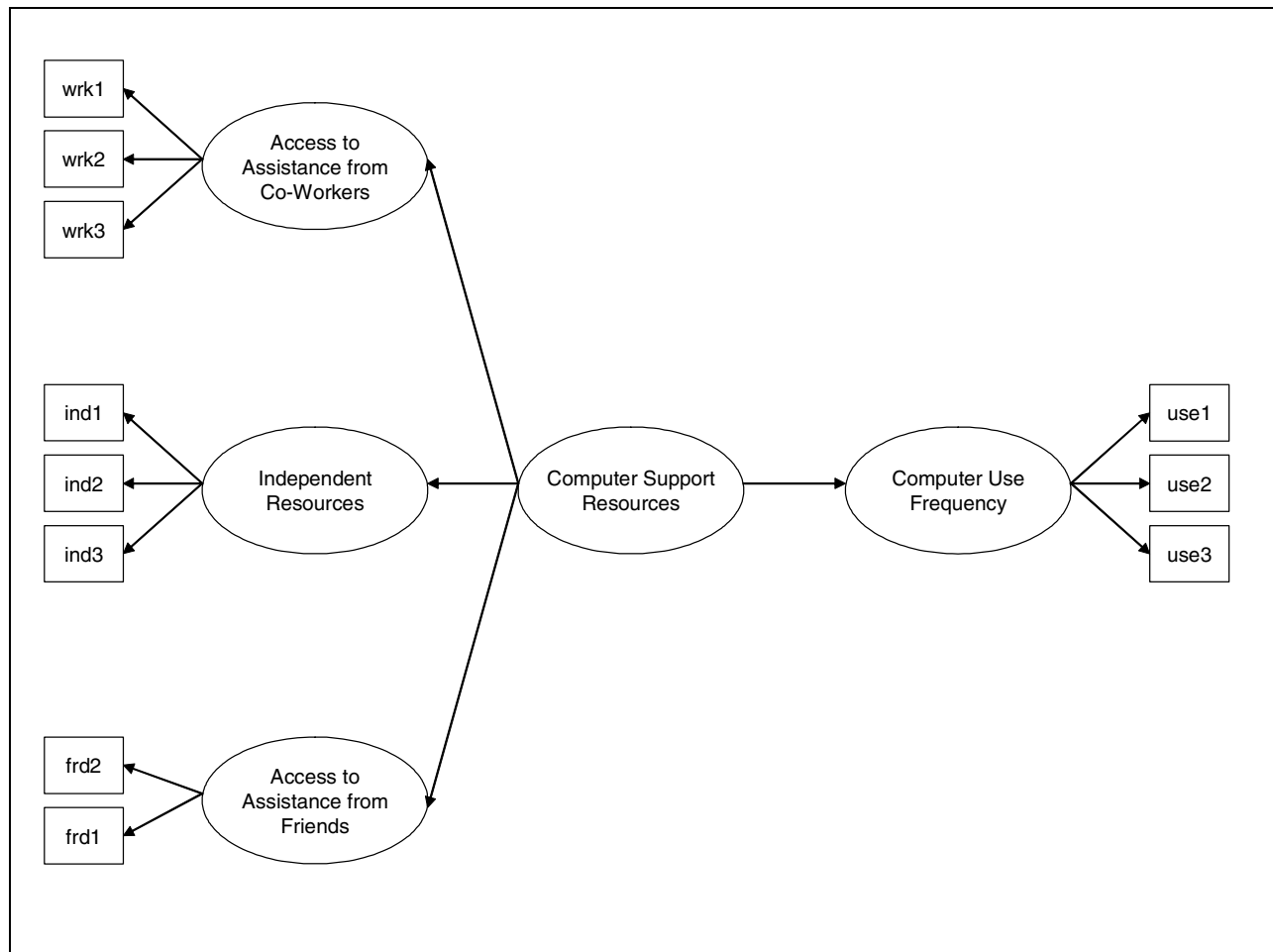


Figure 1. Research Model

Data

Funded by the National Science Foundation, the General Social Surveys (GSS) (Davis et al. 2005) have routinely benchmarked the demographic and attitudinal characteristics of US residents since 1972. In the years 2000, 2002, and 2004 this survey included a topic module entitled “Information Society” that consisted of a number of questions surrounding the use of information technology in the home with the primary focus being on the adoption and use of the Internet. Survey data

collected during the year 2000 included the most comprehensive set of variables related to computer support resources and data from this year was therefore used to test the research hypotheses. Prior to performing any analysis, respondents from the year 2000 who identified themselves as users of the Internet were isolated to create a sample of 558 users from a total of 2817 survey respondents. Only respondents who identified themselves as using the Internet were selected since the dependent variable of interest was the frequency with which the Internet was used rather than whether a respondent had adopted use of the Internet. Subsequent removal of cases with missing values further reduced the final sample from 558 to 546 users.

Measures

Measurement items for all of the variables identified in Figure 1 are listed in Table 1. Simple yes/no responses were provided for each of the items used to measure the independent variables while the items used to measure the frequency of Internet usage were measured on a four point scale ranging from “never” to “more than five times.” Although a gender variable was included in the original dataset, it was necessary to create two additional variables based on the available data in order to test whether age or level of education moderated the strength of any association that might exist between perceived access to computer support resources and frequency of use. First, a dichotomous variable indicating whether a respondent had completed a post-secondary education was constructed based on a variable in the dataset that indicated the highest degree obtained by the respondent. Similarly, a dichotomous variable indicating whether a respondent was over 30 years of age was constructed based on the reported age of the respondent. Although the choice of 30 as the demarcation between older and younger respondents was somewhat arbitrary, it was based on the premise that respondents over the age of 30 at the time of the survey would typically have completed most of their studies prior to the rise in prominence of the Internet which is generally seen as having occurred during the early 1990’s. This is important given earlier theoretical arguments which suggest that the need for support may be diminished among younger individuals as a consequence of their exposure to the use of a technology during their formal education.

Access to Assistance from Co-Workers	
1	When you need advice on how to do something with your software do you ask someone at your workplace or school for help?
2	Do the people you can ask for advice include a supervisor or trainer at work?
3	Do the people you can ask for advice include other co-worker?
Access to Assistance from Friends	
1	Do the people you can ask for advice include a close, personal friend?
2	Do the people you can ask for advice include another friend or acquaintance?
Independent Resources	
1	When you need advice on how to do something with your software do you look in the online help provided as part of the software?
2	When you need advice on how to do something with your software do you look in a printed manual, book, or CD that tells how to use the software?
3	When you need advice on how to do something with your software do you figure it out yourself?
Computer Use Frequency	
1	In the past 30 days how often have you visited a web site for financial information?
2	In the past 30 days how often have you visited a web site for news and current events?
3	In the past 30 days how often have you visited a web site for government information?

Table 1. Scale Measurement Items

Analysis

The raw data was analyzed via covariance-based Structural Equation Modeling (SEM) using AMOS Version 6.0.0 (Build 848) (Arbuckle 2005). The use of SEM allows for the construction of latent variables from observable indicator variables and for the concurrent modeling of relationships between multiple dependent and independent variables (Bollen 1989; Chin 1998). These capabilities permit the simultaneous assessment of both measurement and structural models and the modeling of second order latent constructs, making SEM well suited to the analysis of the research model posited by this study (Figure 1). Analysis was run using Maximum Likelihood (ML) Estimation which is considered an appropriate method of estimation when sample sizes exceed 100 to 150 (Hair et al. 1998).

Prior to analysis the sample was randomly split into three smaller samples of approximately equal size to permit cross-validation (Cudeck and Browne 1983). Employing the two-step procedure recommended by Anderson and Gerbing (1988), the measurement model was tested via confirmatory factor analysis (CFA) using the first of the three samples ($n = 189$). The full structural model was evaluated to test hypothesis H1 using the second sample ($n = 184$). Finally, the third sample ($n = 173$) was used to test the impact of the hypothesized moderators (H2 – H4) on the structural path between perceived access to computer support resources and frequency of use.

Testing of hypotheses H2 through H4 involved testing for moderation according to the procedure outlined by Byrne (2001). Data from the third sample was split into groups based on the value of the dichotomous variable representing the moderator of interest. The presence of moderation was then tested by assessing the significance of the chi-square difference between an unconstrained model and a model constrained such that the path between computer support resources and use frequency was equivalent across groups. This procedure was repeated three times to test each of hypotheses H2 through H4 with a non-significant chi-square difference being indicative of the absence of moderation.

RESULTS

Construct means, standard deviations, correlations, and average variance extracted (AVE) are reported in Table 2. Although some significant correlations exist between the variables, all correlations are relatively low which indicates the absence of multicollinearity.

Construct	Mean	S.D.	1	2	3	4
Computer Use Frequency	6.429	2.536	0.440			
Access to Assistance from Friends	1.427	0.759	0.172**	0.481		
Access to Assistance from Co-Workers	1.841	1.146	0.195**	0.211**	0.550	
Independent Resources	2.343	0.912	0.281**	0.269**	0.226**	0.360
**Correlation is significant at the 0.01 level (2-tailed), Diagonal values are Average Variance Extracted (AVE) for measurement model						

Table 2. Latent Variable Correlations

Measurement Model

A review of the results of the confirmatory factor analysis established the absence of Heywood cases or other indications of estimation problems. The measurement model exhibited very good fit with a chi-square value of 46.304 ($df=41$, $p=0.263$). The non-significant chi-square value suggests that the covariance matrix estimated by the research model (Figure 1) is a good approximation of the observed matrix and this assertion is supported by a reported goodness-of-fit index (GFI) of 0.957, an adjusted goodness-of-fit index (AGFI) of 0.931, and a comparative fit index (CFI) of 0.986. The root mean square error of approximation (RMSEA) was found to be suitably low at 0.026 with a 90% confidence interval of 0.000 to 0.058.

Internal Consistency

Construct reliabilities (C.R.) and Cronbach's alphas were calculated for all scales and are reported in Table 3. Construct reliabilities are all well above the value of 0.5 suggested by Hair et al. (1998) though some of the alpha values do fall below the recommended minimum value of 0.7 (Nunnally 1978). Being, however, on the order of 0.6, the reported alphas do seem

to meet at least a basic standard for preliminary research and seem reasonable given some of the limitations associated with reliance on archival data.

Construct	C.R.	Alpha
Computer Use Frequency	0.690	0.581
Access to Assistance from Friends	0.650	0.592
Access to Assistance from Co-Workers	0.780	0.734
Independent Resources	0.620	0.606

Table 3. Consistency Measures

Validity

Model regression weights are summarized in Table 4 which shows that all weights are significant at $p < 0.001$. This provides evidence for the convergent validity of the scales in the measurement model (Anderson and Gerbing 1988). Similarly, tests of discriminant validity performed as prescribed by Anderson and Gerbing (1988) established the discriminant validity of model constructs at $p < 0.01$. Findings of discriminant validity are further supported by the relatively small inter-item correlations shown in Table 2 and by the large differences observed between the average variance extracted (AVE) for each variable and the shared variance observed between any given variable and all other variables.

	Regression Weights	Standardized Weights	Standard Error	Critical Ratio	p
Computer Support Resources					
Assistance from friends	0.204	0.594	0.049	4.181	< 0.001
Assistance from co-workers	0.175	0.455	0.043	4.115	< 0.001
Independent resources	0.284	0.848	0.054	5.242	< 0.001
Frequency of Computer Use					
News in last 30 days	1.000	0.818	—	—	—
Financial data in last 30 days	0.578	0.483	0.108	5.344	< 0.001
Government information in last 30 days	0.602	0.638	0.089	6.798	< 0.001
Independent Resources					
Assistance from online help	1.000	0.697	—	—	—
Resolve problem on own	0.538	0.521	0.111	4.857	< 0.001
Assistance from manual	0.699	0.557	0.151	4.636	< 0.001
Assistance From Friends					
Assistance from other friend	1.000	0.717	—	—	—
Assistance from close friend	0.857	0.669	0.216	3.970	< 0.001
Assistance From Co-Workers					
Assistance from other co-workers	1.000	0.837	—	—	—
Assistance from people at work	0.937	0.801	0.115	8.149	< 0.001
Assistance from supervisor	0.713	0.554	0.103	6.905	< 0.001

Table 4. Measurement Model Factor Loadings

Structural Model

Testing of the full structural model using the second of the three sub-samples yielded a model with very good fit. The chi-square statistic was found to be 65.026 ($df=40$, $p=0.007$) and all other fit statistics exceeded generally accepted minimum thresholds. The GFI had a value 0.940, the AGFI was 0.901, the CFI was 0.935, and the RMSEA was 0.058 with a 90% confidence interval of 0.030 to 0.084. Standardized path coefficients and regression weights for the model are presented in Figure 2 and Table 5. These results show that all paths were significant at $p<0.001$ and it can therefore be concluded that hypothesis H1 was supported with approximately 20.4% of the variance in the frequency of computer use being explained by variance in perceived access to computer support resources.

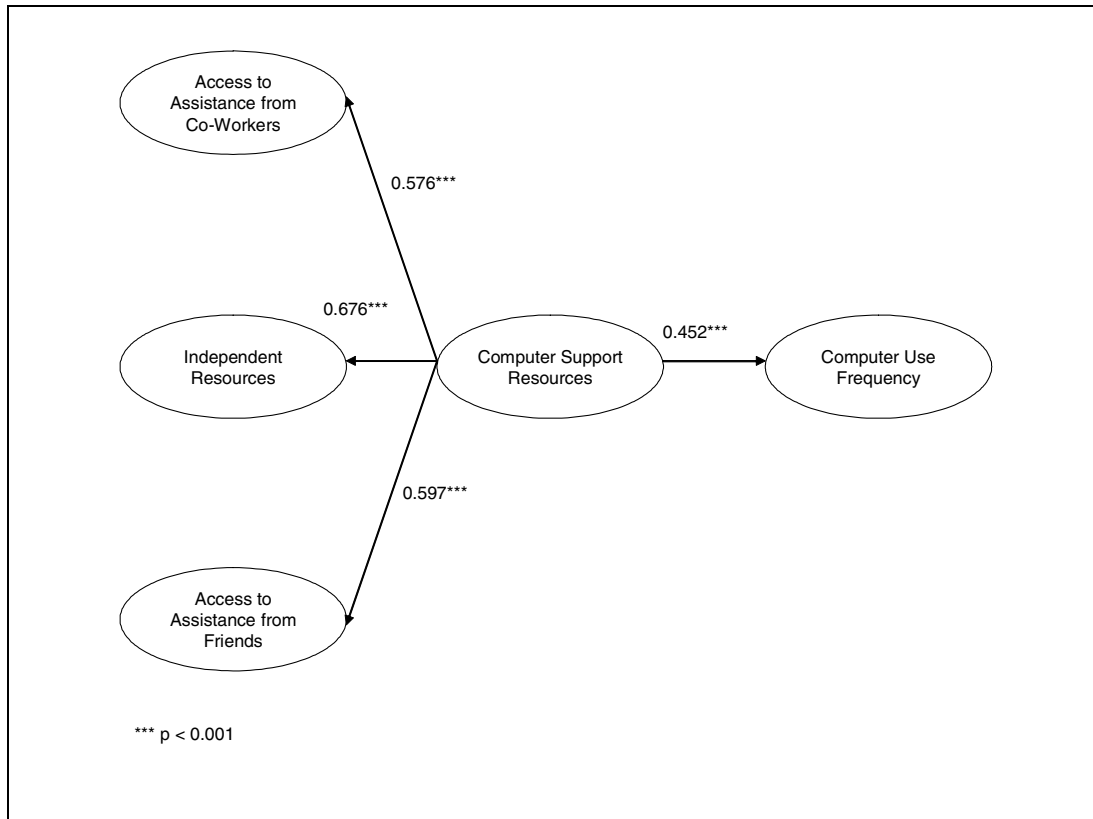


Figure 2. Full Structural Model Results – Standardized Weights

Moderation Testing

Based on the support found for hypothesis H1 it was deemed appropriate to proceed with an assessment of the impact of age, gender, and education on the relationship between perceived access to support resources and frequency of system use. Testing of these effects was conducted using the third of the three sub-samples and commenced with an examination of the impact of age on this relationship. Testing yielded an insignificant chi-square difference of 0.083 ($df=1$) between the unconstrained model and a model constrained such that the path between support resources and use frequency was equivalent for older and younger respondents. A difference of this magnitude is highly insignificant indicating an overwhelming lack of support for the hypothesized difference between older and younger individuals (H2). This finding was confirmed by the observation of a CFI difference of 0.003 between the unconstrained and constrained models, a difference that falls well below the value of 0.01 offered by Chen et al. (2005) as the maximum difference permitted when making claims of invariance.

Construct	Regression Weights	Standardized Weights	Standard Error	Critical Ratio	p
Assistance from friends	0.227	0.597	0.048	4.745	< 0.001
Assistance from co-workers	0.220	0.576	0.050	4.412	< 0.001
Independent resources	0.205	0.676	0.052	3.941	< 0.001
Computer use frequency	0.431	0.452	0.118	3.659	< 0.001

Table 5. Structural Model Regression Weights

Examination of the moderating influence of gender on the relationship between perceived access to support resources and system use proceeded in a manner analogous to the analysis of the moderating influence of age. Results indicate an insignificant chi-square difference of 0.005 ($df=1$) and a CFI difference of 0.007, thereby providing support for hypothesis H3 which argues that gender will not impact the relationship between support and use. Finally, absence of support for hypothesis H4 was demonstrated by analysis which yielded an insignificant chi-square difference of 0.051 ($df=1$) and a CFI difference of 0.004 when testing for the moderating influence of the level of education attained by the user. This result suggests that the relationship between perceived access to computer support resources and use frequency is not moderated by the level of education attained by the user. In general, the results of all moderation tests indicate that this relationship is relatively robust to differences in user age, gender, and level of education.

DISCUSSION

Although inferences of causality are not warranted given the cross-sectional nature of the data, these results suggest that there is a notable link between the frequency with which personal information systems are used and user perceptions of the extent to which they have access to a set of computer support resources. Furthermore, this relationship was found to be invariant with respect to age, gender, and education thereby suggesting that perceived access to computer support resources is associated with increased system use irrespective of a user's demographic characteristics. This relationship was found to hold for males and females and, despite hypotheses to the contrary, it was also found to hold regardless of whether the respondent had completed a post-secondary education and for both older and younger respondents. The failure to find age and education differences is, to some extent, in accordance with the premise of the research which argues that computer support resources can assist users to overcome difficulties that may impede their use of a system. Thus, it can reasonably be argued that these resources are effectively substituting for individual shortcomings such as a lack of education and are thereby permitting continued use of a system despite these shortcomings. This is a relatively intuitive assertion that is also in accordance with transactive memory theory which argues that individuals can substitute their own knowledge and experience with an awareness of contacts that possess the requisite knowledge and experience (Nevo and Wand 2005). Access to computer support resources can thus permit users to forgo training and education, substituting the resultant skills with an awareness of and access to individuals who do possess these skills.

The reported findings are of some significance given the potentially substantial social disadvantages incurred by those who fail to make adequate use of personal information systems. These disadvantages can include reduced access to educational resources, increased time and monetary costs when purchasing goods and services, impaired social interaction and mobility, and limited access to key government services. The continued growth in the use of information systems by all types of organizations and the emergence of social computing technologies can only be expected to further heighten this significance over time. For instance, as governments expand e-government initiatives they risk placing a portion of society at significant disadvantage unless efforts are made to not only ensure adequate access to the requisite technology but also to ensure that the support resources necessary to foster active system use are in place. The present work suggests that such support need not come in the form of a formal customer support system. Rather, initiatives aimed at helping citizens to recognize and draw upon existing support resources within their social networks may be both more economical and more effective in facilitating system use. The potential importance of social support further suggests that the developers of personal information systems might improve the use of their systems by incorporating "ask a friend" technology that permits friends, family members, and co-workers who use a system to connect to each other through the system to offer and receive assistance. The findings reported here appear to indicate that such technology could, in addition, reduce the customer support costs incurred by developers of personal information systems.

This study provides a relatively optimistic perspective on system use, suggesting that even users with limited skill sets might be encouraged to use a system provided that they feel they have access to a network of support resources. The relevant

support resources have been shown here to extend beyond formal resources such as the helpdesks that are typically found in organizations and the telephone support systems often provided by vendors. Better understanding of more informal support resources and how they are used may be important to fostering greater user commitment to the use of a system in both personal and business use contexts. In business use contexts, the potentially wide range of support resources relied upon by users draws attention to the possibility that the actual costs of user support may be considerably higher than the costs associated with formal computer support services (Kiesler et al. 2000). Users who are relying extensively on co-workers as part of their support network are consuming significant firm resources that are not accounted for in the costs of the traditional help desk. This has important implications in any assessment of the net benefits obtained by a firm through the use of an information system. In addition, the departure or transfer of key individuals who were functioning as support resources for other employees can have important implications for the continued use of both organizational information systems and, perhaps more surprisingly, personal information systems. Thus, providers of personal information systems may face apparently inexplicable discontinuance behavior that is explained by the “loss” of a key source of informal support. From the perspective of the organization, it may be important to identify sources of informal support and ensure that these individuals are present in key locations within the organization and that due consideration is given to the impact of their departure on subsequent system use.

Limitations and Future Research

The results of this research are, to some extent, limited by its reliance on an archival dataset which presented some challenges in relation to the measures used to operationalize the constructs of interest. The most notable of these challenges was an inability to include an adequate measure of the computer support obtained from family members. Inclusion of family support was thought to be desirable based on the extant literature (e.g. Kiesler et al. 2000) but dataset limitations impeded the inclusion of such a measure. Two factors do, however, mitigate the impact of this exclusion. First, the reflective nature of the computer support resources construct considerably reduces the need to include every possible measure when compared to a formatively specified construct (Jarvis et al. 2003). Second, there is at least some suggestion in the literature (e.g. Gloria and Ho 2003) that friends might offer consistently higher levels of support than family members. Thus, given the preliminary nature of the study, this limitation should not be seen as detracting from the substantive message that perceptions of access to computer support resources appear to be linked to the frequency of personal system use.

Mitigating factors aside, future research would benefit from a more comprehensive specification of the computer support resources construct. Future research would also benefit from the inclusion of this construct in a wider nomological network to provide additional insight into the relative importance of computer support resources in relation to other factors impacting the frequency of personal systems use. Additionally, the weighting of the dimensions of the computer support resources construct might differ depending on the system in question. The support role played by friends might, for instance, be diminished in comparison to the role played by IT co-workers in the context of more complex systems. This suggests a need to further test the model in contexts other than personal use of the Internet as well as in business contexts characterized by a greater degree of voluntariness such as in the use of project management tools and personal database management systems.

Longitudinal testing would also be useful in providing insight into whether access to support resources encourages system use or system use leads users to identify potential sources of support. A longitudinal study would also be of considerable value in establishing the longer term implications of reliance on support resources. For instance, there is a need to understand whether users mature and eventually develop some measure of independence from their support resources or remain chronically dependent upon these resources. Should the latter be the case, excessive dependence may result in the eventual withdrawal of support by those who are providing it (Harlow and Cantor 1995) with potentially severe negative implications for the dependent user. Finally, it would be useful to understand whether and how users rely on the support resources that they claim to have at their disposal. It is, for instance, possible that users who perceive that they have access to the necessary computer support resources may approach the use of information systems more confidently and are therefore able to use these systems with less actual reliance on support resources.

CONCLUSION

This study has performed a preliminary empirical investigation of the association between perceived access to computer support resources and the frequency of use of personal information systems. The results presented here suggest a significant link that has important implications for individual and organizational use of information systems. Better understanding of the significance of informal support holds notable promise in the quest to better understand the ongoing use of information systems.

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REFERENCES

1. Amsel, A. (1958) The Role of Frustrative Nonreward in Noncontinuous Reward Situations, *Psychological Bulletin*, 55, 102-119.
2. Anderson, J.C., and Gerbing, D.W. (1988) Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach, *Psychological Bulletin*, 103, 3, 411-423.
3. Arbuckle, J.L. (2005) Amos 6.0 User's Guide, Amos Development Corporation, Spring House, PA.
4. Baldwin, M.W. (1992) Relational Schemas and the Processing of Social Information, *Psychological Bulletin*, 112, 3, 461-484.
5. Bhanthumnavin, D. (2003) Perceived Social Support from Supervisor and Group Members' Psychological and Situational Characteristics as Predictors of Subordinate Performance in Thai Work Units, *Human Resource Development Quarterly*, 14, 1, 79-97.
6. Bollen, K.A. (1989) *Structural Equations with Latent Variables* Wiley, Toronto, ON.
7. Brown, S.A., Massey, A.P., Montoya-Weiss, M.M., and Burkman, J.R. (2002) Do I Really Have To? User Acceptance of Mandated Technology, *European Journal of Information Systems*, 11, 4, 283-295.
8. Byrne, B.M. (2001) *Structural Equation Modeling with AMOS: Basic Concepts, Applications, and Programming*, Lawrence Erlbaum Associates, Inc., Mahwah, NJ.
9. Chen, F.F., Sousa, K.H., and West, S.G. (2005) Testing Measurement Invariance of Second-Order Factor Models, *Structural Equation Modeling: A Multidisciplinary Journal*, 12, 3, 471-492.
10. Cheung, W., Chang, M.K., and Lai, V.S. (2000) Prediction of Internet and World Wide Web Usage at Work: A Test of an Extended Triandis Model, *Decision Support Systems*, 30, 1, 83-100.
11. Chin, W.W. (1998) Issues and Opinion on Structural Equation Modeling, *MIS Quarterly*, 22, 1, vii-xvi.
12. Cudeck, R., and Browne, M.W. (1983) Cross-Validation of Covariance Structures, *Multivariate Behavioral Research*, 18, 2, 147-167.
13. Davis, J.A., Smith, T.W., and Marsden, P.V. (2005) *General Social Surveys, 1972-2004 (ICPSR04295-v1)* National Opinion Research Center, Chicago, IL.
14. Folkman, S., and Lazarus, R.S. (1980) An Analysis of Coping in a Middle-Aged Community Sample, *Journal of Health and Social Behavior*, 21, 3, 219-239.
15. Gloria, A.M., and Ho, T.A. (2003) Environmental, Social, and Psychological Experiences of Asian American Undergraduates: Examining Issues of Academic Persistence, *Journal of Counseling & Development*, 81, 1, 93-105.
16. Hair, J.F., Anderson, R.E., Tatham, R.L., and Black, W.C. (1978) *Multivariate Data Analysis*, Prentice Hall, Englewood Cliffs, NJ.
17. Harlow, R.E., and Cantor, N. (1995) To Whom Do People Turn When Things Go Poorly? Task Orientation and Functional Social Contacts, *Journal of Personality and Social Psychology*, 69, 2, 329-340.
18. Hirschman, A.O. (1970) *Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States*, Harvard University Press, Cambridge, MA.
19. Jarvis, C.B., Mackenzie, S.B., and Podsakoff, P.M. (2003) A Critical Review of Construct Indicators and Measurement Model Misspecification in Marketing and Consumer Research, *Journal of Consumer Research*, 30, 2, 199-218.
20. Jasperson, J.S., Carter, P.E., and Zmud, R.W. (2005) A Comprehensive Conceptualization of Post-Adoptive Behaviors Associated with Information Technology Enabled Work Systems, *MIS Quarterly*, 29, 3, 525-557.
21. Kiesler, S., Zdaniuk, B., Lundmark, V., and Kraut, R. (2000) Troubles With the Internet: The Dynamics of Help at Home, *Human-Computer Interaction*, 15, 4, 323-351.
22. Lakey, B., and Cassady, P.B. (1990) Cognitive Processes in Perceived Social Support, *Journal of Personality and Social Psychology*, 59, 2, 337-343.

23. Larose, S., Bernier, A., Soucy, N., and Duchesne, S.p. (1999) Attachment Style Dimensions, Network Orientation, and the Process of Seeking Help From College Teachers, *Journal of Social & Personal Relationships*, 16, 2, 225-247.
24. Moore, G.C., and Benbasat, I. (1991) Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation, *Information Systems Research*, 2, 3, 192-222.
25. Morris, M.G., and Venkatesh, V. (2000) Age Differences in Technology Adoption Decisions: Implications for a Changing Work Force, *Personnel Psychology*, 53, 2, 375-403.
26. Nevo, D., and Wand, Y. (2005) Organizational Memory Information Systems: A Transactive Memory Approach, *Decision Support Systems*, 39, 4, 549-562.
27. Niessen, C. (2006) Age and Learning During Unemployment, *Journal of Organizational Behavior*, 27, 6, 771-792.
28. Nunnally, J.C. (1978) *Psychometric Theory*, McGraw-Hill, New York.
29. Peeters, M.C.W., and Le Blanc, P.M. (2001) Towards a Match Between Job Demands and Sources of Social Support: A Study Among Oncology Care Providers, *European Journal of Work & Organizational Psychology*, 10, 1, 53-72.
30. Rogers, E.M. (2003) *Diffusion of Innovations*, Free Press, New York, NY.
31. Shaw, L.H., and Gant, L.M. (2002) Users Divided? Exploring the Gender Gap in Internet Use, *CyberPsychology & Behavior*, 5, 6, 517-527.
32. Taylor, S., and Todd, P.A. (1995) Understanding Information Technology Usage: A Test of Competing Models, *Information Systems Research*, 6, 2, 144-176.
33. Taylor, S.E., Sherman, D.K., Kim, H.S., Jarcho, J., Takagi, K., and Dunagan, M.S. (2004) Culture and Social Support: Who Seeks It and Why?, *Journal of Personality and Social Psychology*, 87, 3, 354-362.
34. Thompson, R.L., Higgins, C.A., and Howell, J.M. (1991) Personal Computing: Toward a Conceptual Model of Utilization, *MIS Quarterly*, 15, 1, 125-143.
35. Venkatesh, V., Morris, M.G., Davis, G.B., and Davis, F.D. (2003) User Acceptance of Information Technology: Toward a Unified View, *MIS Quarterly*, 27, 3, 425-478.
36. Vogel, D.L., and Wei, M. (2005) Adult Attachment and Help-Seeking Intent: The Mediating Roles of Psychological Distress and Perceived Social Support, *Journal of Counseling Psychology*, 52, 3, 347-357.
37. Winter, S.J., Chudoba, K.M., and Gutek, B.A. (1997) Misplaced Resources? Factors Associated with Computer Literacy Among End-Users, *Information & Management*, 32, 1, 29-42.