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Abstract

User resistance is a common occurrence when new information systems are implemented and can contribute to implementation failure. This research reviewed the literature on the reasons for end-user resistance and identified a number of strategies that could be used for dealing with end-user resistance, such as end-user support, participation, communication, training and consultant involvement on a project. The research investigated the effectiveness of these strategies for dealing with end-user resistance based on the opinions of IT project managers in New Zealand. The results of this research showed that IT project managers use all identified strategies on their IT projects. Among identified strategies various forms of communication, end-user participation and support have been rated as the most frequently used strategies. The results also showed that IT project managers rated end-user participation and communication strategies as the most effective for dealing with end-user resistance. The research also revealed some unexpected results, for example participants who use one-off and stage-wise training techniques experience more end-user resistance on their projects; and participants whose companies have external IT support in place to support users, also experience more resistance.

Keywords

INTRODUCTION

Understanding users and how they interact with information technology (IT) projects is critical to the successful implementation of new systems within an organisation (Russel and Hoag, 2004). IT systems have become larger and more complex. They involve large sets of challenges that impact organisations and people on many levels. Overcoming these challenges is not only essential but it is a must for a successful IT project. Human factors are one of the most important issues that contribute to a project's success or failure. One of the indicators of a successful IT project is how much it is actually used. End-user resistance is a common occurrence when new information systems are implemented (Jurison, 2000). This resistance can contribute greatly to the failure of newly implemented systems (Adams, Berner and Wyatt, 2004).

An end-user is any individual who interacts with a system (Cotterman and Kumar, 1989; Govindarajulu, 2003). Resistance is often identified as a response to change that can result in reluctance to use a new system or technology (Waddell and Sohal, 1998; Lorenzi and Riley, 2000; Adams et. al., 2004; Henry, 1994). End-user resistance is a complex phenomenon. It can have various forms such as sabotage of computer equipment, employees being absent or late to work, "badmouthing" of systems, not using the systems or continuing to use the old system (Adams et. al., 2004). It can introduce unexpected delays, costs and instabilities into a project. Thus, resistance can become an ongoing problem at both individual and organisational levels (Lorenzi and Riley, 2000).

The aim of this research was to investigate various factors that affect end-user resistance and strategies that could be used to deal with this resistance. This research investigated whether these strategies are used by IT service providers within New Zealand environment. The research further studied the effectiveness of the strategies for dealing with end-user resistance as thought by IT project managers.

The next section reviews the academic literature on factors that influence end-user resistance and identifies strategies for dealing with end-user resistance. After summarizing the literature the details of the research methodology and results are reported.

FACTORS THAT INFLUENCE END USER RESISTANCE

End-user resistance could be a result of various factors such as innate resistance to change, lack of involvement in the development and implementation processes, lack of management support, poor technical quality which makes the system appear "unfriendly", inadequate or improper training, unclear benefits of the new system, lack

of user support and poor interaction between the designers and users (Henry, 1994; Coe, 1996; Adams et. al., 2004)

There is some debate about whether end-user resistance should be viewed in a positive or a negative light. Resistance to a dysfunctional or flawed system can be viewed as a legitimate response by a rational user to a system that needs to be redesigned, however end-user resistance is most often seen as a dysfunctional response on the part of the end-users that requires eradication or neutralising (Griffiths and Light, 2006).

Several theories have been developed to explain the individual's adoption and acceptance of computer based technology. These theories provide useful insights into the cognitive, affective, and behavioural reactions of individuals to technology. In each of the theories, end-user behaviour is viewed as a set of affective responses and the result of a set of beliefs. Affective responses are typically attitudes toward use and an individual's evaluation of behaviour as either positive or negative (Gallivan, 2001; Chau and Hu, 2001; Compeau, Higgins and Huff, 1999). Diffusion of Innovation (DOI) theory represents these beliefs as perceived characteristics of innovation, Technology Acceptance Model (TAM) represents them as usefulness and ease of use and Theory of Planned Behaviour (TPB) looks at them as outcome of evaluations. DOI, TAM and TPB can be used to identify various strategies to deal with end-user resistance and influence user acceptance of the new technology.

Other research has investigated how end-user resistance varies according to the nature of the information system. Van der Heijden (2004) showed that for pleasure based (or hedonic) information systems, such as games that may be used at home, perceived enjoyment is more important than characteristics such as usefulness or ease of use which are more significant for productivity orientated models. More recently, research has begun to focus on the characteristics of individual user's that affect their perception of the new technology. End-user computer anxiety and self-efficacy are examples of such characteristics (Sievert, Albritton and Clayton, 1988; Havelka, Beasley and Broome, 2004).

Computer anxiety is a state of fear of interaction with a computer or computer software, even though the computer or software poses no immediate threat (Sievert, et. al, 1988). Computer anxiety can affect a user's intention to use a computer-based technology and his or her usage behaviour. It is also related to an individual's ability to learn a new application and their performance when using it (Havelka et.al. 2004). Computer anxiety comes in various forms such as fear of breaking something, a feeling of incompetence, fear of technology, fear for health, fear of anything new and unfamiliar, sense of a threat to the individual's intellectual self-assessment and the feeling of having too little time to learn all the new processes (Doronina, 1995).

Computer self-efficacy refers to individuals' judgment of their ability to use computer based technology (Compeau et. al., 1999). Research suggests that individuals who possess high self-efficacy are more likely to form positive perceptions of IT and have more confidence in their capabilities, thus demonstrating lower levels of computer anxiety (Hasan, 2006). Providing end-users with effective training and support regarding a new system are some of the techniques that could be used to enhance end-users self-efficacy (Hasan, 2006; Venkatesh and Davis, 1996).

STRATEGIES FOR DEALING WITH END USER RESISTANCE

Understanding the factors that can influence end-user resistance helps to identify various strategies that could be used to reduce end-user resistance. User participation, end-user training, effective end-user support, communication and consultant involvement on a project have been identified as the key factors to improve the chances of successful systems implementation (Koenig, 2003; Kappelman and Guynes, 1995; Visser and Visser, 2006; Adams et. al., 2004; Doronina, 1995; Agarwal and Prasad, 1999; Markus and Benjamin, 1997). Strategies can be classified into two categories; participative and directive (Jiang, Muhanna and Klein., 2000). Participative strategies are user friendly and focus on training and building support structures, directive strategies are more business driven and focus on financial incentives, power redistribution and even job elimination for those who do not want to use the new system.

User Participation

User participation can be defined as a set of behaviours or activities performed by users during the system's development process (Barki and Hartwick, 1989). Positive experience gained through participation in system design and development enhances user's self-efficacy and should have a significant positive impact on key determinants of the TAM; usefulness and ease of use (Venkatesh and Davis, 1996). User participation creates a sense of appreciation, empowerment and ownership among users by providing them with opportunities to influence decisions regarding the new system (Kappelman and Guynes, 1995; Visser and Visser, 2006; Adams et. al., 2004). User empowerment is one of the factors that helps to form a feeling of user control, promotes user enthusiasm, and reduces user resistance toward computer based technology changes (Kappelman and Guynes, 1995). Giving users even minor empowering opportunities can have an extremely positive effect on one of the key determinants of TPB: users' attitudes toward computer based technology. Empowering users should

increase user acceptance of a new system. User's acceptance of computer based technology enables setting realistic expectations, facilitates the feeling of ownership, decreases resistance to change, and increases commitment to use the system (Adams et. al., 2004).

End-User Training

Training is the process of "transferring required knowledge and operational skills to users of information technology". It is used to provide users with skills to enable them to use a new system (Huang, 2002, p.30). End-user training is critical for effective system delivery and is an essential part of promoting use and acceptance of new computer based technology (Coe, 1996; Merchant, Kreie and Cronin, 2001). End-user training enhances user's understanding of the new systems and can be used as a tool to raise end-users self-efficacy (Chau and Hu, 2001). Training can also clarify the short and long term benefits of the new system thereby affecting the individual's intention to use it. Thus, training positively influences user's perception of usefulness - one of the key determinants of TAM. End-user training can also be used as a tool to empower users creating a positive end-user attitudes - one of the key determinants of TPB (Agarwal and Prasad, 1999).Training has been identified as one of the tools that can be used to overcome the negative effect of computer anxiety and even prevent it from developing (Doronina, 1995).

Some examples of training include *conceptual training* (presenting end-users with an overview of how the system is organized and how it works), *procedural training* (involves explaining to end-users how to use specific set of the system functionality), *self-taught* (involves end-users learning a new system by themselves by means of trial and discovery), *just-in-time* (training occurs just prior to implementation of the new information system) and *staged training* (involves breaking up training into smaller training sessions) (Coe, 1996; Brown, Massey, Montoya-Weiss and Burkman., 2002; Adams et. al., 2004)

End-User Support

End-user support can be defined as the variety of ways that are available to help end-users deal with their computer system or application enquiries (Lundgren, 1998). Some examples of end-user support involve helping users with internally developed or purchased applications, helping them with hardware use or problems and providing support for work performed on a computer (Yager, Schrage, Fand and Berry, 2002). User support during and after a new system's implementation processes is very important for a successful IT project. Effective user support helps to create a positive user experience with the new system, ensures end-user satisfaction, re-enforces positive attitudes and encourages acceptance of the new system (Chau and Hu, 2001 Davis, Bagozzi and Warshaw, 1989; Coe, 1996).

The help-desk or service desk is one of ways of providing support to end-users. A help-desk provides on-demand advice, information or action to aid the user in carrying out their IT-related tasks (Marcella and Middleton, 1996). The help-desk provides services such as software training, system consulting, technical support, software documentation, hardware consulting and support, and development support.

Communication

Communication is often thought of as the act of transferring information (Cruess, 2005). Adams et. al. (2004) and Coe (1996) identified communication as one of the most important strategies for avoiding user resistance. Communication is seen as a tool that can assist organisations undergoing change by making users feel important, breaking down the resistance among end-users and increasing their trust in the up coming changes (Choudrie, 2005). Jiang et. al. (2000) suggested that end-users consider communication as a condition of acceptance and a source of motivation. Communication has been highlighted to be one of the factors that encourage innovation. Communication can take place in several forms such as oral, written and non-verbal. Communication can also happen by means of face-to-face interaction or via computer based technology (Choudrie, 2005).

3.5 Role of Consultants

Bauman (cited in Adams et. al., 2004) suggested that consultants can be beneficial in information systems implementation by providing experience and knowledge. Consultants, as outsiders, are not involved in company's politics and their decisions are based on what is in the business's best interest. They can help to implement applications successfully and ensure that users adapt to new changes (Hibbard 1998; Markus and Benjamin, 1997). Consultants are often identified as change agents who are responsible for managing both social and technological change within organisations. A change agent is a resource person who has the capacity to initiate and influence structural, employee, and work process changes within an organization (Markus and Benjamin, 1997; Winston, 2002)

RESEARCH METHODOLOGY

This study aimed to measure the effectiveness of the strategies for dealing with end-user resistance as perceived by IT project managers in New Zealand. These strategies included user participation, communication, training, support and consultant involvement. Another goal was to find out whether or not IT project managers use the identified strategies on their IT projects and how frequently they use them.

To investigate the research questions, a quantitative research methodology was used. This research involved surveying a sample population of IT project managers. The survey involved a number of predefined questions and was conducted by means of an online survey tool. Thirty three closed-ended questions provide quantitative data and required a participant to choose from a given set of responses. Three open-ended questions provided qualitative data and allowed participants to expand their answers with further details. Data collection involved sending out e-mail invitations to participants (IT Project Managers who work for IT companies around New Zealand) and getting the answers back in the form of online responses. The online questionnaire contained mainly quantitative and a few qualitative open-ended questions.

Project Managers working for New Zealand IT companies were chosen as target group. New Zealand IT companies were chosen as the research sites because they are IT service providers and have exposure to broad variety of projects for different clients. IT Project Managers were chosen because they work with project sponsors, project team and other project stakeholders and are responsible for projects management and delivery.

RESULTS ANALYSIS

A total of 74 IT project managers participated in the survey. However, 24 respondents did not complete the questionnaire. This resulted in 24 invalid responses and they were discarded. This reduced the effective number of valid responses to 50. A majority (86%) of responses were from private IT companies within New Zealand. Other respondents were from service organisation - software development (1%), limited trading company (1%), government agencies (1%), and public (4%).

The majority of responses came from Wellington (62 percent) region. Other responses came from Auckland (28 percent), Canterbury (8 percent) and Waikato (1 percent).

The responses came from participants working for large, medium-sized and small IT companies. The percentages of responses from the companies are listed as follows:

- 14 percent of responses came from large size companies with over 500 employees;
- 32 percent of participants were from companies with 100 – 501 employees;
- 6 percent of participants were from companies with 51 – 100 employees;
- 22 percent of participants were from small companies with 11 -50 employees and
- 26 percent of responses came from small companies with 1-10 employees.

Paired samples t-test was used to analyse and compare means in order to evaluate the most effective and most frequently used strategies. One-way ANOVA and correlation was used to find correlations between the survey questions. An alpha level of 5% was assumed for all statistical analyses. One open-ended question was analysed by grouping common responses and ranking them.

Participation and communication strategies were rated as the most effective strategies for dealing with end-user resistance. End-user training and support were also rated as effective strategies, but not as strongly. Consultant involvement in the project was rated as the least effective strategy for dealing with end-user resistance. Refer to Table 1 for t-tests results and Figure 1 for means of the strategies as rated by the participants.
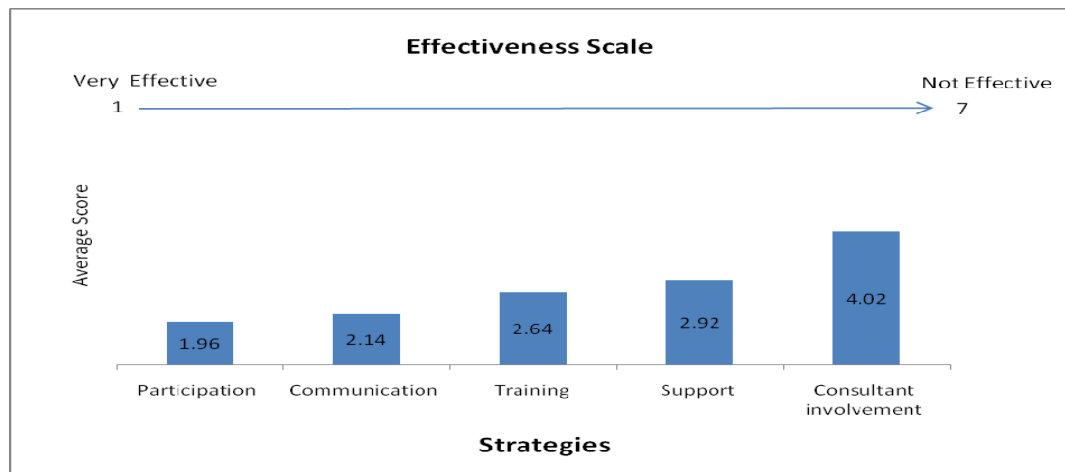
Figure 1: Strategies and their effectiveness (note a scale of 1 to 7 was used to rate effectiveness of the strategies, were 1 was "very effective" and 7 was "not effective")

Table 1. Paired samples T-Test of effectiveness of strategies

	t	df	Sig. (2-tailed)
Participation - Communication	-.988	48	.328
Participation - Training	-3.293	48	.002
Participation – Support	-4.250	48	.000
Participation – Consultant	-6.582	45	.000
Communication - Training	-2.315	48	.025
Communication - Support	-3.616	48	.001
Communication - Consultant	-5.242	45	.000
Training – Support	-1.656	48	.104
Training – Consultant	-3.908	45	.000
Support – Consultant	-3.152	45	.003

The results of this study showed that IT project managers use all of the identified strategies on their IT projects. Among identified strategies various forms of communication, end-user participation and support have been rated as most frequently used strategies. A summary of frequency of use of the various strategies has been presented in Table 2.

Table 2. Summary of frequency of use of strategies

Strategy	Frequency of Use		
	Often	Sometimes/On Some Projects	Occasionally
Communication strategy	Communication by means of e-mail, face-to-face and phone; Meeting up with end-user to discuss any issues or concerns.	Communicating with end-users by means of teleconferencing and making information available via a website;	Communication by means of newsletters.
End-user participation	End-user participation during any of the stages of IT project; End-users performing user acceptance testing; Involving end-users in system testing.	Building prototypes and involving end-users in prototype assessment and evaluation; Encouraging end-users to appoint a formal user-liaison to the project team;	
End-user training		Providing training before, during and after system implementation; Providing one-off training to end-users; Providing stage-wise training to end-users.	Repetitive training sessions
End-user support	Providing end-user support after system implementation;	Giving end-users that were involved in the project support during system implementation;	
Consultant involvement		Consultant involvement in the project;	

DISCUSSION

This study aimed to measure the effectiveness of the strategies for dealing with end-user resistance. These strategies included user participation, communication, training, support and consultant involvement. This research also aimed to find out whether or not IT project managers use the identified strategies on their IT projects and how frequently they use them. During the analysis of the data, a few unexpected but important significant relationships were also found.

Several calculations where carried out on the data. The results indicated a significant, moderate, positive correlation between frequency of end-user resistance and impact of end-user resistance on a project's success, suggesting that user-resistance has a negative effect on a project's success. This finding is consistent with previous research e.g. Lorenzi, and Riley (2000); Clark and Stoddard (1996) Clemons, Thatcher and Row, (1995); Markus and Benjamin (1997); Coe (1996).

The results of the present study also showed that participation and communication strategies were rated by IT project managers as the most effective strategies for dealing with end-user resistance. End-user support and training were also rated as effective but paired samples t-tests revealed that user participation and communication were rated significantly higher. Consultant involvement on the projects was rated as somehow effective but was rated significantly lower than other strategies. Consultant involvement has been discarded from the results of this study due to doubts regarding its validity. A number of the participants did not clearly understand the role of the consultant and how it could impact on user acceptance.

End-User Participation and Communication

The results suggest that user's involvement in the project life-cycle and effective communication with the project team will significantly influence end-user's acceptance of a new system. This confirms the findings of previous research (Kappelman and Guynes, 1995; Visser and Visser, 2006; Adams et. al., 2004).

As was stated earlier, user empowerment plays a significant role in end-user's perceptions of a new system and reduces end-user's resistance (Kappelman and Guynes, 1995). Involving users in a project and providing them

with effective communication empowers users and gives them a sense of control and belonging (Hunton and Beeler, 1997). According to the Theory of Planned Behaviour (TPB), control increases user's usage behaviour. An increased intention can increase end-user's positive attitude towards a new system (Ajzen cited in Chau and Hu, 2001). Consequently, an end-user's positive attitude seems to influence one of the key determinants of the Technology Acceptance Model (TAM); perceived usefulness. Moreover, the user's perception of usefulness is influenced greatly by their positive attitude therefore increasing end-user's usage behaviour. Increased usage behaviour is an indication of acceptance of a new system (Davis et. al., 1989; Brown et. al., 2002). Furthermore, empowerment and positive attitude increase end-user's self-efficacy by giving them more confidence in their capabilities (Hasan, 2006). Increased self-efficacy will also increase end-user's acceptance of a new system (Compeau et. al., 1999).

In short, user's participation and communication strategies empower users and increases their sense of control, intention, positive attitude, perceived usefulness and self-efficacy. The findings of this study are consistence with earlier research and confirm previous findings. The present research provides further evidence for effectiveness of user participation and communication strategies to deal with end-user resistance. The findings highlight that end-user's involvement in development processes and effective communication structures greatly impact end-user's acceptance and are critical to an IT project's success. They are perceived as significantly more effective by IT project managers compared to other possible strategies such as user training and support.

End-User Training and Support

End-user training and support strategies were also rated as effective for dealing with end-user resistance, though not as highly as end-user participation and communication.

Training and support are the key strategies to help end-users deal with computer anxiety and increase their self-efficacy. Effective training and support can reduce end-user's fear of interaction with a new system and change their perception of a new system, thereby reducing computer anxiety (Doronina, 1995; Hasan, 2006). Familiarizing end-users with a new system and providing them with effective learning opportunities such as training can increase end-user's sense of capability and therefore their self-efficacy (Compeau et. al., 1999). Training and support also increase user's perceptions of how easy a system is to use. If users are sufficiently familiar with a system and understand the benefits of that system (the role of user training) and there is a support structure that helps them achieve their goals (the role of user support), that system is perceived as an easy to use system (Davis et. al., 1989; Brown et. al., 2002). Ease of use is one the key concepts of TAM that determines user's usage behaviour; the easier a system is to use, the more it is used and accepted by its users.

The results of the present study have shown that a large number of project managers (78%) train users by means of both presenting users with an overview of the system and also by presenting each specific part of the system. According to Coe (1996) this is the best way of teaching end-users. This way, users are provided with a complete mental picture of the new system, thus getting more value out of training.

Moreover, the results also indicated a significant, weak, positive correlation between frequency of end-user resistance and two training techniques: one-off training and stage-wise training. This finding suggests that one-off and stage-wise training are not effective training techniques for dealing with end-user resistance. The findings also indicated that one-off training and stage-wise training are the most frequently used training techniques. This could indicate that the training techniques that are most often used are the most ineffective training techniques. However, it is important to mention that stage-wise training is recommended to be used on complex IT projects only (Adams et. al., 2004). The complexity of IT projects was not considered as a factor in this research. Therefore, the effectiveness of stage-wise training needs to be further investigated.

One-way ANOVA conducted between frequency of end-user resistance and the self-teaching training technique revealed that companies that have this training technique in place, experience less user-resistance. This might suggest that end-user resistance can be avoided by extending the self-teaching culture by means of manual, online structured course, help file, CD, etc within the organization. Malhotra and Galleta (2004) state that as users are required to use their own time to learn the new material and this can potentially lead to end-user resistance. However, the findings of this study provide counter-evidence to Malhotra and Galleta (2004) and are consistent with previous research where the self-teaching technique was found to be effective for dealing with end-user resistance (Doronina, 1995). There were no other significant relationships found between frequency of end-user resistance and other types of training.

End-user support is one of the strategies that help to avoid end-user's frustration with a new system (Lundgren, 1998). The results of this research have shown that IT companies have various structures in place to provide effective end-user support, whether by means of IT help-desk, manuals or onsite support. Effective user support helps to create positive user experience with the new system, re-enforcing positive attitude towards it and, therefore, acceptance of the new system (Chau and Hu, 2001 Davis et. al., 1989; Coe, 1996).

Furthermore, the results have indicated a positive correlation between end-user resistance and end-user support after system implementation. This can initially be interpreted that post-implementation user support might increase end-user resistance. However, this is more likely to be an indication that projects with high end-user resistance required more end-user support after the system has been implemented. This could be an example of the overhead costs involved when a project manager did not anticipate end-user resistance to a system, and did not take steps to avoid it. It is important to note that these correlations are weak and end-user support after system implementation is not the only strategy that helps to deal with end-user resistance. It is possible that the overhead costs of end-user support could be diminished by other effective ways.

The findings also suggested that organizations that make use of external IT support structures experience more end-user resistance. This could be an indication that supporting users through an external IT department is not an effective way to deal end-user resistance. Moreover, one-way ANOVA conducted between impact of user-resistance on project's success and IT helpdesk structure, revealed that IT project managers whose companies provide users with support through IT helpdesk services, experience less negative impact on a project's success caused by user-resistance. This finding supports previous research and suggests that end-user support through IT helpdesk services is an effective way of dealing with end-user resistance (Marcella and Middleton, 1996).

Further, participants were asked to give a brief description of strategies that they used for dealing with end-user resistance. Some of these strategies are listed below:

- Make use of champions.

- User centred design.

- ADKAR (Aware, Desire, Knowledge, Ability and Reinforce).

- Promotion of benefits of the system to the users.

- Deal with most resistant users first and do a pilot deployment initially with the group of most resistant users to resolve issues and get user buy in.

- Top management support and user incentives.

- Iterative approach.

CONCLUSION

This research helped to identify a number of strategies that could be used for dealing with end-user resistance. These strategies were end-user support, participation, communication, training, learning culture and consultant involvement in a project. These strategies either empower end-users to participate in the project or give support and encourage end-users to learn about new features of the application.

The results of this study show that participation and communication strategies were rated by IT project managers as the most effective strategies for dealing with end-user resistance. End-user support and training were also rated as effective but not as strongly. Participation and communication strategies empower end-users giving them a feeling of control, importance and the ability to influence decisions regarding a new system. Empowering end-users through participation and communication motivates end-users and influences end-user's perceptions of usefulness, ease of use, and the individual's intention to use IT, which eventually influences end-user's attitude towards a new system and their actual usage behaviour.

The frequency of use of each strategy was also analysed. The results have shown that IT project managers use all of the identified strategies on their IT projects. Among identified strategies various forms of communication, end-user participation and support have been rated on average as most frequently used strategies.

The research has focussed on use of each strategy on IT projects independent of the project complexity. Further research could be done to investigate the effectiveness of each strategy in relation to complexity of the IT projects.

The strategies identified in this research, each aim at increasing one or more factors that help to deal with end-user resistance such as perceived ease of use, attitude and positive thinking. However this study did not aim to measure whether or not collective use of these strategies has a greater positive effect on user's acceptance and usage behaviour. Future research should take this matter further and investigate the implications of collective use of these strategies.

This research focussed on the opinions of Project Managers in IT companies, often an IT company may have a limited involvement in the internal processes of their customers, and therefore have a minor role to play in helping their customers deal with end-user resistance. Investigation into these strategies from the customer point

of view would reveal a different perspective on the effect of end-user resistance on IT projects and the effectiveness of the different strategies for dealing with it.

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