

E-LEARNING AS A SOLUTION TO THE TRAINING PROBLEMS OF SMEs

A Multiple Case Study

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Abstract: Facing pressures from an increasingly competitive business environment, small and medium-sized enterprises (SMEs) are called upon to implement strategies that are enabled and supported by information technologies and e-business applications. One of these applications is e-learning, whose aim is to enable the continuous assimilation of knowledge and skills by managers and employees, and thus support organisational training and development efforts through the use of Internet technologies. Little is known however as to the actual role played by e-learning with regard to the training problems faced by SMEs. A multiple case study of 16 SMEs in the Atlantic region of Canada, including 12 that use e-learning with varying degrees of intensity, was designed to explore this question. We observed the firms' training process in terms of training needs analysis, method selection, tool selection and evaluation, and ascertained how this process is impacted by their use of e-learning. E-learning is then characterised in terms of opportunity and feasibility for the development of SMEs and their region.

1 INTRODUCTION

A number of business activities such as communicating, transacting, environmental scanning, collaborating with other organisations and training are now done through the Internet and the World-Wide-Web, that is, in the form of "e-business". Facing pressures from an increasingly competitive business environment, small and medium-sized enterprises (SMEs) in particular are called upon to implement strategies that are enabled by information and communication technologies (ICTs) and supported by e-business applications (Brown and Lockett, 2004). One of these applications is *e-learning*, whose aim is to enable the "continuous assimilation of knowledge and skills" by managers and employees, and thus support organisational training and development efforts through the use of Internet technologies (Morrison, 2003, p. 4). But SMEs are organisations that show specificity in terms of their environment, strategy,

structure, technology and culture, and differ markedly from large enterprises with regard to their training and development needs (Vickerstaff, 1992) and their resources and capabilities (Vinten, 2000)? Little is known however as to the actual role played by e-learning with regard to the specific training and development problems presently faced by SMEs (Roy and Raymond, 2005). And while e-learning has been proposed as an opportune and feasible solution to these problems (Roffe, 2004), there is as of yet little empirical evidence that this is actually the case. The aim of this research is to explore this question, through a multiple case study of 16 SMEs located in the Atlantic region of Canada.

2 THEORETICAL AND EMPIRICAL CONTEXT

Research on training in SMEs has been fraught with conceptual and methodological issues (Wong *et al.*,

1997). In attempting to understand how and why SMEs succeed or fail with regard to training, researchers have adopted various theoretical perspectives such as organisational learning (Gibb, 1997), knowledge management (Kailer and Scheff, 1999), and strategic human resource management (Keogh, Mulvie and Cooper, 2005). Empirical research has attempted to identify the factors that determine the nature, extent and constraints of workplace learning in SMEs such as firm size, resources and capabilities (Joyce, McNulty and Woods, 1995; Carrier, 1999; Fabi, Raymond and Lacoursière, 2007). As well, the individual, organisational and socio-economic impacts of training such as managerial and entrepreneurial development (Raymond, 1988; Evans and Volery, 2001), organisational performance (Westhead and Storey, 1996; Patton, Marlow and Hannon, 2000) and regional development (OECD, 2003) have been investigated. The main conclusion obtained from the empirical research to-date is that, in a globalised knowledge-based economy, there are a number of unresolved problems that still beset SMEs with regard to workplace learning, and in particular there is still great difficulty in providing education and training that meet the specific needs of SMEs, their owner-managers and their personnel (Dawe and Nguyen, 2007).

2.1 Training Problems of SMEs

The training problems of SMEs may be contextualised under three headings, as illustrated in Figure 1. Problems may first related to the exogenous and endogenous factors that induce training needs in SMEs (Meignant, 1997) such as the pressures from large customers, and strategic exigencies in terms of product development (innovation) and market development (internationalisation). For instance, the supply of training services offered to SMEs has generally not been adapted to the specific needs of these firms (Hogarth-Scott and Jones, 1993). A second set of problems relates to the way in which the training function is structured, organised and managed in the firm (Buckley and Caple, 1990; Kapp, 1999). This is where organisational size and capabilities often come into play, as manifested for instance by insufficient investments in training (Sadler-Smith, Sargeant and Dawson, 1998). Finally, from an e-learning perspective, the most important problems concern the training process itself, that is, the analysis of training needs, the selection and application of training methods, the selection and

utilisation of training tools, and the evaluation of training (Laflamme, 1999). For instance, the evaluation of training in SMEs is often found to lack rigour and depth (Jameson, 2000).

2.2 E-learning in SMEs

While one should be cautious in interpreting trend watching reports (Boon *et al.*, 2005), the adoption of e-learning technology for purposes of workplace training and human resource development is rapidly growing in large organisations, both private and public, and to a lesser extent in SMEs (Beamish *et al.*, 2002; Misko *et al.*, 2004). The practitioner literature, adopting a “best practices” approach for the most part (Hall and LeCavalier, 2000), has focused on issues of cost and technological issues, whereas research on e-learning in the workplace is deemed to require a better theoretical grounding (Daelen *et al.*, 2005), a broader conceptualization of e-learning’s impact on the organisation and its individual members and, in particular, “a broader understanding of workers’ learning and affective needs” (Servage, p. 304). Attempts have thus been made to identify the contextual conditions, pedagogical prerequisites, methodologies and design principles for the successful implementation of e-learning in SMEs (Tynjälä and Häkkinen, 2005; Lawless, Allan and O’Dwyer, 2000; Moon *et al.*, 2005). Through field and action research, other attempts have been made to implement e-learning applications designed for SMEs (Swift and Lawrence, 2003; Mullins *et al.*, 2007), and to identify the impact of e-learning on the performance of these organizations (Little, 2001). Overall however, there is insufficient empirical evidence and understanding to support the use of e-learning as an efficient and effective solution to the training problems of SMEs (Welsh *et al.*, 2003). With a view to provide such added evidence and understanding, the research model underlying the present study is presented in Figure 2.

3 RESEARCH METHOD

Given the present state of knowledge on e-learning in SMEs, a qualitative and exploratory research approach was used. The case study method is well adapted in situations where theoretical propositions are few and field experience is still limited (Yin, 1994). A multiple-site case study allows one to understand the particular context and evolution of each firm with regard to e-learning.

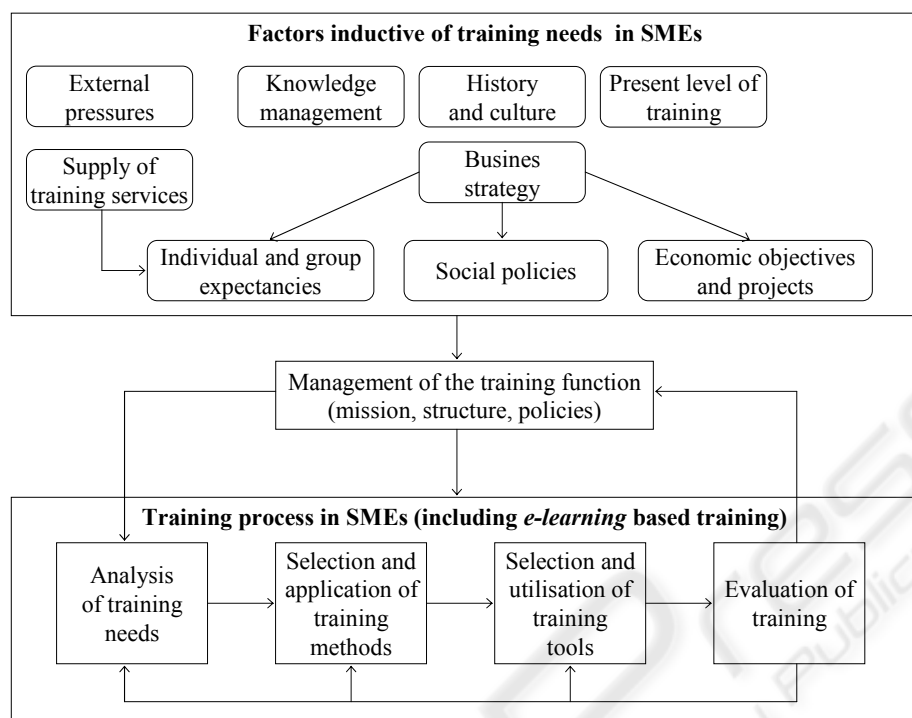


Figure 1: Contextualisation of the training problems of SMEs.

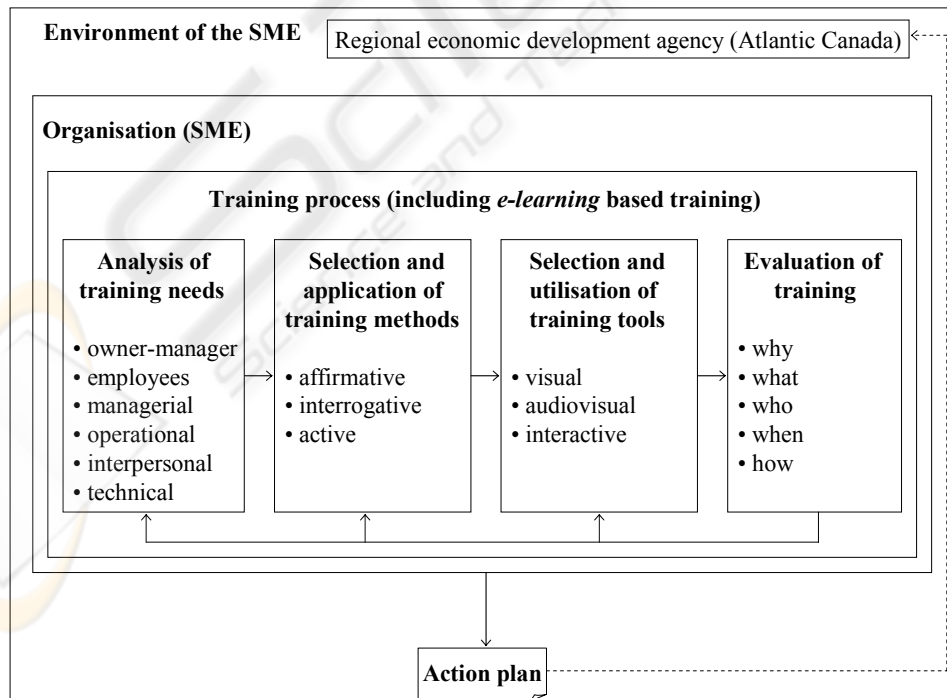


Figure 2: Framework for the study of training and e-learning in SMEs.

Sixteen SMEs located in the Atlantic region of Canada were studied, that is, four in each of the provinces of New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland, selected to be sufficiently successful (at least 10 years in business) and representative in terms of industry and size, for theoretical generalization purposes. Data were collected through semi-structured tape-recorded interviews with the owner-manager or CEO and with the firm's HR manager or manager responsible for training. E-learning users were also interviewed in four cases. Interview transcripts were then coded and analyzed following Miles and Huberman's (1994) prescriptions. As presented in Table 1, these firms range in size from 60 to 485 employees and operate in industries whose technological intensity varies from low to high. All export except for one firm (M). The SMEs were regrouped in four e-learning profiles of increasing intensity, based on the extent of their knowledge and use of e-learning (none, weak, average, strong).

4 RESULTS

The training provided in the 16 SMEs ranges from the general/managerial/functional (e.g., accounting) to the specific/technical (e.g., equipment operation), including mandatory training (e.g., work safety). This training is taken both inside and outside the workplace. Twelve SMEs were found to use e-learning in support of their training process, in one form or another. Table 2 characterizes the firms' training process in relation to their e-learning profile, noting that there is no obvious relationship between the SMEs' size or industry and their use of e-learning.

In identifying situations of opportunity for the SMEs, one must first note that e-learning is used to train owner/managers and office personnel as well as operations and production personnel. Also, the perceived advantages obtained from e-learning are comparable to those found in larger organisations. The most prevalent e-learning barrier perceived by strong users relates to cost and financing, whereas for non users, it is the difficulty in finding online courses and content that fit their specific needs.

Analysis of training needs - The SMEs' training needs center on interpersonal skills and technical competencies, in addition to that which is mandated by laws and regulations. These firms are under the impression that regional development agencies do not understand their needs and that training support programs are thus unadjusted. Strong users identify their training needs with more rigour, in a more

holistic and formal manner, and employ more sophisticated means to do so, such as a "learning management system" or LMS (Little, 2002) in the case of firms C and L. Users identify their training needs at an earlier stage than non users.

Selection and application of training methods - The lecture and "learning by doing" methods are used by all SMEs. When selecting a training method, the learning style of employees is taken into greater consideration by users of e-learning. In firms where this usage is strong, a greater variety of learning methods are applied.

Selection and utilisation of training tools - SMEs that have adopted e-learning tend to utilise more than one type of training tool within a training course, including visual, audiovisual and interactive tools. In conjunction with the training methods selected, this makes the training more adaptable to the various learning styles and capabilities of employees.

Evaluation of training - While the "learning by doing" method of training is the most prevalent, it is evaluated the least formally. E-learning users evaluate training more formally and employ more sophisticated means to do so than non users. Strong users also evaluate at more than one level, including the last level in Kirkpatrick's (1996) evaluation model, that is, they evaluate not only the learner's satisfaction (level 1), the knowledge obtained or skills achieved (2) and the changes in work behaviour (3), but also the tangible improvement in individual and organisational results (4). These firms also evaluate at more than one moment, that is, not only after but before and during training.

In evaluating the feasibility of e-learning, the participants alluded to a number of pre-requisites that could constitute the core of an action plan to further enable e-learning in their organisation. The first such pre-requisite mentioned is the need to develop an e-learning culture within the organisation, where owner-managers and employees are truly motivated and committed to use e-learning because they believe it is essential to their individual development and their organisation's development. This implies greater awareness and promotion of e-learning's value through the dissemination of knowledge among SMEs as to the nature, possibilities and advantages of e-learning for workplace training, and as to the supply and appropriateness of e-learning services and products available. This also implies the presence of e-learning "champions", that is, credible and knowledgeable individuals both within (such as key employees) or outside the firm (such as local or regional development agencies, trade associations, business networks and e-learning providers).

Table 1: E-learning profile of the SME cases studied.

SME	Year of creation	Industry	Size (no. of employees) ^a	Technological intensity ^b	E-learning profile ^c
A	1971	footwear	150	low-tech	weak (III)
B	1909	pulp and paper	280	low-tech	average (II)
C	1994	oil and gas	480	medium-low	strong (I)
D	1925	pulp and paper	485	low-tech	strong (I)
E	1993	computer applications	65	high-tech	average (II)
F	1961	corrugated containers	200	low-tech	weak (III)
G	1942	peat moss	75	low-tech	none (IV)
H	1978	lumber	400	low-tech	none (IV)
I	1991	aerospace (components)	200	high-tech	weak (III)
J	1964	textile (carpets)	350	low-tech	weak (III)
K	1987	automotive (parts)	300	medium-high	strong (I)
L	1995	oil and gas	300	medium-low	strong (I)
M	1992	computer applications	60	high-tech	average (II)
N	1976	pharmaceutical	170	high-tech	none (IV)
O	1990	food	220	low-tech	average (II)
P	1978	home appliances	70	medium-low	none (IV)

^afollowing North American research (Mittelstaedt, Harben and Ward, 2003; Wolff and Pett, 2000), a small enterprise (SE) is defined as having 20 to 99 employees, whereas a medium-sized one (ME) has 100 to 499.

^bfollowing the classification of the OECD (2003).

^cregrouping the 16 SMEs into four profiles on the basis of their knowledge and use (depth and breadth) of e-learning

Table 2: Characteristics of the training process in the SMEs studied.

E-learning profile	Profile I (strong)				Profile II (average)				Profile III (weak)				Profile IV (none)			
SME	C	D	K	L	B	E	M	O	A	F	I	J	G	H	N	P
Training process																
Personnel trained by e-learning	x	x	x	x	x	x	x		x	x	x	x				
management & office personnel	x	x	x	x	x	x	x	x	x	x	x	x				
operation & production personnel	x	x	x	x	x	x	x	x	x	x	x	x				
Perceived benefits of e-learning																
flexibility and accessibility	x	x	x	x		x	x		x	x	x	x	x	x	x	x
modularity			x			x										
rhythm	x		x	x		x				x	x	x	x			
privacy and autonomy		x									x					
interactive feedback		x	x				x									
cost		x	x				x		x		x	x	x	x	x	x
learning style	x	x	x	x	x		x				x					
evaluation	x	x	x	x		x										
distribution of training materials		x			x			x								
uniformity	x	x		x								x				
Perceived barriers to e-learning																
access difficulty (bandwidth)		x			x						x	x	x			x
training and support					x			x	x	x	x		x			
courses and content					x		x			x	x		x	x	x	x
interaction		x	x													
learner-related (computer skills)	x			x	x		x			x		x				
cost and financing	x	x		x	x	x		x		x		x				
Identification of training needs																
holistic	x	x	x	x		x	x				x	x				
formalisation and rigour	+	+	+	+	+-	+	+-	+-	+-	-	+-	+-	-	-	-	-
learning management system use	x			x												

Table 2 (cont.): Characteristics of the training process in the SMEs studied.

E-learning profile	Profile I (strong)				Profile II (average)				Profile III (weak)				Profile IV (none)			
SME	C	D	K	L	B	E	M	O	A	F	I	J	G	H	N	P
Training process																
Training methods used																
Affirmative methods																
lecture	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
presentations and discussions		x	x				x					x		x		
conferences and seminars	x	x	x	x			x			x						
job rotation									x							x
coaching								x	x		x	x				
exercises and applications			x		x					x	x	x				x
Interrogative methods																
computer-based training	x			x	x						x					
Active methods																
case studies		x										x				
role playing		x							x							
simulation and gaming	x			x												
"learning by doing"	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Training tools used																
Visual tools																
blackboard / overhead projector	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x
lecture notes	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x
explicative documents					x			x	x		x	x			x	x
Audiovisual tools																
slide show	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x
film		x			x			x	x							
video tape recorder		x			x			x	x							
Interactive tools																
computer	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x
courseware	x			x	x	x					x					
simulator	x			x												
multimedia	x	x	x	x	x	x	x	x	x	x	x	x				
Level of evaluation																
1 - reaction (satisfaction)	x	x	x	x	x	x	x	x	x	x	x				x	x
2 - learning	x	x	x	x	x		x		x	x	x	x			x	
3 - behaviour	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
4 - results	x	x		x	x				x		x		x		x	
Who evaluates																
trainer	x	x	x	x	x				x	x	x	x		x		x
supervisor	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
manager	x	x		x						x	x	x				
Moment of evaluation																
before training	x			x												
during training	x		x	x						x						x
after training	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Evaluation tools used																
questionnaire	x	x	x	x	x	x	x	x	x	x	x	x			x	x
test of knowledge	x	x	x	x	x		x		x	x	x	x			x	
observation	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x
skill test (equipment)		x	x						x							x
evaluation report	x	x		x				x		x	x				x	
evaluation checklist	x	x		x				x								
through e-learning	x	x	x	x	x	x										

A second pre-requisite mentioned by the respondents is the necessity to lower the present barriers to the efficient and effective use of e-learning by SMEs. This implies that employees possess the computer knowledge and skills required to use e-learning effectively, and that they be provided with e-learning software that is user-friendly and appropriate to the task at hand. This also implies better management and technical support of employees with regard to e-learning, support which was found lacking in a number of SMEs. This could be done through e-learning information and decision support tools made available to SMEs, allowing them for instance to explore the supply of e-learning products and services available and find the ones that best fit their specific training needs. Another barrier that is often mentioned by SMEs in rural or more remote areas is the lack of access to high-speed Internet. In this regard, regional initiatives are being developed to provide such access to most SMEs, and to their employees at home, whatever their location.

5 IMPLICATIONS

By empirically confronting the actual use of e-learning in SMEs with the specific training and development problems faced by these firms, and within their training process in particular, this study has taken a contingent and descriptive mode of theorising rather than the universalistic ("one best way") and prescriptive ("best practices") one that has been prevalent to date. Given the intrinsic limitations of case study research, added investigation along these lines, both intensive (e.g., case studies and action research on e-learning adoption and implementation) and extensive (e.g., surveys of e-learning use, including the service sector) is needed to further justify and specify the contingency argument. From a resource-based view, this could be done by conceptualizing and measuring the "strategic alignment" of e-learning technology, and evaluating the performance outcomes of this alignment.

Owner-managers and HR managers may use the results of this study to evaluate and compare their firm's situation, and thus gain insight with regard to training and e-learning. Regional development agencies and other stakeholders may also use these results to revise and refine their plans and actions to support the development of SMEs through e-learning. This technology may yet achieve its potential if managed and used wisely by SMEs.

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