



Developing of a collaborative learning environment through technology enhanced education (TE3) support

Robert J. Harris

*Institute of Innovation and Enterprise,
University of Wolverhampton Business School, Wolverhampton, UK*

Abstract

Purpose – The purpose of this paper is to report on the development of a knowledge transfer project, part funded through TE3, designed to encourage innovation and improve the capability of SMEs in the West Midlands region of the UK. Knowledge is critical to developing competency within small businesses and managers that understand how their customers behave and translate that insight into innovative products/services are more likely to succeed.

Design/methodology/approach – Adopting an action research methodology, the paper aims to describe the TE3 funding process and address the effectiveness of a project designed to overcome some of the contextual issues relating to the development of SME capability through technology supported learning. It describes the development of a knowledge transfer framework (The Collaborative Learning Environment) designed to specifically target the needs of SMEs.

Findings – Firms that efficiently tap into all relevant sources of knowledge are likely to thrive, whilst those that cannot may struggle. However, an obstacle to SME development is often an inability to access technical and business knowledge. The Technology Enhanced Enterprise Education (TE3) initiative was found to provide a solution to this problem by funding the development of technology supported learning solutions delivered through a collaborative network of UK Higher Education Institutions

Originality/value – The paper outlines a proposal for a collaborative learning environment. This model will provide value to designers of virtual learning environments and funded support providers.

Keywords Knowledge transfer, Learning, Small to medium-sized enterprises, United Kingdom

Paper type Research paper

Introduction

Limited resources are a distinguishing characteristic of small and medium sized companies (SMEs) and a barrier to the development of their competitive capabilities but they do, however, possess counter-balancing advantages. They are usually more entrepreneurial and willing to experiment and innovate in terms of business models and operations than larger organizations with established hierarchies. Government initiatives that aim to increase the “e-readiness” of SMEs with respect to learning can contribute towards a higher level of entrepreneurship and competitiveness in this crucial sector. Enterprise skills will also be useful to those who will become

The TE3 Project is managed by Dr Kelly Smith, Department of Geography, Birmingham University, whose input and support has been extremely valuable in the compilation of this paper



self-employed and work on a freelance or consultancy basis. Hegarty (2006) argues that enterprise and entrepreneurship are learned phenomena and that through the application of technology supported learning universities can play a vital role in encouraging and providing opportunities for enterprise to flourish (Gibb, 2005). The delivery of effective learning by universities, through technology supported platforms is imperative since technologies, markets and competitive situations are changing rapidly and unpredictably (Snyder and Cummings, 1998). The need for change and improvement has become increasingly associated with organisational learning (Lee *et al.*, 2000). Organisations must be capable of learning from their experiences and of disseminating tacit knowledge, if they are to respond to emerging conditions (Hendry, 1996). However, SMEs frequently regard training as a somewhat peripheral, limited, and at times easily neglected activity. It is important that these attitudes are changed and that they view the facilitation of learning within their organisation as a key element in organisational change (Lee *et al.*, 2000). Technology should be viewed as a conduit for learning which can lead to effective change and improved business performance (Pollard and Hayne, 1998).

The success of the SME sector will relate, in some respects, to its ability to remain competitive and to satisfy consumer needs and demands, within its characteristically turbulent environment. Organisational implementation of new technologies and electronic commerce in particular, can aid SMEs in coping with their operational environment and can provide numerous organisational opportunities (Turban *et al.*, 2000; McDonagh and Prothero, 2000). However, they are not effective in their exploitation of electronic resources and are weak in their provision of training in the area. Indeed, SMEs have traditionally been identified as weak across the training continuum, ranging from the identification of training needs to the sourcing and implementation of training interventions and finally, to the evaluation of training provisions (Martinsuo and Jarvenpaa, 1998, Kitching, 1999). Hence, electronic training provisions targeting owner/managers must be considered within this context.

Boddy (cited in Wagner, 2003) believes that partnering with other organisations and institutions stimulates learning and brings about tangible business benefits such as reduced costs and improved efficiency to the organisations involved. Direct interaction between partner organisations allows both partners to observe the operational practices used by the other and thus facilitate experiential learning, a factor that is essential for knowledge transfer. Cavusgil *et al.* (2003), in recent studies of manufacturing and service organisations concluded that tacit knowledge could be obtained from partner organisations due to their frequent and close interactions. Indeed, it seems that the degree of interaction between partner organisations and the level at which the partnership agreement is tied is key to the overall success of the collaboration. To be successful, collaborative partnerships need to have a degree of interdependence that benefits all the partners involved.

The implementation of technology supported learning can help SMEs to develop the skills to cope with their operational environments. However, current literature suggests that they are not effective in their exploitation of the channel due to a lack of understanding and mistrust of vendors. Clearly this is an important nut to crack since providing owner/managers with direct access to information and knowledge is of primary importance in facilitating their growth and development. Knowledge is a highly valuable asset. Organisations that understand their customers and can

effectively focus this capability into quality products and value added services, have a significant advantage in the marketplace.

Research for this paper identified an increasing demand for informal learning support and mentoring by owner/managers and this raises issues regarding the quality of content provision. Success will be dependant on content providers supplying appropriately focused material that is aligned to the needs of SMEs. Ratings are increasingly becoming available so that learners are more able to discern which material is appropriate for their needs. Inevitably the importance of context in relation to the value of content will be heightened. Many managers involved with this TE3 project complained of being overwhelmed with "information overload" much of which was of limited use to them. There is a need for knowledge transfer to have relevance and context. The ability for learners to contribute to this process through an asynchronous collaborative learning environment is acknowledged.

Objectives

Adopting an action research methodology, the aim of this paper is to describe the TE3 funding process and address the effectiveness of a TE3 funded project developed by The University of Wolverhampton to overcome some of the contextual issues relating to the development of SME capability through technology supported learning. The primary objective is to describe the development of a knowledge transfer framework (The Collaborative Learning Environment) designed to specifically target the needs of SMEs. Most of the learning frameworks that have been developed to date have been designed to meet the needs of large organisations. The reason for this is that larger businesses remain at the forefront of championing and accomplishing knowledge transfer/management. The goal of the University of Wolverhampton's TE3 project is to create a framework that effectively blends online and offline support and is heterogeneous, focusing provision on the specific developmental needs of individual owner/managers.

The Technology Enhanced Enterprise Education (TE3) initiative

In 1999, a network of twelve Science and Enterprise Centres (SECs) were set up in UK Universities to promote the teaching and practice of commercialization and entrepreneurialism in science and technology (Office of Science and Technology, 2002). A further SEC, the Mercia Institute of Enterprise (MIE) was launched in 2001 and now comprises a consortium of 12 Higher Education Institutions with the common objective to promote enterprise and entrepreneurship in the West Midlands of the United Kingdom (Mercia Institute of Enterprise, 2005). One of the main areas of activity for the MIE is the teaching of enterprise and entrepreneurship within higher education. The Technology Enhanced Enterprise Education initiative (TE3) forms a major part of this activity and consists of a community of enterprise educators with an interest in the use of learning technologies. It was set up and supported in order to embed enterprise education into the curriculum across a range of subject areas and to link into the development of the capabilities of owner/managers through integration with regional SMEs.

TE3 processes and procedures are based on those developed by Birmingham University (founder of the initiative) for general e-learning and enhanced learning projects, adapted where appropriate for enterprise-related learning. Changes in procedure are agreed by the steering group at quarterly meetings and are entered into a

project specification document which acts as a working constitution. The first version of the project specification document was created, based on one-to-one discussions with key contacts at each of the partner institutions, before the TE3 project formally commenced thus taking into account the needs and aspirations of educators and their institutions.

Each of the 12 university and university college partners are able to apply for funding for institutional projects, up to £10,000 per financial year, to produce on-line materials, tasks, and activities linked to an accredited module of study.

TE3 is led by Dr Kelly Smith who reported that the first and main requirement of TE3 projects, is that the materials developed must be “technology enhanced”, or usable through and with a virtual learning environment (VLE). A recent survey of UK HEIs conducted by McKeown *et al.* (2006) showed that 32 per cent of pre-1992 (old) responding universities and 52 per cent of post-1992 (new) responding universities used technology to support enterprise education programmes of study. The most common type of learning technology used is a VLE which, for example, can provide opportunities for self-directed learning, formative assessment, and discussion tasks. However, these VLEs are frequently designed to be exclusive rather than inclusive and prohibit collaborative input from non-institutional partners.

Within TE3, there is a strong emphasis on the need to develop tasks and activities rather than simply provide lecture notes and links to further resources on the web. The benefits of web-based learning and discussion activities, has recently been confirmed by a project in Northern Ireland run by NICENT (Hegarty, 2006). In the study, students reported benefits such as the ability to learn at their own pace, to learn independently, and to have fun; they specifically reported a preference for interactive computer simulations and video clips of entrepreneurs’ experiences. Educators also gave positive feedback and felt that their learners would enjoy learning from e-learning as it was different from normal lecture-based learning opportunities. Use of communication tools within VLEs can also improve learning relationships between the tutor/mentor and participant/manager, and between student peers as they become a member of a knowledge community or community of practice (Ramsey, 2003).

The second main requirement for TE3 projects, to be linked to accredited modules, ensures that the materials will be embedded into the curriculum and used by specified cohorts. This is intended to help avoid issues experienced by previous enterprise initiatives which have been criticised as not being sustained and embedded. From a practical perspective this requirement facilitates the personal development of employees within SMEs.

It is acknowledged that significant barriers to the uptake of learning technologies include lack of time and lack of training/skills (Haywood *et al.*, 2000; Davies and Smith, 2006; Hegarty, 2006). Staff time required to complete the project and the need for training to fill skills gaps are recognized as critical to the success of TE3 projects and are funded accordingly. Project managers apply for funds to buy out staff time, buy in expertise from outside their faculty or department, to provide training for the project team, or to purchase specialist software. Note that although TE3 would fund the purchase of special software, the institution must commit to continued support for ongoing costs such as annual licensing outside the funding period of the project to ensure sustainability and continuation once TE3 funds have been spent.

ET
50,8/9

The TE3 community

TE3 provides funds to develop materials and enhance enterprise education through the use of learning technologies in partner higher education institutions (HEIs) of the MIE in the West Midlands, UK. The MIE and TE3 partners are: Aston University, University of Birmingham, University of Central England in Birmingham (UCE), Coventry University, University of Keele, Open University, Staffordshire University, Warwick University, University of Wolverhampton, University of Worcester, Harper Adams University College, and Newman College.

678

In addition to face to face events such as Open Days, enterprise and consultant academics are supported by access to the TE3 website and an electronic mail-list, which announces new projects, flags when new materials are ready for download, and advertises workshops and other events related to enterprise education.

Since its creation in August 2003, over 13,000 participants across the region have been registered to learn about enterprise through the on-line content, tasks, and activities developed with TE3 funds and over 500 members of academic and academic-related staff have been involved with TE3. Staff involvement has included those developing or piloting enterprise materials, members of TE3 mail lists, attendees at TE3 events, and those who have requested a materials account. The spirit of the initiative is that all partner institutions fully collaborate and share unfettered use of all material developed. This allows maximum value to be extracted from the initiative and has enabled the pooling of expertise to develop specific solutions for organisational development. Feedback from partners has been positive and commitment has been solid throughout the life of the initiative and a second phase of development of TE3 is planned for 2007. As a result of this requirement to share, TE3 has a suite of standards compliant e-learning materials and reusable learning objects available for partner institutions to download from the TE3 web site into their own learning platforms, to adapt, and to use freely and without restrictions with their own learners and for research purposes. The types of materials available include single file resources such as electronic paper and video case-studies, animations of enterprise concepts and tools, financial spreadsheet tools, self-assessment quizzes, reflective questions for use in on-line discussion boards, and more complex learning packages taking students through a body of structured information and tasks on a particular topic as part of a unit of study or a whole module. All TE3 materials are available via a dedicated learning content repository.

TE3 case project – the collaborative learning environment

TE3 funding was secured by The University of Wolverhampton to develop a learning framework, designed specifically to facilitate the transfer of knowledge between learning providers and SME owner/managers. It is envisaged that this framework will subsequently be developed through further funding, to facilitate European engagement. Through the initial £10,000 funding allocation, four modules of entrepreneurial marketing support were developed to populate the framework and have been piloted amongst SME participants in the UK West Midlands region and in the Netherlands. Crucial to the success of the project was the choice of an effective framework, which was the subject of the initial research

Knowledge management frameworks

A number of knowledge management frameworks have been developed but the definition remains rather vague. It is often used as a broad term encompassing different constituents, elements, and targets. A framework of collaborative support may offer the most effective route for supporting the development of marketing capability within SMEs. A framework can be defined as a set of basic assumptions or fundamental principles of intellectual origin that supports the basis for discussions and actions (Popper, 1994). Therefore, a structure or set of underlying principles can be assumed to be crucial to the understanding of management capability and the associated transfer of knowledge, but in addition it is also needed to provide a theoretical foundation for executing and performing it. This is supported Rubenstein-Montano *et al.* (2001), who suggest that knowledge management frameworks are characterised by their role as overseer or provider of guidance for the discipline. They purport that frameworks steer work in a discipline and provide guidance for how knowledge transfer should be implemented. Dale (1999) defined a framework as a means of developing and presenting plans, guiding firms to execute an appropriate course of action at a pace that suits their business situation and resources. Essentially a framework is, therefore, an effective mechanism to secure a link between theory and practice assisting SMEs to engage in the knowledge transfer process and further develop their capability. From a theoretical perspective there are key pillars that underpin the framework. These include:

- *Tacit and explicit knowledge repositories.* SMEs contain huge silos of tacit knowledge but commonly fail to convert it into explicit knowledge. The two categories are located at different ends of the knowledge spectrum with disparate characteristics. Tacit knowledge is solely created by human beings whereas explicit knowledge can be acquired from documented sources. Underpinning the Collaborative Learning Environment, is the notion that face-to-face conversations and group meetings are better for transferring the former, whereas shared databases and groupware are more appropriate for the latter. Goh (2002) suggested that tacit knowledge required a more interpersonal and less structured means of transfer but explicit knowledge needed a more technologically driven and structured process. Rubenstein-Montano *et al.* (2001) purported that “tacit knowledge cannot be treated in the same way as explicit knowledge is treated”. The major implication of these two perspectives of knowledge is that each of them requires a different strategy or means of management. Hence, they should be clearly delineated in the framework in order to inform organisations of the need to address both of them.
- *Technology and people focus.* Underpinning the Collaborative Learning Environment is the fact that both technology and people play a vital role in the development of an SMEs capability. It is therefore, important that the framework provides a balanced view between a technological and a social focus on knowledge development and management. If this issue is inadequately addressed, there may be an inherent tendency for practitioners to take an overly narrow approach towards learning and development. Most technologically driven approaches have failed for example, largely because they ignored the people issues related with knowledge sharing (Carter and Scarbrough, 2001). IT is not equivalent to knowledge management (Lang, 2001). It is a good enabler for transforming data into information, but on the other hand, it is poor at converting information into

knowledge (Bhatt, 2001). It is certainly capable of transferring vast amounts of information by removing time, space and location barriers. However, if people are not motivated to share their knowledge, it is very unlikely that they will use IT as a knowledge sharing tool (Hendricks, 1999). Clearly, technology is an enabler. Focusing exclusively on it may bring about improvements and changes in the way that an organisation manages knowledge, but it will not help to sustain the learning effort. Unquestionably, human systems, organisational culture, value and norm, employees' motivation and willingness, and other soft issues must be considered in order to realise the full potential of SMEs. It is best accomplished through the optimisation of both the technological (hard) and human (soft) systems (Gao *et al.*, 2002). Essentially, SMEs need to be aware of this aspect, if they want to ensure their successful development.

- *Knowledge enabling group.* This component deserves significant attention since a vital element for introducing any new initiative to develop SME capability is to have championship or ownership. A group must be accountable for knowledge development and management on behalf of the organisation. Focus groups conducted for this project with sixty owner/managers established a preference for a university to represent an enabling group, who would be responsible for planning, organising, coordinating and managing the learning effort in a structured way but which may also involve an owner/manager and external mentor. Craig and Jutla (2001) suggested that one of the more useful mechanisms for transferring knowledge and innovation to the SME sector is through distribution channels such as university business schools and associated networks. These provide pertinent e-business development skills at very low cost to SMEs. The University of Wolverhampton has a key enabling role in the development of the Collaborative Learning Environment through its Institute of Innovation and Enterprise (IIE). The Institute was created in 2004 with a remit to centralise the innovation and entrepreneurship activities of the University's students and staff, and external partners/SMEs. To achieve this aim it is part funded through a project known as the Integrated Innovation Initiative (I3) which is funded by Advantage West Midlands, the Regional Development Agency. IIE actively engages external mentors and business advisors who provide direct support to SMEs on a match funded basis. This significantly minimises the cost of support to SMEs taking participating in the pilot phase. In the longer term IIE will continue to act in an enabling capacity and will be responsible for undertaking a monitoring role. Feedback responses will be filtered into the development process where appropriate as part of an ongoing process of action research.

An important cornerstone for the development of capability is to assess the knowledge base of individual organisations in order to obtain an understanding and overview of their current state of capability. This process is also referred to as a capability audit or knowledge audit (Liebowitz *et al.*, 2000) and is critical to reveal the strengths and weaknesses of an organisation's knowledge assets as well as the performance of its knowledge related activities, practices and capabilities. It also allows organisations to discover what knowledge requirements and key management problems need to be addressed. The assessment should comprehensively involve an examination of a firm's

competitors, markets, customers and external environment. In contemporary market places owner/managers need to understand their competitor's capability, where their markets are heading and what benefits their customers seek. Through an assessment audit, a company will be able to ascertain its current knowledge performance, determine key knowledge requirements and identify needs and opportunities to further develop marketing capability. To be effective support should be aligned to an organisation-wide strategy and drive in order to ensure consistency and continuity. It has been asserted that a strategy for the development of capability and knowledge should be formulated to support and serve the overall business strategy, not vice versa (Horwitch and Armacost, 2002).

Motivating employees to seek knowledge from other people or sources, and to offer their own knowledge to the organisational base is also crucial to achieve effective networking. A reward and recognition scheme for those employees who exemplify knowledge related behaviours could help to achieve this and it is critical that a process of monitoring is periodically undertaken. Companies need to know how effective the initiatives they are implementing are. Approaches to measuring and monitoring performance can range from carrying out an employee feedback survey to performing a detailed quantitative study (Wiig, 1999). In essence, measuring the performance of the effort of SMEs is crucial so that appropriate follow up action can be taken where and when necessary.

- *Tools and techniques.* New to knowledge development is the phenomenal growth of various technologies that facilitate and support it (Binney, 2001). Currently, there are many technologies and tools being used to manage knowledge in an organisation. As asserted by Davenport and Volpel (2001), "The technology for developing and managing knowledge is not a single technology, but rather a broad collection of technologies that needs to be adopted and integrated". Databases such as a knowledge repository, base, inventory or warehouse are common in the literature. Their function is to store knowledge in electronic format and make it available to organisational members. Collaborative tools such as groupware, electronic discussion forums, electronic meeting systems and messaging facilitate human interaction. In fact, groupware has been defined as an umbrella term used to describe the various electronic technologies that support human collaboration (Coleman, 1999). Collaborative tools provide a platform for individuals to share knowledge, establish dialogues, and exchange ideas and perspectives. They help to expand individual networks and create linkages with other people, which is crucial for an innovative knowledge sharing enterprise. It is important to recognise that the adoption and implementation of these measures should be undertaken progressively, based upon the resources available within SMEs. Firms may, for example, start with measures which are less costly or easy to implement such as establishing collaborative teams, job rotation, mentoring, and later advance to the adoption of work flow automation systems, expert and intelligent systems or e-learning tools.

The collaborative learning environment structure

At the heart of the framework is a web portal. Owner/managers interviewed for this research indicated a willingness to engage with online support mechanisms if they were pertinent to their business, easy to administer and content rich. Respondents

perceived that their increased use of online content could lead to increased marketing effectiveness. However, it was felt important that the integrity of any business information provided is maintained, in order that employees could make good decisions from the aggregation of information. Supporting these findings, a recent survey by Clark (2003) found that respondents from a raft of industries were enthusiastic towards the concept of technology driven collaborative learning and employee development. E-tutored collaborative learning with active moderation and intervention by a mentor or tutor was perceived to be the preferred route to learning by the owner/managers Clark questioned, whilst threaded discussion forums, a less mediated form of collaboration scored lower. This confirms the importance of expert intervention in the collaborative framework. Virtual classrooms were perceived to have only moderate benefits to SMEs, confirming the notion that simply putting a classroom online is not leading the way of future collaborative learning. Email ranked highly as an effective form of knowledge transfer and by volume alone is the single most important method of getting knowledge from one person to another. However, it is so embedded in everyday business practices that it is often not regarded as a form of online learning. Perhaps this may be its strength (Clark, 2003).

A significant driver for the Collaborative Learning Environment is the belief that a framework approach to support is the most appropriate, and particularly through the identification of owner/managers preferences for a blended learning approach to marketing support that is fundamentally inclusive. This has been used as a basis for the project, at the heart of which is a web portal. The pilot portal was initially developed using open source software and adopted an extranet format, allowing members to both view, download, and upload information. This effectively ensures that communication flows are multi-directional. The virtual elements of the project are all delivered through this website. Although content and functionality are key framing concepts, during the testing phase not all features are available to members. The main brief for the development of the web portal is that it is an intelligent portal that can seamlessly connect individuals, groups, and knowledge repositories. This facilitates the network, enabling members to take advantage of relevant information across a range of business and educational disciplines to help them learn more efficiently and develop their capabilities. Information from various systems is focused via one collaborative learning environment through single sign-on and application integration capabilities.

The portal aggregates, organises, and searches information so that users can find relevant information and support quickly. Personalisation of portal content and layout, and audience targeting enables information to be published to the right groups of individuals and members at the right time. The portal is secure, scaleable, and integrated into the Microsoft Windows and Office environment in order to have relevance to both owner/managers of SMEs, students and academics alike.

The core benefit of the collaborative environment is the interaction between learners and knowledge providers who can easily upload materials to their own area within the portal using a suite of tools provided. This repository of information is used in conjunction with online forums, web logs, web quests, and participant support groups in order to facilitate collaboration in the learning process. Added value is achieved through other online and offline services (outlined in Figure 1). The principle objective of the collaborative learning environment is that it provides a conduit to engage

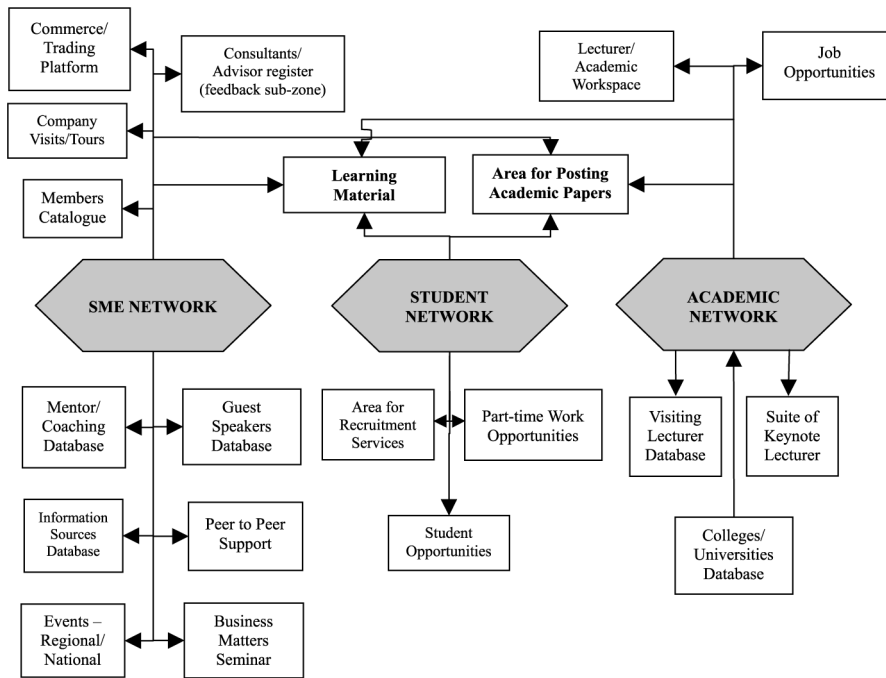


Figure 1.
The CLE components

academics, students and small businesses with the common goal being the support and development of capability amongst SMEs who are resource critical.

Conclusion

The TE3 initiative has demonstrated that enterprise academics can work together across institutional boundaries to develop a pool of expertise and resources that each can add to and can draw from. Academics and educators from a variety of institutions have demonstrated enthusiasm for their materials to be used by others, and several have collaborated in cross-institutional material production with each partner bringing their own particular expertise to the project. Campbell (2003) purports that social, practical, and cultural factors can impact on engagement with sharing. TE3 processes, procedures, and incentives are therefore likely to have contributed to the formation of a supportive community, particularly as these have been negotiated by key contacts at each institution promoting a culture of ownership and engagement from the start. From these formal processes, more informal aspects of Wenger's (2002) communities of practice have evolved, including sustained mutual relationships and shared ways of engaging in doing things together.

As part of the TE3 evaluation process, several projects reported improved linkages with small firms and linkages between academics and educators across the region that may not otherwise have arisen. TE3 processes may have stimulated the latter outcome in particular: the application forms for TE3 funds require project managers to identify opportunities for dissemination within and external to their institution and events have been organized to bring enterprise academics and educators together.

These findings have been reinforced through the University of Wolverhampton project, where TE3 has been highly successful and has provided the funding and expertise to develop the first phase of the Collaborative Learning Environment. A portal structure has been designed to offer a support mechanism that is highly collaborative and inclusive. This portal has been populated with four entrepreneurial marketing learning modules, which have received positive feedback from owner/managers, in both the UK and Holland. Synergy has been achieved through the meshing of online and offline support services and portal features between the three key target groups, enabling communication and interaction between owner/managers, academics/mentors, and students. This has provided considerable strength to the overall provision and there have been numerous examples of added value being achieved (for example several businesses have engaged students through the portal, to undertake cost effective market research for them).

Key to the projects success has been the wider input from partner institutions from within the Mercia Institute. Support and advice has been available from across the 12 partner universities/colleges, together with valuable insights from their own experiences. Access to their wide business network has also been available, which inevitably ensured strong awareness amongst the SME community.

Quality of information, learning, materials, and communications will be imperative to the growth of the project. From a front end perspective good navigation and frequent content refresh are critical factors that will contribute to the long term success of the portal, which effectively acts as the hub cementing the collaborative learning environment. However, from the research findings, it is apparent that the real success of the initiative for the primary target group – owner/managers, will be achieved through effectively binding the virtual elements and physical offline support. To achieve this aim it is envisaged that the primary collaborators will provide direct support to SMEs in a far more cohesive manner and consideration will be given to the finding that contemporary SME owner/managers prefer informal learning support that is focused on their actual business needs. For direct consultancy support, credible business advisors will be required to work with owner/managers, in order to ensure the quality and effectiveness of physical support provision.

References

- Bhatt, G.D. (2001), "Knowledge management in organizations: examining the interaction between technologies, techniques, and people", *Journal of Knowledge Management*, Vol. 5 No. 1, pp. 68-75.
- Binney, D. (2001), "The knowledge management spectrum – understanding the KM landscape", *Journal of Knowledge Management*, Vol. 5 No. 1, pp. 33-42.
- Campbell, L. (2003), "Engaging with the learning object economy", in Littlejohn, A. (Ed.), *Reusing Online Resources: A Sustainable Approach to E-learning*, Kogan Page, London.
- Carter, C. and Scarbrough, H. (2001), "Towards a second generation of KM? The people management challenge", *Education + Training*, Vol. 43 Nos 4/5, pp. 215-24.
- Cavusgil, S.T., Calantone, R.J. and Zhao, Y. (2003), "Tacit knowledge transfer and firm innovation capacity", *Journal of Business and Industrial Marketing*, Vol. 18 No. 1, pp. 6-21.
- Clark, D. (2003), "Epic survey 2003: the future of e-learning", available at: www.epicgroup.co.uk (accessed 20 September 2005).

- Coleman, D. (1999), "Groupware: collaboration and knowledge sharing", in Liebowitz, J. (Ed.), *Knowledge Management Handbook*, CRC Press, Boca Raton, FL, pp. 12:1-12:15.
- Craig, J. and Jutla, D. (2001), *eBusiness Readiness: A Customer Focused Framework*, Addison Wesley, Boston, MA.
- Dale, B.G. (1999), *Managing Quality*, Blackwell, Oxford.
- Davenport, T.H. and Volpel, S.C. (2001), "The rise of knowledge towards attention management", *Journal of Knowledge Management*, Vol. 5 No. 3, pp. 212-21.
- Davies, A. and Smith, K.J. (2006), "Drivers and barriers to the uptake of learning technologies: staff experiences in a research-led university", in O'Donoghue, J. (Ed.), *Technology Supported Learning and Teaching: A Staff Perspective*, Information Science Publishing, Hershey, PA.
- Gao, F., Li, M. and Nakamori, Y. (2002), "Systems thinking on knowledge and its management: systems methodology for knowledge management", *Journal of Knowledge Management*, Vol. 6 No. 1, pp. 7-17.
- Gibb, A. (2005), "Towards the entrepreneurial university: entrepreneurship education as a lever for change", Policy Paper No. 003, National Council for Graduate Entrepreneurship, Birmingham.
- Goh, S.C. (2002), "Managing effective knowledge transfer: an integrative framework and some practice implications", *Journal of Knowledge Management*, Vol. 6 No. 1, pp. 23-30.
- Haywood, J., Anderson, C., Coyle, H., Day, K., Haywood, D. and Macleod, H. (2000), "Learning technology in Scottish higher education – a survey of the views of senior managers, academic staff and 'experts',", *Association for Learning Technology Journal*, Vol. 8 No. 2, pp. 5-17.
- Hegarty, C. (2006), "It's not an exact science: teaching entrepreneurship in Northern Ireland", *Education and Training*, Vol. 48 No. 5, pp. 322-35.
- Hendricks, P. (1999), "Why share knowledge? The influence of ICT on the motivation for knowledge sharing", *Knowledge and Process Management*, Vol. 6 No. 2, pp. 91-100.
- Hendry, C. (1996), "Understanding and creating whole organisational change through learning theory", *Human Relations*, Vol. 49 No. 5, pp. 621-41.
- Horwitch, M. and Armacost, R. (2002), "Helping knowledge management be all it can be", *Journal of Business Strategy*, Vol. 23 No. 3, pp. 26-31.
- Kitching, J. (1999), "Training provision and the development of small and medium sized enterprises", *International Small Business Journal*, Vol. 17 No. 2, pp. 101-4.
- (The) Knowledge Management Methodology Team, Liebowitz, J., Rubenstein-Montano, B., McCaw, D., Buchwalter, J., Browning, C., Newman, B. and Rebeck, K. (2000), "The knowledge audit", *Knowledge and Process Management*, Vol. 7 No. 1, pp. 3-10.
- (The) Knowledge Management Methodology Team, Rubenstein-Montano, B., Liebowitz, J., Buchwalter, J., McCaw, D., Newman, B. and Rebeck, K. (2001), "A systems thinking framework for knowledge management", *Decision Support Systems*, Vol. 31 No. 1, pp. 5-16.
- Lang, J.C. (2001), "Managerial concerns in knowledge management", *Journal of Knowledge Management*, Vol. 5 No. 1, pp. 43-59.
- Lee, G., Bennett, D. and Oakes, I. (2000), "Technological and organisational change in small-to-medium sized manufacturing companies: a learning organisation perspective", *International Journal of Operations & Production Management*, Vol. 20 Nos 5-6, pp. 549-71.
- McDonagh, P. and Prothero, A. (2000), "Euroclicking and the Irish SME: prepared for e-commerce and the single currency", *Irish Marketing Review*, Vol. 13 No. 1, pp. 21-33.

- McKeown, J., Millman, C., Sursani, S.R., Smith, K. and Martin, L.M. (2006), "UK graduate entrepreneurship education in England, Wales, and Scotland", Working paper 017/2006, National Council for Graduate Entrepreneurship, Birmingham.
- Martinsuo, M. and Jarvenpaa, E. (1998), "Development and challenges of small and medium sized enterprises", *Industrial Management, Work and Organisational Psychology*, Helsinki University of Technology, Helsinki.
- Mercia Institute of Enterprise (2005), *Annual Report: October 2004- September 2005*, University of Warwick, Coventry.
- Office of Science and Technology (2002), *Science Enterprise Challenge*, available at: www.ost.gov.uk/enterprise/knowledge/sec.htm (accessed September 2006).
- Pollard, C.E. and Hayne, S.C. (1998), "The changing faces of information system issues in small firms", *International Small Business Journal*, Vol. 16 No. 3, pp. 70-87.
- Popper, K.R. (1994), *The Myth of the Framework: In Defence of Science and Rationality*, Routledge, London.
- Ramsey, C. (2003), "Using virtual learning environments to facilitate new learning relationships", *International Journal of Management Education*, Vol. 3 No. 2, pp. 31-41.
- Snyder, W.M. and Cummings, T.G. (1998), "Organisational learning disorders: conceptual model and intervention hypotheses", *Human Relations*, Vol. 51 No. 7, pp. 873-95.
- Turban, E., Lee, J., King, D. and Chung, M. (2000), *Electronic Commerce: A Managerial Perspective*, Prentice Hall, Englewood Cliffs, NJ.
- Wagner, B.A. (2003), "Learning and knowledge transfer in partnering: an empirical case study", *Journal of Knowledge Management*, Vol. 7 No. 2, pp. 97-113.
- Wenger, E., McDermott, R. and Snyder, W.M. (2002), *Cultivating Communities of Practice*, Harvard Business School Press, Boston, MA.
- Wiig, K.M. (1999), "Introducing knowledge management into the enterprise:", in Liebowitz, J. (Ed.), *Knowledge Management Handbook*, CRC Press, Boca Raton, FL, pp. 3:1-3:41.

Corresponding author

Robert J. Harris can be contacted at: r.j.harris@wlv.ac.uk

To purchase reprints of this article please e-mail: reprints@emeraldinsight.com
Or visit our web site for further details: www.emeraldinsight.com/reprints

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.