FACTORS INFLUENCING PERSONAL COMPUTER USAGE AMONG NOVICE AND EXPERIENCED USERS

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ABSTRACT

An empirical study was conducted to examine factors that facilitate and/or inhibit personal computer (PC) usage. Data were collected from a questionnaire survey of novice and experienced PC users. Results of this study indicated that novice users viewed the importance of facilitators and inhibitors differently from experienced users. Findings of this study have implications for administrators (or management) who wish to understand and promote PC usage in their organizations.

INTRODUCTION

Research on the adoption and utilization of computers have continued to receive significant attention. Various models and theories derived from reference disciplines in the areas of psychology and organizational behavior have been used to examine computer adoption and utilization [8,22,34]. Past research has suggested that any computer system cannot be effective unless it is adopted and used by people. Mandated use of computers often has its drawbacks in terms of lower productivity and morale, increased resistance, sabotage or job dissatisfaction [32]. Such research evidence has provided impetus for research interests pertaining to factors influencing the adoption and utilization of computers. Since computers are increasingly used in every sector of the economy, and have been known to contribute to increased efficiency and competitive advantage [25], studies of the factors that facilitate or inhibit the adoption and usage of computers have implications for organizations. Results of such studies may increase our understanding of the factors that influence computer adoption and utilization, and consequently lead to more effective measures to better predict and control (to a certain extent) the factors that affect computer adoption and utilization. Appropriate steps can then be taken to facilitate greater computer usage and the acquisition of computer-related skills. While organizations may recognize the importance of computer literacy among staff, individuals also need to realize that computer knowledge and skills can widen job opportunities and improve their employability [27].

This study focuses on both facilitators and inhibitors influencing personal computer (PC) adoption and utilization. Similar to King and Teo's [19] work, facilitators can be broadly defined as factors that positively influence both the ability and decision of an individual to adopt and use PCs. Similarly, inhibitors can be broadly defined as factors that negatively influence both the ability and decision of an individual to adopt and use PCs. Comparisons are made between novice and experienced users of PCs in terms of facilitators and inhibitors. The overall purpose of the study is to determine if novice users have different perceptions of facilitators and inhibitors compared to experienced users.

BACKGROUND

A considerable amount of research has been conducted on factors influencing adoption and utilization of computers. The context of such studies have included computer adoption and utilization in the home [36], organizations [5], and countries [38]. Computer adoption and utilization have also been examined in various research disciplines including finance, marketing [11], education,

public administration, operations management and agriculture [2].

Researchers have also proposed various models and theories adapted from reference disciplines to examine factors affecting PC adoption, diffusion and/or utilization. Examples of such models and theories are Fishbein and Azjen's [10] theory of reasoned action [9], Ajzen's [1] theory of planned behavior [22], Davis's [8] technology acceptance model [30], Triandis' [35] theory of attitudes and behavior [34], Rogers' [28] innovation diffusion theory [23] and Bandura's [3] social cognitive theory [15]. Researchers have also compared the suitability of these models and theories in explaining adoption and utilization of computers [9,22,31].

Previous research have examined factors influencing PC adoption and usage such as perceived usefulness, perceived ease of use [8], perceived fun [18], voluntariness, image, relative advantage, compatibility, result demonstrability, trialiability, and visibility [23], complexity, job fit, long-term consequences, and affect towards PCs [33], self-efficacy [15], experience and technical support [34], attitudes, subjective norms, and behavioral intentions [9], role of opinion leaders [38], role of culture [29], and extrinsic and intrinsic motivation [16].

Despite the abundance of research on computer adoption and utilization, there appears to be a paucity of research that specifically examines inhibitors. Most of the models and theories focus mainly on facilitators. There seems to be an implicit assumption that investigating facilitators is sufficient since, intuitively, if the presence of a factor facilitates, then its absence should inhibit. This assumption however, needs to be re-examined in light of theoretical arguments provided by Herzberg's [12] two-factor theory of motivation.

In his influential work, Herzberg suggested that job satisfaction is not the opposite of job dissatisfaction as most people would assume. Rather, according to Herzberg, "the opposite of job satisfaction is....no job satisfaction; and similarly, the opposite of job dissatisfaction is not job satisfaction but no dissatisfaction" [12:p110]. Herzberg distinguished between two types of motivation factors: hygiene factors and motivators. Hygiene factors include job security, interpersonal relations, working conditions and status. According to Herzberg, the presence of hygiene factors would lead to the absence of job dissatisfaction but would not lead to job satisfaction and truly motivate an employee. To motivate an employee to a high level of performance, Herzberg suggest that "motivators" need to be present. These factors include job recognition, job responsibility, career advancement and growth. The presence of these factors lead to job satisfaction and consequently would motivate employees to a high level of performance.

Central to Herzberg's theory is the idea that factors associated with employees' job satisfaction and job dissatisfaction may be different. Thus, Herzberg encouraged managers to re-examine carefully what actually motivates employees. Despite various criticisms, Herzberg's theory has made a useful contribution to the topic of motivation by emphasizing the importance of distinguishing between "hygiene factors" and "motivators".

In line with the theoretical arguments put forth by Herzberg, it is plausible that the concept of motivators and hygiene factors can be applied to facilitators and inhibitors for PC usage. In other words, researchers may need to re-examine the present assumption that if the presence of a factor facilitates PC adoption/usage, then its absence will inhibit. Based on Herzberg's theory, it stands to reason that factors which facilitate PC adoption/usage may not be necessarily the same as those which inhibit PC adoption/usage. In addition, while the presence of certain factors may facilitate PC adoption/utilization, their absence may not have an inhibiting effect. Thus, researchers in the areas of PC adoption and usage should re-examine further the nature or types of factors which facilitate or inhibit PC adoption/usage. This research represents an initial attempt to examine this. Specifically, this research aims to examine the validity of this assumption by examining a small subset of facilitators and operationalizing the inhibitors to be the absence of facilitators. Such research design has been carried out successfully recently [19].

Based on previous literature review, we felt that it is most appropriate to focus on both social and technical factors as facilitators because they were often used to explain computer adoption and utilization [33]. In addition, since user related factors e.g., computer experience has also been found to be important, we will use this variable as the basis to divide the sample into novice and experienced users. The main reason is that experienced users generally require different types of support from novice users. Hence, the importance of various facilitators and inhibitors for these two groups of users may be expected to be different.

Technical Factors

Technical factors can be defined in terms of the level of technical support provided to users. Technical support has been commonly viewed as one of the facilitating conditions that can influence PC usage [31][33]. In a study of small firm computing, Cragg and King [7] found that the lack of technical support often discourage IT growth. Technical support may be provided in the form of

ease of accessibility as well as technical support for hardware and software [31].

Social Factors

Social factors generally reflect individual norms, roles and values, which in turn can be influenced by referent others and reflect what individuals think they should do [35]. Social factors which have been examined include managerial influence [20], peer usage [33] and culture [29]. Igbaria, Guimaraes and Davis [14] found that social factors in terms of management support have a significant influence on PC use. In a similar vein, Yavas, Luqmani and Quraeshi [38] found that opinion leaders who use PCs can be crucial as change agents in helping to reduce anxieties and dissonant feelings towards computers, thereby facilitating PC usage.

User-Related Factors

User-related factors generally focus on individual differences e.g., level of experience [34], and self-efficacy [15]. Of interest in this study is the level of computer experience which may influence how users perceive the importance of various facilitators and inhibitors. Previous research has shown that usage of computers in the past is correlated with PC usage [17] and may create a more positive attitude towards computers [27]. Furthermore, experience has been found to have strong direct and indirect effects on attitudes towards computer usage [13,34]. Similarly, Igbaria and Iivari [14] found that experience may influence self-efficacy which has both direct and indirect effects on PC usage. In addition, the importance of technical factors and social factors on computer utilization may be dependent on the level of experience [34].

We will therefore divide the sample into novice and experienced users because previous research suggested that user-related factors such as the level of experience is important in influencing the importance of various facilitators and inhibitors. For example, novice users generally require different types and levels of support compared to experienced users. It is therefore our thesis that novice users of PCs perceive the relative importance of various facilitating and inhibiting factors differently from experienced users. These differences in perceptions may explain why some individuals are eager and/or able to adopt and utilize PCs for a wide range of applications while others lack such enthusiasm.

RESEARCH QUESTIONS

This research addresses the following questions:

(1) What are the differences in the perceptions of facilitators and inhibitors that might distinguish between novice PC users and experienced PC users?

(2) What are the differences in the perceptions of facilitators and inhibitors within a group of novice PC users and also within a group of experienced PC users?

METHODS

Operationalization of Constructs

Due to the exploratory nature of this study, we decided to examine a somewhat restricted number of facilitators and inhibitors. Variables examined in this study include technical factors, social factors and/or user-related factors.

Items used to measure technical factors and social factors were adapted from Thompson, Higgins and Howell [34]. Technical factors were operationalized in terms of technical support, namely whether guidance was available in the selection and usage of hardware and software. Social factors were operationalized in terms of administrative support, namely whether administrators (or management) were supportive of PC usage and also whether peer usage of PC is common. Inhibitors were then identified as the absence of factors that make up the facilitators (e.g., if "my close friends use PCs" is considered a facilitator, then "my close friends do not use PCs" can be considered to be a potential inhibitor).

For items pertaining to facilitators, respondents were asked to indicate the extent to which the factors facilitated PC usage on a five point Likert-type scales ranging from (1) "not facilitative" to (5) "greatly facilitative". Similarly, for inhibitors, respondents indicated the extent to which the factors inhibited PC usage on a five-point Likert-type scale ranging from (1) "not inhibitive" to (5) "greatly inhibitive". Variables in this study are scored on Likert-type scales as such scales have been commonly used in IS research [30,33].

The experience level of respondents was assessed using a five point Likert scale ranging from (1) "no experience or knowledge" to (5) "worked with regularly" based on broad computer areas such as usage of PC with

CD-ROM option/multimedia, database software package, statistical software package, graphics software package, desktop publishing software package, and fixing hardware/software problems. Experience with a range of applications were used because we are assessing the general experience level of respondents rather than the experience level associated with any specific application. The questionnaire used to measure the various constructs in this study is shown in the Appendix.

Sample and Procedure

The sample chosen were PC users at a local university. The instrument was pretested among ten business administration students and two faculty members. The aim of the pretest was to elicit feedback regarding the clarity of the instructions and questions in the instrument and the overall presentation of the questionnaire. Comments and suggestions obtained from the pretest served as a basis for fine-tuning the questionnaire. A total of 250 questionnaires were then distributed to second year business administration students who were enrolled in a management course at a local university in Singapore. The students were asked to complete the questionnaires in their spare time. The completed questionnaires were collected by the researchers a week later.

ANALYSES AND RESULTS

Of the 195 questionnaires collected, four were rejected because several items were left incomplete. Usable responses totalled 191; 101 from the 'Novice Users' group and 90 from the 'Experienced Users' group. The final usable response rate is 76.4%.

We followed the procedure recommended by Cohen and Cohen [6] to segregate novice from experienced users. Basically, based on the mean of items measuring experience, samples which fall below the mean plus one standard deviation are classified as 'Novice Users'. Conversely, samples which fall above the mean plus one standard deviation are classified as 'Experienced Users.'

Table 1 shows the profile of respondents. In terms of sex distribution, the 'Novice Users' group has similar number of males and females. In contrast, the 'Experienced Users' group has about twice the number of males compared to females. This is not unexpected as males have traditionally been more technically inclined than females. In addition, computer usage has often been found to be a male-oriented activity and males have also been found to have a greater liking for computers compared to females [37]. Similarly, in a study of university graduates, Lowe and Krahn [21] found significant gender differences in computer skills and usage. However, other researchers found no significant relationships between gender and usage (e.g., [17]). Hence, evidence concerning the effect of gender on computer usage is generally equivocal.

Table 1. Profile of Respondents

Constructs	Novice	Experienced		
Sex	Number	Number		
Male	14	28		
Female	13	7		
	Mean (SD)	Mean(SD)	t	p
Age	21.25 (1.82)	21.61 (1.27)	-0.87	0.389
No. of years of PC usage	3.60 (3.04)	6.94 (1.27)	-4.31	0.000
No. of hours per week of PC usage	6.46 (7.31)	17.00 (11.03)	-4.47	0.000

As a validation check, we compared the average age of the two groups using two sample t-tests and found no significant differences between the two groups, thereby indicating the two groups are fairly equivalent in terms of age. As a second validation check, we also measured the number of years of PC usage as well as the number of hours of PC usage per week. As expected, the results showed that the 'Experienced User' group is significantly different from the 'Novice User' group in terms of the above two characteristics. This reinforces the validity of our method used to split the sample.

Factor Analysis and Reliability Assessment

Factor analysis with oblique rotation was carried out. Oblique rotation rather than varimax rotation was used since the factors are likely to be correlated. The results as shown in Table 2 indicate the existence of three main dimensions. The first dimension is termed "Technical Support" (F1). Note that Thompson et al. [34] used the term "Facilitating Conditions" instead of "Technical Support." However, in their paper, they clarified that the items which were used actually capture the level of technical support offered. Hence, in the present study, we labelled this group of items as "Technical Support".

The second and third dimensions are labelled "Administrative Support" (F2) and "Peer Usage" (F3) respectively. Although Thompson et al. labelled these two dimensions "Social Factors," the result of our factor analysis yielded two distinct factors. On closer examination, it is obvious that "Administrative Support" and "Peer Usage" actually capture different aspects of social factors, the former pertaining to influence from administrators (analogous to management), and the latter pertaining to influence from their peers. This distinction would be consistent with previous research which treats influence

Table 2: Factor Analysis

Dimensions		Loadings		
		F1	F2	F3
	Eigenvalue	3.57	2.34	1.16
	Variance (%)	39.7	26.1	12.9
F1	*Technical Support (α_f = 0.92, α_i = 0.91)*			
4.	A specific person (or group) is available for assistance with hardware difficulties	**0.89**	-0.03	-0.02
2.	A specific person (or group) is available for assistance with software difficulties	**0.89**	-0.01	0.02
1.	Guidance is available to me in the selection of hardware and software	**0.88**	0.03	0.01
3.	Instructions regarding popular software are available to me	**0.79**	0.05	0.05
F2	*Administrative Support (α_f = 0.83, α_i = 0.94)*			
7.	My faculty is very supportive of PC use for my work assignments	-0.03	**0.83**	0.13
8.	In general, my faculty has supported the use of PCs	-0.10	**0.81**	0.20
6.	My faculty has been helpful in introducing PCs	0.15	**0.71**	-0.18
F3	*Peer Usage (α_f = 0.70, α_i = 0.75)*			
9.	My close friends use PCs	0.11	-0.08	**0.79**
5.	The majority of my classmates use PCs	-0.06	0.16	**0.54**

KEY: α_f = Cronbach alpha for facilitator
α_i = Cronbach alpha for inhibitor

from peers and superiors to be different [31]. Past research has also found that users usually consider the most important type of support to be other users [4]. Hence, this distinction is potentially important since influence from peers and influence from administrators (or management) may be expected to have different facilitating or inhibiting effects on PC usage.

In order to ensure that the items comprising each dimension are internally consistent, reliability assessment was carried out using Cronbach Alpha. Low values of Cronbach Alpha would indicate poor internal consistency. In addition, all items within each dimension should contribute to the value of Cronbach Alpha. The values of Cronbach Alpha for all three dimensions are above the recommended value of 0.60 for exploratory research [26].

Between Group Comparisons (Two Sample T-Tests and ANCOVA)

Comparisons between 'Novice Users' and 'Experienced Users' are carried out using two sample t-tests as in Table 3a.

Table 3a: Between Group Comparisons (Two Sample T-Tests)

Constructs	Novice Mean (SD)	Experienced Mean (SD)	t	p
Facilitators				
Technical Factors				
Technical Supports	4.08 (1.82)	5.31 (1.43)	-2.88	0.006
Social Factors				
Administrative Support	4.70 (1.28)	4.63 (1.64)	0.20	0.845
Peer Usage	5.20 (1.14)	5.63 (1.32)	-1.33	0.187
Inhibitors				
Technical Factors				
Technical Support	5.03 (1.55)	4.36 (1.85)	1.51	0.136
Social Factors				
Administrative Support	3.63 (1.29)	3.70 (1.94)	-0.18	0.856
Peer Usage	3.43 (1.51)	2.89 (1.51)	1.40	0.166

Table 3b: Between Group Comparisons (ANCOVA)

Sources	Technical Support df	MS	F	Admin. Support df	MS	F	Social Support df	MS	F
Facilitators									
Covariates									
Sex	1	3.78	1.47	1	0.05	0.02	1	0.53	0.34
Main effects									
Experience	1	26.52	10.00**	1	0.05	0.02	1	1.87	1.19
Error		59	2.57	59	2.28		59	1.56	
Inhibitors									
Covariates									
Sex	1	2.13	0.71	1	5.03	1.79	1	5.53	2.50
Main effects									
Experience	1	4.22	1.41	1	0.90	0.32	1	1.72	0.78
Error	59	2.99		59	2.82		59	2.21	

**$p<0.01$

In terms of facilitators, the mean for "Technical Support" for the 'Experienced Users' group is significantly higher than that for the 'Novice Users' group. This implies that the 'Experienced Users' group generally view the presence of "Technical Support" as more important facilitators than the 'Novice Users' group. This is an interesting finding that may run contrary to expectations since experienced users (by virtue of their experience) may be expected to require less technical support than novice users. Consequently, the presence of technical support should be less important to 'Experienced Users'. One possible reason for our findings may be that the 'Experienced Users' group recognizes the importance of technical support in motivating them to use a wider variety of IT hardware and software, some of which may be complex (thereby requiring some level of technical support). In contrast, the 'Novice Users' group is probably contented with using simple and common IT applications, and consequently may be less affected by technical support. There are no significant differences in terms of "Administrative Support" and "Peer Usage" between both groups.

With respect to inhibitors, no support for significant difference at the $p < 0.05$ level exists between the 'Experienced Users' and the 'Novice Users' groups in terms of all three dimensions, i.e., absence of "Technical Support, Administrative Support and Peer Usage." These findings seem to suggest that some agreement exists for both groups with respect to the factors that inhibit PC usage.

A noteworthy feature in Table 3a is that the mean scores for the 'Novice Users' group are generally higher than the 'Experienced Users' group in terms of inhibitors and generally lower in terms of facilitators. A plausible explanation for this is that respondents in the 'Experienced Users' group may have certain predisposition to adopt and explore new technology such that the level of technical and administrative support as well as peer usage that is required is much lower than for the 'Novice Users' group. Consequently, the absence of appropriate technical and social factors is seen as less inhibitive for the 'Experienced Users' group than for the 'Novice Users' group. This explanation would be consistent with Leonard-Barton and Deschamps' [20] research findings which suggest that managerial (or administrative) influence in the implementation of new technology is often not equally perceived by subordinates. Another explanation is that the 'Experienced Users' group (being more experienced in PCs)

can perhaps be expected to view inhibitors less strongly than the 'Novice Users' group.

As a validation check on the results of t-test, we carried out ANCOVA using gender as covariate. This is to ensure that differences between the "Novice" and "Experienced" groups are not confounded by gender. The results are shown in Table 3b.

The results of ANCOVA confirmed that the results of the t-test discussed earlier are not confounded by gender of respondents. Consistent with previous results, only the main effects for technical support are significant ($F = 10.30$, $p < 0.01$).

Within Group Comparisons: "Relative Strengths" (Paired Sample T-Tests)

To analyze the results further, comparisons are made using a paired sample t-test for each group to determine whether there are any significant differences in perceptions of the relative importance of each facilitator and the corresponding inhibitor.

The "relative strength" of each factor in facilitating or inhibiting was assessed. Intuitively, a factor that functions as a facilitator when present, may also function as an inhibitor when absent. Obviously, the degree to which it facilitates or inhibits may vary. Similar to the classification used by King and Teo [19], we define a "Normal" factor as one whose presence facilitates to a similar extent (measured in terms of the five point Likert scale used) as its absence inhibits; a "Plus" factor as one whose presence facilitates to a significantly greater extent than its absence inhibits; and a "Minus" factor as one whose presence facilitates to a significantly lesser extent than its absence inhibits. The results of the paired sample t-tests to determine the "relative strengths" of facilitators and inhibitors are shown in Table 4.

For the 'Novice Users' group, there are both "Plus" and "Minus" factors while for the 'Experienced Users' group, there are both "Plus" and "Normal" factors. This implies that the presence of a factor may impact PC usage to a significantly different extent than its absence. Hence, the common assumption that if a factor whose presence acts as a facilitator, then its absence would act as an inhibitor often fails to take into account the possibility that their "relative strengths" in facilitating and inhibiting may differ.

For the 'Novice Users' group, both "Peer Usage" and "Administrative Support" function as "Plus" factors. In contrast, "Technical Support" functions as a "Minus" factor. This implies that the 'Novice Users' group generally emphasizes the importance of widespread peer usage as well as administrative support in facilitating their use of PCs. Although the presence of technical support facilitate PC usage to a certain extent, the absence of technical support is perceived as a powerful inhibitor.

Table 4: Within Group Comparisons (Paired Sample T-Test)

Constructs	Facilitator Mean (SD)	Inhibitor Mean (SD)	t	p	Relative Strength
Novice Users					
Technical Factors					
Technical Support	4.08 (1.82)	5.03 (1.55)	-2.47	0.021	Minus
Social Factors					
Administrative Support	4.70 (1.28)	3.63 (1.29)	4.38	0.000	Plus
Peer Usage	5.20 (1.14)	3.43 (1.51)	5.40	0.000	Plus
Experienced Users					
Technical Factors					
Technical Support	5.31 (1.43)	4.36 (1.85)	2.44	0.020	Plus
Social Factors					
Administrative Support	4.63 (1.64)	3.70 (1.94)	1.83	0.076	Normal
Peer Usage	5.63 (1.32)	2.89 (1.51)	8.03	0.000	Plus

For the 'Experienced Users' group, "Technical Support" and "Peer Usage" are viewed as "Plus" factors while "Administrative Support" is a "Normal" factor. Hence, the results for both the 'Novice Users' and 'Experienced Users' groups are similar only in terms of "Peer Usage". Since the 'Novice Users' group views "Technical Support" as an important "Minus" factor while the 'Experienced Users' group views it as an important "Plus" factor, these findings suggest that the absence of technical support has a greater inhibitive effect for the 'Novice Users' group. One possible explanation is that the threshold level for technical support to be effective for the 'Novice Users' group may be higher than for the 'Experienced Users' group. Consequently, the 'Novice Users' group requires a higher level of technical support to be present, but the presence of technical support alone may not actually facilitate PC usage to a great extent if other conducive factors are not present.

LIMITATIONS

Three main limitations are inherent in this study. First, we have selected a small subset of facilitators and have treated inhibitors as the absence of facilitators. This may somewhat limit the range of applicability of our findings since other factors may also function as facilitators or inhibitors. However, even with a small subset of facilitators and inhibitors examined in this study, we have managed to provide empirical evidence supporting the view that novice and experienced users may perceive social and technical factors differently.

In this study, we decided to examine inhibitors as the absence of facilitators because previous research has largely focused on facilitators. Furthermore, the procedure of deriving the list of inhibitors from the list of facilitators enable us to examine whether the absence of a facilitator would necessarily function as an inhibitor. Such findings would enhance our understanding of the relative importance of each facilitator and inhibitor. Future attempts to extend this research can expand the list of facilitators and inhibitors

Second, although we have segregated novice and experienced users based on extreme values of one standard deviation below and above the mean respectively, our novice users may not be "pure" novices since some of them have used PC for more than four years. This is because as the use of PC proliferates in secondary schools, it become increasingly difficult to get "pure" novice users (with minimal PC experience) in our undergraduate sample. While the novices in our sample are actually novices relative to the more experienced undergraduates, using the undergraduate sample enables us to better control for possible confounding effects of age and educational level.

Third, while the use of undergraduates as our sample may limit the generalizability of our results, undergraduate students constitute a potential pool of computer users in business and government institutions. Hence, examining this group of individuals may provide researchers and managers with some insights regarding individual's receptiveness or resistance to PC adoption and utilization. Nevertheless, researchers should recognize that in workplace setting, other factors may assume greater importance in facilitating or inhibiting PC usage. Future research can replicate this study by sampling novice and experienced PC users from organizations.

CONCLUSIONS AND IMPLICATIONS

This study extends previous research on facilitators and inhibitors by examining both "Novice Users" and "Experienced Users." Previous research examining factors influencing PC usage seldom distinguish between different types of PC users, and tend to treat PC users as homogeneous entities. In addition, the definitions of inhibitors as the absence of facilitators enabled direct comparisons to be made between the 'Novice Users' and 'Experienced Users' groups as well as comparisons within each group.

Results of this research suggest that the 'Novice Users' and 'Experienced Users' groups do view the importance of each facilitator and inhibitor differently. An understanding of such differences can help explain why some persons are more willing and eager to use PC compared to others. The results also demonstrates that the importance of technical support as facilitators for 'Novice Users' and 'Experienced Users' are significantly different.

The comparison of facilitators and inhibitors within each group of 'Novice Users' and 'Experienced Users' suggests that the relative strength of each facilitator and the corresponding inhibitor is often different. This result is potentially important as it shows that the absence of a factor need not necessarily inhibits to the same extent as the presence of the factor facilitates. Future research can examine possible interactive effects among different factors. More importantly, results of this study provide empirical evidence suggesting the need to reexamine the common assumption that if the presence of a factor facilitates PC usage, then its absence would inhibit. Such assumption often fails to take into account the relative strengths of the factors in facilitating or inhibiting PC adoption/usage.

It is also important to realize that there may be some factors whose presence might not act as strong facilitators but whose absence would strongly inhibit PC usage. In other words, factors which are weak facilitators may also need to be present to minimize any inhibitive effects of their absence on PC usage. Technical support is potentially an example of such a factor since it is viewed as a "Minus" factor by the 'Novice Users' group. Conversely, there may also be some factors whose absence might not act as strong inhibitors but whose presence would strongly facilitate PC usage. Peer usage is an example of such a factor since it is viewed as "Plus" factors by both groups.

Results of this study are instructive in that they may help both researchers and practitioners set guidelines in identifying potentially important facilitators and inhibitors for PC usage. Firms with low PC usage or high resistance to PC use may consider taking appropriate measures to encourage the presence of facilitators and reduce or eliminate inhibitors. Specifically, firms should take steps to provide both technical support and administrative (analogous to management) support. In addition, they should also bear in mind that PC usage is often greatly facilitated when there is a high level of usage among the potential PC users' peers. In fact, by providing more effective administrative (or management) and technical support, firms are likely to also foster an environment which promotes and enhances high levels of PC usage.

Future research can examine whether there are any differences in perceptions of facilitators and inhibitors among different levels, i.e., administrators (management) and students (workers) in an organization. It is possible that the lack of acceptance of PC could be due to the fact that administrators (management) have different ideas about what factors are important compared to the students (workers).

The study of facilitators and inhibitors can be used not only for PC usage but also for any introduction of new technology e.g., electronic data interchange, interorganizational system. It is possible that different factors may be more important in facilitating or inhibiting different types of new technology. Hence, the degree to which each facilitator and inhibitor affect the adoption of different types of technology can be examined.

Other factors such as perceived usefulness, perceived ease of use [8], perceived fun [18], relative advantage, compatibility, and result demonstrability [23] have often been conceptualized as facilitators for PC usage. It would be interesting for future research to conceptualize the absence of such factors as inhibitors and examine their relative strength in facilitating or inhibiting PC usage. Such findings may lead to a better understanding of the importance of various factors and also would provide further evidence of the applicability of Herzberg's concept of hygiene and motivator factors. This could further open up new avenues for research since previous studies often ignores whether the influence of a factor is uniform over its range of values (from its absence to its presence).

Of interest also is the examination of facilitators and inhibitors for each stage of Rogers' [28] innovation diffusion process. It is conceivable that different factors are more important depending on the stage of diffusion, e.g., what factors are important in the initial stages of adoption; what factors are more important during the later stages; what factors are more important regardless of the stage of diffusion. These findings may also help to explain why 'Novice Users' and 'Experienced Users' view facilitators and inhibitors differently since it is possible that the observed differences obtained in this research could be due to the two groups being at different stages of the innovation diffusion process.

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APPENDIX

Experience

INSTRUCTIONS: Please indicate your background in each of the following computer areas. Please circle your responses on the scale provided.

	No experience or knowledge	Read/heard about	Tried 1-2 times	Have worked with some	Worked with regularly
1. PCs with built-in CD-ROM option/multimedia.		1	2	3	4	5
2. A database software package.		1	2	3	4	5
3. A statistical software package.		1	2	3	4	5
4. A graphics software package.		1	2	3	4	5
5. A desktop publishing software package.		1	2	3	4	5
6. Fixing hardware/software problems.		1	2	3	4	5

Facilitators

INSTRUCTIONS: For each item, please indicate on the scales below (ranging from "Not Facilitative" to "Greatly Facilitative"), your judgement concerning the extent to which it **facilitates** your efforts to use Personal Computers (PCs).

	Not Facilitative						Greatly Facilitative
1. Guidance is available to me in the selection of hardware and software.	1	2	3	4	5	6	7
2. A specific person (or group) is available for assistance with software difficulties.	1	2	3	4	5	6	7
3. Instructions regarding popular software are available to me.	1	2	3	4	5	6	7
4. A specific person (or group) is available for assistance with hardware difficulties.	1	2	3	4	5	6	7
5. The majority of my classmates use PCs.	1	2	3	4	5	6	7
6. My faculty have been helpful in introducing PCs.	1	2	3	4	5	6	7
7. My faculty is very supportive of PC use for my work assignments.	1	2	3	4	5	6	7
8. In general, my faculty has supported the use of PCs.	1	2	3	4	5	6	7
9. My close friends use PCs.	1	2	3	4	5	6	7

Inhibitors

INSTRUCTIONS: For each item, please indicate on the scales below (ranging from "Not Inhibitive" to "Greatly Inhibitive"), your judgement concerning the extent to which it **inhibits** your efforts to use Personal Computers (PCs).

	Not Inhibitive						Greatly Inhibitive
1. Guidance is not available to me in the selection of hardware and software.	1	2	3	4	5	6	7
2. No specific person (or group) is available for assistance with software difficulties.	1	2	3	4	5	6	7
3. Instructions regarding popular software are not available to me.	1	2	3	4	5	6	7
4. No specific person (or group) is available for assistance with hardware difficulties.	1	2	3	4	5	6	7
5. The majority of my classmates do not use PCs.	1	2	3	4	5	6	7
6. My faculty have not been helpful in introducing PCs.	1	2	3	4	5	6	7
7. My faculty is not very supportive of PC use for my work assignments.	1	2	3	4	5	6	7
8. In general, my faculty has not supported the use of PCs.	1	2	3	4	5	6	7
9. My close friends do not use PCs.	1	2	3	4	5	6	7