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A learner perspective on barriers to e-learning

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This study aims to identify and categorize barriers to e-learning adoption and the relative impact of those barriers on learners. It contributes to the understanding of learner perceptions of barriers, the different types of barriers and their relative importance. This study used a quantitative methodology grounded in previous literature. The study is based on a self-administered questionnaire conducted with employees in a rail organisation. This research demonstrates there are three key factors that represent barriers to e-learning: the nature of e-learning as a learning approach, the use of technology, and concerns about lack of time and potential interruptions when trying to complete e-learning.

Keywords: *e-learning, learning barriers, learning technologies, e-learning adoption*

Introduction

The use of e-learning in the workplace has become widespread and with the continuing emergence of new technologies, growth in popularity can be expected to continue. The many potential benefits of e-learning have long been extolled by researchers and practitioners alike, however there is far from widespread consensus on the benefits of e-learning and whether it is more effective than traditional forms of training and development in every situation (Derouin, Fritzsche, and Salas, 2005). Beamish, Armistead, Watkinson, and Armfield (2002) claim cost effectiveness, access and flexibility amongst the benefits of adopting e-learning and similar claims have been raised by many others (Brown, Murphy, and Wade, 2006; Hill and Wouters, 2010; Welsh, Wanberg, Brown, and Simmering, 2003). However, some research has reported finding no significant difference between learning outcomes of e-learning and those of more traditional modes of delivery. Indeed, in a review of previous studies Derouin et al. (2005:929) concluded that "overall, it is difficult to conclude that e-learning is more, less, or equally effective at the learning level than traditional classroom-based training". In many situations, it may be the case that individual or organisational contexts will determine whether e-learning is the most effective means of providing learning opportunities for employees in the workplace.

Regardless of the arguments supporting the use of e-learning, much of the research into e-learning highlights factors that, when present, facilitate a greater likelihood of success of e-learning. It could be assumed that an absence of such factors may represent barriers to effective implementation of successful e-learning. Indeed, much literature in the e-learning area, whether focusing on education or corporate settings, identifies a range of factors for success and these are typically issues relating to the individual, the technology and/or the organisation/institution. In contrast to research about "enablers", this paper considers this range of potential barriers and takes the perspective of the individual learner in relation to their perception of barriers to effective e-learning.

Purpose of the Study

Given the growing importance of e-learning and its use in the workplace, it is critical to understand the barriers that act upon and hinder successful adoption of such technologies. The purpose of this study was to identify and categorise barriers to e-learning adoption, and to assess their relative impact on learners. Understanding learner perceptions of barriers, the different types of barriers and their relative importance, will enable those responsible for workforce development to focus upon the most critical potential barriers to successful e-learning implementation.

Literature Review

A wide range of terms and definitions have been offered for learning that involves the use of technology. For the purposes of this research, the term e-learning has been used exclusively and is defined as "instructional content or learning experiences delivered or enabled by electronic technology" (Servage, 2005:306). E-learning has the potential to offer many advantages beyond those of more traditional forms of training and development at the level of the individual learner and at the organisational level. While this potential may not be realised in all e-learning courses (Derouin et al., 2005), this dilemma is not unique to e-learning. Indeed, even in traditional forms of learning and development, many decisions within the development and implementation of the individual intervention will impact on its ultimate success or failure.

One of the most common arguments in favour of e-learning is the potential to deliver learning tailored to the specific needs of learners, essentially offering "just-in-time and just-for-me learning" (Berge and Giles, 2008:46). In comparison to other forms of delivery, the quality of the learning process and the information provided for learners can potentially be enhanced as e-learning material can be immediately updated to be "more accurate and useful for a longer period of time" (Kathawala and Wilgen, 2004:5.04). Tynjala and Hakkinen (2005:324) also believe that learning quality can be enhanced in an e-learning environment where "technology has made

it possible to create virtual environments that almost exactly mimic authentic ones". In some cases, it is even possible to create learning environments that could not be created in a face-to-face training course. However, the capacity for e-learning to result in superior learning outcomes has been the topic of widespread disagreement with some experts concerned that a higher level of thinking and engagement may not occur without facilitation as a part of e-learning (Kanuka and Kelland, 2008).

Regardless of the many potential benefits of e-learning, it is critical that the debate acknowledge potential drawbacks and barriers to the development and implementation of e-learning. Indeed, e-learning has the potential to be seen as an impersonal mode of delivery and assessment, which can potentially be isolating for the learner (Bell, 2007) and such concerns have led to consideration of social presence in e-learning (for example, see Hall and Herrington, 2010; Kreijns, Kirschner, Jochems, and van Buuren, 2011). To further understand the barriers to e-learning it is important to first review the related and more established literature of technology adoption.

Technology adoption barriers

A full consideration of the potential barriers to e-learning is not confined to, or informed by, just the e-learning literature. Indeed, it is appropriate to consider the literature and research in the information systems (IS)/information technology (IT) field which has a long history of considering technology adoption and factors affecting IS success. Within this literature, a widely accepted model of IS success is that of DeLone and McLean (1992) which has become known as the D&M IS Success Model and used extensively in the measurement of IS success for over twenty years (DeLone and McLean, 2003). The taxonomy introduced in this model considers six factors important to the success of IS implementation: system quality, information quality, use, user satisfaction, individual impact, and organisational impact.

Since it was originally developed, this model has been refined to group individual impact and organisational impact together as "net benefits", and an additional factor added, that of "service quality".

Importantly, the addition of this factor recognises that as well as more quantitative measures (e.g. response times and nature of use), the level of support offered to users in the form of assurance, empathy and responsiveness can make a critical difference to the success of systems (DeLone and McLean, 2003). This represents a move to recognise the importance of 'people factors' and the role individuals may play in determining the ultimate success of IS adoption efforts.

In a study referring back to previous barriers research, Brzycki and Dudt (2005) considered technology adoption in teacher training. Originally, a model had been proposed in 1999 that identified five barriers to adoption of technology by teachers: time, support, models, infrastructure, and culture/tradition. After six years of interventions and study, Brzycki and Dudt (2005) emphasised the most significant issues to overcome barriers to technology adoption were the effective management of change, appropriate and available support for users, and finally they highlighted the critical role of ensuring incentives exist to motivate adoption. Most importantly, they identified new barriers that had not been considered in earlier studies. More specifically, the authors emphasised the need to consider issues of organisational size and complexity, and the continuing development of technology requiring not just learning how to use technology but also being prepared to change on a rapid and ongoing basis.

Adoption of advanced technology and the potential barriers have also been studied by Baldwin and Lin (2002) who were able to identify five groups of impediments namely cost-, institution-, labour-, organisation-, and information-related. The most unexpected finding from this study was that impediments were more readily cited by innovators using advanced technologies than by non-innovators. This finding can be explained based upon the fact that particularly early adopters are those who experience the most challenges with new technology and are therefore more likely to foresee potential impediments (Baldwin and Lin, 2002).

Overall, technology adoption studies provide at least an initial indication of the potential barriers that may be faced when developing and implementing e-learning in organisations, with a growing

recognition of the role of people, and not just the technology itself. However, the nature of IS/IT as a discipline means that much of the technology adoption literature from this field does have a general tendency to focus on the system and content rather than specific individual issues (although they are considered as an element). Researchers in the areas of learning, education and human resource development have also begun to investigate e-learning as a specific type of learning intervention and therefore, the results from studies in these areas are also critical to understanding the potential barriers to e-learning.

Barriers to e-learning adoption

Given the growing use of e-learning, it is not surprising that research has turned to specifically addressing potential barriers to successful implementation of such technologies. Although more recent advances have focused on corporate e-learning, the large majority of studies of e-learning originated from the education literature, with the research generally based on samples of students in educational institutions. While this research can inform the practices of those implementing e-learning in a corporate context, it cannot be assumed that learners in a corporate setting will be the same as those in educational settings.

In the context of higher education, Rogers (2000a) investigated the adoption of learning technologies from the perspective of those delivering the classes. Barriers to e-learning adoption were argued to often come in the form of pre-existing norms such as institutional or teaching method norms. These studies focus on why educators might choose to adopt learning technologies in their teaching and why learners may or may not choose to take them up. While this is appropriate to a higher education context, in a corporate context there is often no choice about learning mode, and the option to learn using alternate forms may not be available. However, Rogers (2000b) argues the need for behaviour change in both the learner and the instructor for successful implementation of learning technologies.

Other research also conducted within the tertiary education sector has investigated barriers to technology adoption by teachers and tertiary educators. For example, Rogers (2000b) drew together previous studies conducted in the 1990's and identified barriers as being related to internal and external factors, and factors cutting across both areas. Internal barriers are related to the individual learner and encompass factors such as attitudes and level of technological competency. On the other hand, external barriers are related to a lack of availability and accessibility of technology, the quality of support, and insufficient development of skills for stakeholders (both learners and educators) in the use of learning technologies. Last, barriers that were reported to cut across both internal and external factors include a lack of time available, a lack of appropriate funding and a culture that resists adoption of learning technologies. Similarly, Beamish et al. (2002) identified workplace barriers to e-learning adoption; individual barriers such as cultural resistance and learner motivation, and barriers relating to the technology itself such as cost, availability and access to computers or necessary devices.

The theme of internal versus external (or individual versus institutional) factors is prevalent in much of the research conducted regarding e-learning barriers and success factors. For instance, Muilenberg and Berge (2005:29) identified eight key factors that represent barriers to the uptake of online learning; administrative/ instructor issues, social interaction, academic skills, technical skills, learner motivation, time and support for studies, cost and access to the Internet, and technical problems. Of these factors, the research found that lack of social interaction was the most significant barrier followed by administrative and instructor issues, time and support and learner motivation. It should be noted, however, that while this research drew a sample from a wide and diverse population, only 7% represented respondents from a business context.

Overall, it should be highlighted that much of the literature about barriers and obstacles to e-learning has been conducted in educational rather than corporate settings (see Berge, 2002). Moreover, many of the existing studies have looked across many organisations at different stages of adoption and implementation of

learning technologies. Nevertheless, findings from this research have identified a wider range of barriers that, in general, highlight a lack of technical expertise and inability to manage organisational change as the most significant barriers across all individuals surveyed.

Less prevalent are studies with a specific focus on organisational e-learning and the barriers to successful implementation. A study by Anderson et al. (2010) explored organisational barriers in small to medium enterprises (SMEs) and their adoption of e-learning. The authors found that the level of sophistication of general information communication technology (ICT) used in the organisation was a predictor of the extent to which e-learning would be utilised. This finding indicates that organisational readiness is key to the adoption of e-learning and that unless an organisation is mature in its use of ICTs generally, e-learning is not likely to be used in the organisation. Overall, this research suggests that, as discussed previously, e-learning can be considered just another form of technology and therefore the nature of the organisation itself may be a barrier to successful e-learning.

To synthesise some of the previous findings to inform the current study, results from some of the key literature (Ali and Magalhaes, 2008; Berge, 2002; Brzycki and Dudt, 2005; Muilenburg and Berge, 2005; Rogers, 2000b) has been summarised in Table 1. For each study, the table shows the focus of the study categorised as: education, corporate or general. This relates to the nature of the sample present in the study, including the category 'general' which represents studies conducted on the broader population and not necessarily within a specific context of education or an organisation. The second element of the table identifies whether each study took a specific e-learning focus or a broader technology adoption focus. Finally, Table 1 maps the factors, both individual and organisational/institutional, that were identified by the study. Whilst some of the studies identified unique factors, it is clear from this mapping that some factors are universal. In particular, ability to use technology, lack of user support, difficulty with availability/access to technology and workload concerns were common barriers.

Table 1. Barriers identified in previous literature

	Rogers, 2000	**Berge, 2002**	**Brzycki & Dudt 2005**	**Muilenburg & Berge, 2005**	**Ali & Magalhaes, 2008**
Educational / Organisational / General focus	E	O	E	G	O
Technology/ E-learning context	T	E	T	E	E
Individual factors					
Attitudes to technology	X	X			
Capability/ability to use technology	X	X		X	
Social interaction/ quality concerns		X		X	
Lack of motivation to use				X	
Lack of 'academic' (eg reading & writing) skills				X	
Organisational/ external factors					
Lack of user support	X	X	X	X	
Lack of administrative support				X	
Lack of training/ professional development for users	X				
Lack of management support					X
Availability/ accessibility of technology	X	X	X	X	

	Rogers, 2000	Berge, 2002	Brzycki & Dudt 2005	Muilenburg & Berge, 2005	Ali & Magalhaes, 2008
Cost of technology	X			X	
Time/workload	X	X	X	X	X
Lack of incentives to use		X	X		
Organisational culture / resistance to change	X	X	X		
Problems with the technology				X	X
Language barriers					X
Evaluation/ effectiveness concerns		X			

Overall, this study aims to extend the existing literature by identifying and synthesising existing barriers to e-learning adoption in an organisational setting, and in particular to consider these barriers from the perspective of the learner. To this end, barriers were assessed with a view to exploring their underlying factor structure and subsequently their relative impact on intention to adopt further e-learning. Our study seeks to answer the questions:

What are the key barriers in e-learning adoption? and

To what extent do these barriers influence the intention to adoption further e-learning?

Methodology

This study used a quantitative methodology grounded in the previously reviewed literature and the findings of a pilot qualitative exploratory study, and utilised a self-administered questionnaire to

gather data. The questionnaire was made available both online and in a paper-based form.

Participants and Procedure

The study was conducted in a case organisation which operates and maintains an Australian state suburban, interurban and rural rail network for passenger and freight services. In accordance with ethical approvals for the project, this organisation cannot be named. The organisation started utilising e-learning in 2008 for employees, covering topics such as the use of financial systems, security transit procedures and safety-related policies and practices. The focus of this study was the perceptions of users based on past experience of e-learning, and therefore our key informants were individuals who had used e-learning in the past two years. All those who had used e-learning during that time were invited to respond to the questionnaire regardless of their location or position in the organisation. Whilst the invitation to participate was issued by the Learning and Development Manager, all responses came directly to the researchers either via postage paid envelopes or through the online survey tool.

The most common form of e-learning undertaken by respondents related to topics such as health and safety, environmental compliance, and use of financial systems. A small number had also undertaken courses relating to supervisory skills. These courses were predominantly completed by the participants in the workplace at a desktop computer.

Overall, 1,047 employees responded to the survey. Within this sample, 364 respondents reported that they never experienced e-learning and 683 respondents had used e-learning at some stage during the last two years. It is these respondents who are the focus of this study. Of those who had used e-learning most respondents reported participating in one or two courses. The majority of e-learning users were male (67%), with an average age of 40 years (ranging from 18 to 71). This profile is typical of the composition of the Australian rail workforce more broadly. A majority of e-learning users (59%) had

qualifications lower than a bachelor degree (e.g. high school, trade certification or diploma qualifications), and average tenure within this organisation was 10 years (ranging from 1 to 44 years). In relation to the types of positions held by e-learning users, the majority worked in non managerial positions (76.5%) such as technical, administration or operational roles.

Instrument

In the introduction to the questionnaire, e-learning was defined broadly for participants as "*any type of training which has involved you using the internet, company intranet or other type of computer technology. This might include working through information online or on the company intranet, through to the use of simulators*". The definition provided was purposely broad to encourage respondents to consider all forms of e-learning to which they had been exposed. As the purpose of this research was to address perceptions of e-learning and not one particular course, this was considered the most appropriate definition. Respondents were asked to rate a number of questions in a larger study. However, this study focused on questions related to perceived barriers of e-learning and intention to adopt more e-learning in the future. These constructs are explained in detail below:

E-learning barriers. Based on a pilot study in the organisation, there were a number of potential e-learning barriers identified. Drawing from interview information and the review of literature outlined previously and summarised in Table 1, we listed potential barriers and asked respondents to rate the extent to which they believed each to be a barrier to using e-learning a five point Likert scale. Example items were "Physical health barriers such as eye strain" and "Concerns of privacy or confidentiality online." Respondents were also given the opportunity to provide additional barriers however these were not significantly different to those listed, and in many cases were aligned with one of the forced choice items. The internal reliability of this construct is .87.

Intention to adopt e-learning in future. Respondents were asked to rate the possibility of adopting e-learning in the future using a scale that ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). Two items were adapted from Sawang, Unsworth and Sorbello (2007). An example of items in this scale is "*Based on my experience I would use e-learning again in the future.*" The internal reliability of this construct is .85.

Control variables. Based on e-learning and technology adoption literatures, respondents' demographic information such as age, gender, tenure and educational background may influence intention to use e-learning (Sawang and Unsworth, 2011) and thus we controlled for these variables in our analysis.

Results

Exploratory factor analysis, correlation, and hierarchical multiple regression analyses were conducted in order to examine the data with respect to the research questions. First, SPSS 19 was used to conduct an exploratory factor analysis on the data (N = 683) to determine the underlying factor structure of the barrier variables. A principal components extraction using varimax rotation was requested. Investigation of the rotated component matrix revealed that the variables that loaded onto three factors at a level above .5. As per Tabachnick and Fidell (2007), Bartlett's test of sphericity showed that the correlation matrix was not an identity matrix, indicating that significant correlations among the items existed ($\chi 2 = 3491.82$, $p < .001$). Furthermore, the Kaiser-Meyer-Olkin measure of sampling adequacy was high (0.85) and above the recommended minimum threshold of 0.60. Overall, the three factor solution explained 67.55% total variance (Table 2). Items loading onto each factor were inspected and labelled as nature of e-learning, system difficulty, and time concerns.

Table 2. Exploratory factor analysis of e-learning barriers

	Nature of e-learning	System difficulty	Time concerns
1. Impersonal nature of e-learning	.87		
2. Concern about the validity of training and assessment that is done online rather than face-to-face	.62		
3. Concerns about the effectiveness of e-learning	.68		
4. Lack of interaction with other learners or a trainer	.82		
5. Doesn't suit the way I prefer to learn	.77		
6. Inability to work with computers		.81	
7. Anxiety or stress related to the technology		.82	
8. Concerns of privacy or confidentiality online		.66	
9. Physical health barriers such as eye strain		.62	
10. Interruptions when I am doing the training			.83
11. Lack of time			.82
Eigenvalues	44.67	13.42	9.46
Mean (SD)	2.86(.87)	2.28(.71)	3.39(.90)
Cronbach Alpha	.88	.76	.65

Descriptive statistics, correlations and reliability coefficients for focal variables of this study are displayed in Table 3. Overall, intentions to adopt e-learning were negatively correlated with the nature of e-learning system (r =-.55, p<.01), system difficulty (r =-.40, p<.01), and time concerns (r -.19, p<.01). As such, all barriers were related to lower levels of intention to adopt e-learning in the future. Two control variables (age and tenure) were significantly negatively correlated with intention to adopt e-learning in the future indicating that older and longer serving employees reported lower levels of intention to adopt e-learning.

Table 3. Descriptive statistics and correlations among constructs (N = 577)

	1	2	3	4	5	6	7	8	SD	SD
1. Intention to adopt future e-learning	(.85)	-.55**	-.39**	-.19**	.04	-.10*	-.15**	.07	3.85	0.83
2. Nature of e-learning		(.88)	.55**	.42**	-.03	-.01	.07	-.04	2.86	0.88
3. System difficulty			(.76)	.28**	-.07	.05	.05	-.12**	2.28	0.71
4. Time concerns				(.65)	-.13**	-.02	-.03	-.01	3.39	0.90
5. Gender						.18**	.21**	.03	0.63	0.48
6. Age							45**	-.12**	41.32	11.33
7. Tenure								-.27**	9.88	10.05
8. Education									0.41	0.49

Note:**p<.01, *p<.05, Gender (0=female, 1=male), and education (0 = lower than bachelor degree, 1 bachelor degree or higher) are dummy coded. Cronbach alphas (internal reliabilities) are in the diagonals.

Hierarchical multiple regression analyses were conducted to examine the differential roles of e-learning barriers on intention to adopt e-learning in the future. Step one of each regression was designed to control for possible confounding effects related to personal demographic information (gender, age, education, and tenure). To test main effects, e-learning barriers (nature of e-learning, system difficulty, and time concerns) were entered at step two.

The initial two steps in the regression equations explained 34% of the variance in intention to adopt future e-learning (Adj. R^2 = .32, $F(7, 555) = 41.69$, $p < .001$). After partialling out the effects of control variables, e-learning barriers accounted for a significant proportion of additional variance for the prediction of intention to adopt e-learning in the future. Table 4 demonstrates that nature of e-learning (β=-.50, t(555) = -11.31 p < .001) and system difficulty (β=-.13, $t(555) = -3.20$ $p < .001$) negatively predicted intention to adopt future e-learning. However, time concerns did not significant predicted intention to

adopt future e-learning (β=.05, $t(555) = 1.31$, ns). In relation to RQ2, we found that nature of e-learning was perceived as the most important barrier influencing individuals' intention to adopt more e-learning in the future. System difficulty was also perceived as a barrier to future adoption of e-learning. However, time concerns did not have an impact on future adoption of e-learning.

Table 4. Hierarchical regression analyses predicting intention to adopt further e-learning in the future (N = 577)

	Intention to adopt further e-learning			
	B		t statistics	
Step 1: Control variables	1	2	1	2
Gender	.08	.07	1.90	2.01
Age	-.04	-.06	-.01	-1.66
Tenure	-.15**	-.11**	-3.10	-2.60
Education	.01	-.02	.30	-.56
Step 2: Main effects				
Nature of e-learning		-.50***		-11.31
System difficulty		-.13***		-3.19
Time concerns		.05		1.31
R2	.03	.35		
Δ R2	.03	.32***		

Note: ***p < .001, **p <.01; *p < .05. The coefficients reported are standardised regression weight. Significance of ΔR2 tested with partial F-tests in regression equations.

Discussion

This research sought to identify the key barriers to e-learning use as perceived by past users, and the extent to which these barriers impact on a user's intention to use e-learning in the future. Whilst previous research has identified some potential barriers (often in an educational setting or focusing on broader technology adoption), this study provides a unique insight into the key factors that serve as

barriers to e-learning particularly in the eyes of learners. The study also identified specifically the extent to which these barriers mean users are less likely to want to use more e-learning.

Three key factors emerged as barriers to e-learning from the current research. The first factor related to the nature of e-learning as a learning approach. This factor includes general concerns about the validity and effectiveness of e-learning and the lack of a "personal touch" in comparison to more traditional forms of learning and development. It also represents a concern that e-learning doesn't suit some learning styles and represents less opportunity for interaction with other learners and facilitators. Whilst these perceptions may not all be true of all forms of e-learning there is little doubt that time must be taken to address these concerns in the minds of users if e-learning is to be successful. Whilst Berge (2002) identified some of the elements within this factor as potential barriers, the current research identified this as the most likely factor to impact on future e-learning use and therefore the most critical to address for successful implementation.

The second factor relates specifically to the use of technology. This factor includes both physical and psychological issues perceived to be barriers to the use of e-learning. Issues such as a lack of technology skills have often been argued to act as a constraint on the implementation of e-learning (Berge, 2002; Rogers, 2000b) and the results from this study reinforce this argument. However in addition to the element of ability, there also exist anxieties about the use of computers for learning, and concerns about the physical impact of e-learning. In general however, this factor can be considered to represent concerns about the use of technology more broadly and therefore may be addressed using similar strategies to those used to overcome barriers to IS adoption more broadly.

The third factor relates to concerns about lack of time and potential interruptions when trying to complete e-learning. This represents a common concern amongst learning and development professionals that when learning material is converted to e-learning, there is often the erroneous assumption that this learning will simply

be 'absorbed' into the normal working day of the individuals. Importantly, of the previous research studies analysed (refer Table 1), the only noted barrier common to all studies related to these time and workload concerns. Although the hierarchical regression results did not find this factor to be predictive of future use, there was a negative correlation between the time factor and future use intentions, suggesting it is still important to consider in any strategy to implement e-learning. Indeed this factor may be seen to relate to the issue of 'affordances' as described by Billett (2001) whereby individuals may not be equally provided with opportunity to undertake learning. It would seem considerations of affordances applies as much to e-learning as to other forms of workplace learning. This finding highlights the importance of ensuring equity of access to learning opportunities and the critical role of managers and HRD professionals in providing all employees with time and space to engage in e-learning, even if it is to be undertaken in the normal place of work.

The final noteworthy finding relates to the impact of age and tenure on future use intentions. This research found that older employees and those who have spent significant time in their organisation were less likely to intend to use e-learning in the future. For younger generations, the use of technology in learning is more prevalent even in school settings and therefore the likelihood of acceptance of this form of learning in the workplace could be anticipated. Older workers are more likely to have developed expertise in traditional learning settings and therefore may be less accustomed to an e-learning approach to development. In a study of the general population, Muilenburg and Berge (2005) reported the same finding in relation to age. Tenure (which was correlated with age) was also found to impact on an individual's outlook on e-learning. It could be expected that if individuals had been in the organisation for a lengthy period of time and had used predominantly face-to-face methods of learning, the use of e-learning may not be as appealing. In contrast to other findings (for example, see Muilenburg and Berge, 2005), gender did not impact on future use intentions.

As with all research, there are some caveats to be offered in relation to the findings from the current study. Firstly, the respondents to the survey were all employed in one industry and therefore generalising to other industries, particularly those with significantly different profiles to that of the transport industry should be undertaken with care. Secondly, the survey asked respondents to comment on their most recent experience of e-learning and across all respondents this may have represented a range of different types and formats of e-learning experience, and they may have undertaken the e-learning at different times in that two year timespan. The limitation of providing respondents with a broad definition of e-learning is also acknowledged as this can lead to respondents considering a broad range of e-learning approaches. However as the intent of this research was not to focus on one specific course but on overall perceptions it was deemed appropriate for the context.

Conclusion

Contemporary organisations are constantly looking for ways to continually develop the capabilities of the workforce in a rapidly changing business environment. With this need as a key driver, many organisations have turned to e-learning to facilitate this process of learning and development in a more time-efficient and cost-effective manner. However, whilst the supporters of corporate e-learning have demonstrated the benefits to be gained by the use of technology in a learning environment, it is also critical to understand why there may be resistance to such approaches. The findings from this research provide the perspective of the individual learner and identify the potential barriers to e-learning adoption.

The key message from this research is that if organisations planning the implementation of e-learning can address only one issue, it is the issue of the perception of e-learning that should be addressed. The critical issue is to reassure users about the nature of e-learning and to address concerns about validity and usefulness of e-learning, as well as provide opportunities to engage actively with the material, and potentially with other learners. In many cases, this may only be accomplished by implementation of a quality learning product

that can then be experienced by the individual learners. However, the research also reinforces the need for those in the organisation responsible for e-learning adoption, be cognisant that organisational issues such as support and time allocation should be part of any strategy to adopt e-learning. By awareness of the potential barriers to e-learning implementation, organisations will be well placed to capitalise on the benefits technology can bring to the learning environment.

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