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A Model for E-learning Integration

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Abstract: As yet there is no comprehensive theory to inform how the various elements of e-learning environments, such as design, implementation and delivery can be understood and optimised. A major study of the introduction of e-learning into the Australian Army has allowed a preliminary grounded theory model to be developed. This model identifies key factors, including organisational priorities, instructors' roles, learners' needs and the learning environment as contributing to an integrated e-learning culture. Furthermore, the study highlights that by accepting that e-learning environments are not value-free, it is possible to understand the competing priorities and discourses that influence how e-learning effectiveness is constructed and defined.

Introduction

Understanding e-learning effectiveness is problematic and contested due to the wide range of competing priorities and discourses across a range of education and training situations. Organisations which do not have training as their main purpose but rely on training to maintain a skilled and competent workforce have added difficulties in determining the variables that reflect training effectiveness due to the interactions of organisational, technological and learning factors. A recent literature review of e-learning effectiveness in workplace organisations (DeRouin, Fritzche, & Salas, 2005) also identified significant gaps, including the limited research available, the time lag between research and practice and inconsistencies in research approaches.

A review of the e-learning effectiveness research literature for this research indicated that there has been a resulting dichotomy of approaches to understanding e-learning effectiveness. Firstly, the technological determinist approach that measured how using educational technologies impacts on training outcomes, including studies of cost effectiveness, comparative media outcomes and benchmarking. Discussions in the literature of the relevance and difficulties of measuring e-learning outcomes included problems in isolating and controlling variables in training situations (Strother, 2002) and in balancing different stakeholder perspectives of what is considered valuable (Reeves & Carter, 2001). The second type of research approach was socio-technical which included studies of using technologies to support social constructivist pedagogies which were promoted largely in the higher education sector using Web-based course delivery. These studies focussed on examining, measuring and improving online interactions and collaboration events. However, research in the vocational education and training sector has identified considerable pedagogical conflicts where e-learning delivery does not match assumptions that underpin constructivist learning designs (Bate, Robertson, & Smart, 2003; Brennan, 2003). The resulting contention between intent and experience of e-learning has been termed "a type of organisational schizophrenia" (Welle-Stran & Thune, 2003). The subjectivity associated with effectiveness was also mentioned by many authors researching e-learning in training situations (Brennan, 2003; Calder, 2000; Cashion & Palmieri, 2002), for example: "This concept is difficult to tie down. One person's effectiveness is another person's failure" (Brennan, 2003, p.18). However, this study proposes that rather than interpreting these contentious situations as indicators of complexity they indicate that it is more relevant to consider the influences of the organisational culture on the experiences and perspectives of e-learning effectiveness in an organisation.

The Australian Army is a large dispersed organisation that has experience of using e-learning and the Army's Training Technology Centre (TTC) has produced over fifty stand-alone multimedia CD-ROM learning packages since 2000. The field data collection period for this study was from 2004 to 2005. Over this period the predominant e-learning delivery method used in the Army was delivering CD-ROM packages over local area

networks in Regional Training Centre (RTC) classrooms, facilitated by an instructor. 'E-learning' in this article refers to the use of the Army's CD-ROM developed courses.

Methodology

This article presents current findings of an ongoing study that asks:

- What factors influence effective e-learning in the Australian Army?
- How does this understanding inform the improvement of e-learning effectiveness in this organisation?

To address these research questions it was necessary to use an approach that allowed the emergence of factors that were important to the respondents and the development of a model. Thus, the chosen epistemology for this study was interpretivist as understanding the perspectives of stakeholders of e-learning design within the context of the Army was required. As there are insufficient research studies with a theoretical basis to use to form hypotheses, an inductive Grounded Theory (Glaser & Strauss, 1967) approach was selected as the appropriate methodology on which to base this research. To gain a depth of understanding of the social phenomena and processes influencing e-learning in the organisation, qualitative research methods were used.

Gaining access to soldiers involved negotiations between the researcher and staff in the Army's Training Command. Data collection periods involved working within Army training schedules to minimise any disruption to operations during 2004 to 2005. The selection of respondents in the case study followed the tenants of "theoretical sampling" described in Grounded Theory (Glaser & Strauss 1967, p. 47). The research focussed on the e-learning modules of an all-corp promotion e-learning package for the 'Subject One Corporal' course which has been running for about five years. Respondents included past and present senior training managers, training centre managers, instructors, reserve soldier trainees, permanent soldier trainees, e-learning instructional designers and course developers. Data collection also included Army policy documents, internal reports, pre and post course trainee questionnaires, observation and participation in e-learning classes and in Army organised post-course trainee focus groups.

This data was collected and analysed using the tenents of Grounded Theory (Glaser & Strauss, 1967). A convergent interviewing technique (Dick, 1998) was used as it allowed the content to be unstructured but provided a structured approach to the interviews. That is, predetermined questions were not used but questions emerged through constant comparative analysis of the data. Each respondent in the interviews or questionnaires was asked the same initial questions: "What do you think of computer-based learning"? and "What are the advantages and disadvantages"? "Computer-based learning" was used in the questions to reflect the current Army terminology. Further questions developed based on respondents' replies with the aim of determining the main issues and seeking explanations for their beliefs and actions. While there were variations in individual perspectives, the continual processes of collecting and analysing data by comparing and building on the themes resulted in the emergence of the main concern for the respondents and how they were dealing with this concern and related issues. While refinement of this analysis is still continuing as part of a doctoral thesis, the preliminary model is presented (Figure 1) with a summary of the main factors and the concepts that informed the development of the model.

The Model

The overall concern of the respondents was managing tensions by integrating e-learning into the organisational culture. This concern had both individual and organisational perspectives. There was a focus on attempting to balance how the requirements to use e-learning fitted with maintaining the status quo in the training culture. Furthermore, beliefs, traditions, expectations and experiences of the organisational culture influenced how technologies and learning activities were managed, designed, delivered and used. Tensions and issues about how e-learning should be integrated into training were emerging due to social and political aspects of the organisational culture. Overall, actions were aimed at weighing up how to best manage the organisational requirements and experiences of e-learning processes to fit in with the traditional training culture. Therefore, the solutions encouraged the integration of e-learning activities into the organisational culture. As the introduction highlighted, understanding e-learning effectiveness is a complex and fuzzy concept due to the interactive and competing aspects of what is important, to whom, when, where and why. However, this model shifts the focus to understanding factors that are influencing the integration of e-learning into the organisational culture. While this model was based on the experiences of respondents in the Australian Army, it will be useful for other large organisations using e-learning methods in their training programs.

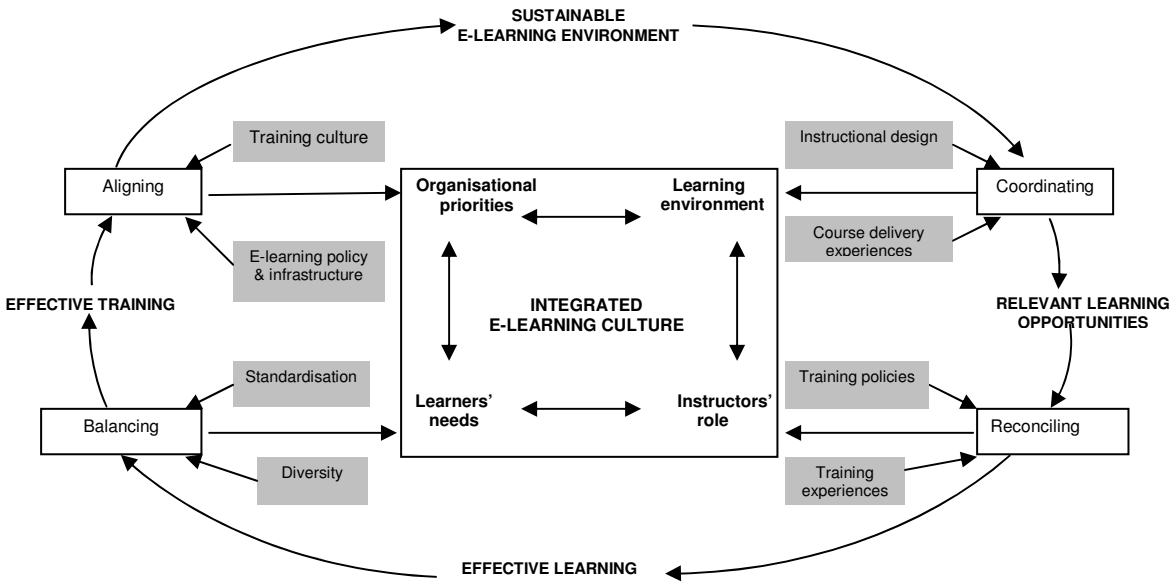

Figure 1: A model for developing an integrated e-learning culture in a large organisation.

Therefore, an integrated e-learning culture requires the facilitation of communication processes to define and develop a sustainable e-learning environment which supports relevant learning opportunities to encourage effective learning and to deliver effective training outcomes within the organisational culture. The main factors influencing the integration of e-learning and the organisation reflected the various activities relating to e-learning:

- Organisational priorities
- Learning environment
- Instructors' roles
- Learners' needs

Each of these factors was interrelated and contributed to how respondents were preserving their position by integrating e-learning activities into the organisational culture. The following discussion and theoretical development are very firmly grounded in the respondents' perspectives and the comparative analysis of emerging themes. References to other publications based on this research where there is further discussion of the issues presented have been included. Questions for further research resulting from this model are also provided.

Organisational Priorities

To support organisational priorities, e-learning policies and infrastructure provision need to be aligned with the training culture. Like many organisations, the Army's primary function is not training delivery. However, training is essential to provide the trainees with the competencies required to meet changing and increasing operational needs. A Department of Defence Efficiency Review (1996) and a subsequent overview of the Army's e-learning projects and technical infrastructure resulted in a series of policy documents from the Army's Training Command Headquarters (1996) providing high level support for developing centralised e-learning course development distributed to Regional Training Centres (RTCs). To improve and maintain control of the quality of the e-learning products, training managers and specialised instructional design and courseware development staff were centrally located in the Training Technology Centre (TTC) which was formed in 2000. RTCs were built during 2000-2001 to deliver e-learning courseware in classrooms and to provide other training activities more efficiently in eight main centres of soldier population. Therefore, establishing a centralised e-learning infrastructure supported hierarchical policy development, funding, design, development and distribution processes which have maintained the sustainability of e-learning infrastructure despite frequent staff changes (Ellis & Newton, 2004). Aligning e-learning

organisational structures with the hierarchical organisational culture encouraged integration into training programs and the development of sustainable management processes and infrastructure.

The alignment of training priorities and e-learning policies encouraged continuing support for e-learning. The shift to centralised e-learning development and regional delivery reflected the organisation's need for efficient and effective training. Demonstrating that e-learning met these organisational priorities was a focus in the early adoption phase. Controlled comparison experiments indicated that e-learning could deliver learning outcomes that "matched the training effectiveness of traditional classroom instruction if all other training remains equal" and furthermore that e-learning "had no detrimental effect on other competencies" (Headquarters Training Command-Army, 2000, p. 29) which justified the continued investment in e-learning projects. Effectiveness also required that training programs produced soldiers who could deliver consistent skills, knowledge and attitude competencies in field operations, regardless of where they were based or whether they were employed part-time or full-time. Standardising content and delivery through e-learning packages was valued as providing more structured and consistent course delivery in line with Army doctrine and the Army Training System (ATS) than traditional face-to-face classroom delivery. Efficiency was discussed in terms of improving training access to more soldiers across Australia and cost savings, particularly in travel and resources. Measuring e-learning effectiveness and efficiency were included in policies and structured, ongoing evaluation and reporting (Headquarters Training Command-Army, 2002).

However, the nature of the organisational culture encouraged areas of support and resistance to e-learning courses. The hierarchical management structure provided a leadership role for managers to exhibit support and commitment to e-learning. Past managers acknowledged that for the e-learning projects that worked well there was the support of individual champions who "were committed to it and followed it through with enormous energy and personal commitment". Current managers supporting e-learning development also exhibited enthusiasm as champions for e-learning innovation. However, the culture was also competitive and "scoring points" in work performance, including e-learning projects, was important for promotion within a structure of constant staff changes. Competition also encouraged areas of resistance to e-learning resulting from a "territoriality" between sections in the organisation that generated "turf wars" (Training manager interviews). Technical infrastructure disparities between RTCs, particularly with local network capabilities and computer access have also caused problems with e-learning delivery. Personalities and training preferences of managers in training centres also influenced perceptions of the effectiveness of using e-learning courses. Therefore, aligning the e-learning polices and infrastructure with priorities in the organisational culture provides a basis for supporting a sustainable e-learning environment. However, organisational cultures also carry histories and hierarchies of management that influence the relative allocation of resources and control in the e-learning environment. Therefore, there should be recognition of the features of the organisational culture in terms of the social and political factors that influence e-learning activities.

The nature of the organisational culture will influence the development of e-learning policies in terms of the level of control and flexibility provided to stakeholders to be involved in decision-making. The provision of infrastructure to support e-learning activities will also reflect the influence of the organisational culture and the capability and commitment of the organisation to invest and support training innovations. Whether e-learning use is intended to conform to the certainties of the existing training culture or to transform the training culture needs to be considered in terms of the toleration in the organisation to uncertainty and change. Furthermore, integrating e-learning into the existing training culture possibly allows faster and more acceptance of e-learning but does not necessarily encourage potential opportunities and challenges to be fully recognised.

Learning Environment

The influence of organisational structures provided for e-learning design, development and delivery stages on the learning environment should also be recognised. To support the learning environment and encourage relevant learning opportunities, there needs to be coordination between course design and delivery expectations, policies and practices.

Establishing the role of e-learning design and delivery within the training culture facilitates acceptance of e-learning in training programs. For the Army, considerable effort went into presenting doctrinally correct content and modelling of Army values and traditions. E-learning's role was defined with the explicit recognition of the use of training for the enculturation or "resocialisation" of trainees from civilian to the authoritarian Army culture (Training manager interview). This resocialisation process was explicitly embedded in the structured course design of the e-learning courseware. Underpinning the TTC development of e-learning instructional design had been research into instructional design, adult learning theories and online usability (Training Technology Centre-Army, 2003). All personnel involved in Army courseware production were instructed to use the TTC developed "rigorous instructional

design methodology". However, the Army has adopted a behaviourist, competency-based approach to training based upon the Army Training System (ATS), "the cornerstone for all military instruction" (Training Technology Centre-Army, 2003, p.12) which influenced the interpretation and application of the TTC research. Although e-learning design and delivery needed to comply with the ATS, there was also a transformational aim in the design guidelines to include some features of "other learning orientations" (Instructional designer interview) to provide content, interactive learning activities and formative assessment. The result was the production of structured independent learning courseware using a wide range of multi-media including videos, animations, audio and text delivered on CD-ROMs. However, the development of innovative learning approaches was accepted within established training procedures and guidelines.

Therefore, organisational policy directions for an instructional design approach that supported the traditional training culture led to overall support for the structured e-learning course design. The design processes in turn supported the organisational culture and reflected organisational management structures. However, these structures also provided the support to integrate e-learning design into the learning environment. In less structured organisational environments, a greater range of instructional design and learning opportunities may be considered and used. The organisational context influenced the assumptions about the role of e-learning in training and what types of e-learning design models were desirable.

Understanding the learning culture of the organisation and how this is applied to e-learning design and delivery processes also informs the development of an integrated e-learning culture. In the Army, entrenched structured project management practices supported increasing and changing demands for e-learning production. A strong team culture based on collaboration and mentoring supported the change management required for e-learning design and development at the TTC. However, difficulties in collaboration between the design, development and delivery stages were associated with problems in e-learning development. Problems in encouraging two-way communication between instructors acting as Subject Matter Experts (SMEs) and the TTC had caused delays in production. Instructors who were encouraged to become more familiar with e-learning features and delivery were acting as "champions" support for e-learning. However, with frequent staff movements it was necessary for instructional designers to "break in new SMEs" (Instructional designer interviews). Therefore, the influence of changing operational priorities can create tensions in e-learning developments. Establishing effective two-way communication processes to encourage collaboration between instructors and designers can improve innovation and support for e-learning development.

However, a lack of collaboration between the design and delivery stages of e-learning creates tensions in the learning environment. While the Army e-learning packages were originally designed with the intention of using distance delivery, issues with bandwidth limitations on the Defence Restricted Network, inadequate computer access and "cultural issues" led to residential delivery (Headquarters Training Command-Army, 2003, Annex A). These cultural issues included the hierarchical instructor-trainee relationship which influenced the provision of learner support in distance learning trials (Ashman & Ellis, 2005; Newton, Ashman, & Ellis, 2005). As a result, the self-contained CD-ROM courseware was delivered in traditional structured classroom course periods facilitated by an instructor. When the role of more independent learning in the training program was not clear and conflicted with traditional training delivery expectations there were issues with resistance in training centres. Therefore, the certainty of e-learning design was not matched by the uncertainty of more independent learning opportunities offered by e-learning approaches. Further, disparities between centralised e-learning courseware development and training experiences reinforced this uncertainty about e-learning delivery in RTCs.

Therefore, particularly in a large organisation, separation of the design, development and delivery stages of e-learning can result in uncoordinated approaches in the learning environment. Different expectations and practices in using technologies and learning designs can result in conflicts and tensions between sections. Encouraging communication and collaboration between sections of the organisation can encourage more integration of the design and delivery of e-learning. However, hierarchical organisational structures can influence the "bottom-up" flow of ideas and the perceived effort to change existing practices. Non-hierarchical organisational structures could possibly encourage more learning innovations, including the use of e-learning courses but could also result in uncoordinated and conflicting expectations and practices in the learning environment.

Instructors' Role

Instructors in workplaces can provide a vital role as the implementers of e-learning packages. There needs to be reconciling processes between training policies and instructors' experiences to inform the development of instructors' roles to develop relevant and effective learning opportunities.

Changes in the instructors' role which potentially threaten traditional roles and positions in the organisation can lead to resistance. Army instructors expressed increased isolation from the training process with the delivery of e-learning packages which resulted in resistance to e-learning delivery. There was concern about the loss of autonomy and a low sense of involvement and control in managing e-learning modules. The role of e-learning facilitator was a shift in their position which conflicted and eroded traditional instructor roles in the organisation. For example, value was placed on traditional mentor relationships and being role-models for trainees and passing on their "war stories" of knowledge and experience, including leadership and instructional skills (Instructor interview. Further, e-learning facilitation was associated with "skills fade" in face-to-face teaching skills and subject knowledge. E-learning facilitation in the classroom was associated more with providing technical assistance than with learning new teaching skills. Instructors are also in a direct position to be able to influence student perceptions and use of e-learning. With a sense of erosion of skills and position, there were direct consequences in how e-learning was presented to students and subsequent course feedback (Newton & Ellis, 2005). In many workplaces there are no instructors involved in e-learning. Alternatively, there can be extensive online collaboration between instructors and students designed into e-learning courses. Shifts in perceived roles need to be understood and communicated to policy makers to reduce potential resistance and to improve e-learning integration with the training culture.

The organisational factors that led to e-learning implementation also influence the degree of autonomy instructors have in controlling the use of e-learning. For the Army, adopting e-learning was a directive from the Department of Defence which was scaffolded to provide the required learning efficiencies and effectiveness in the organisation. Unlike other sectors, where educators can decide when and how to use e-learning, this was an authoritarian organisation where instructors were required to deliver the e-learning packages. There was also peer pressure to support e-learning with derogative terms, such as "greybeards" or "dinosaurs" being used to ridicule resistors (Instructor interviews). Understanding instructors' experiences of lack of autonomy also indicated areas to improve operational feedback. While the Army provided feedback procedures for instructors to comment on content and delivery method issues, these actions involved hierarchical approval processes through the chain of command to maintain content accuracy and consistency. However, significant delays in updating content on CD-ROMs reduced instructor credibility with students when errors had to be explained or were located by students. Further, content errors provided evidence for some instructors to resist using e-learning (Newton & Ellis, 2005). Reduced control over course delivery and classroom management with more independent e-learning was also a concern that led to uncertainty and resistance. Therefore, understanding the impact of organisational pressures to use e-learning on instructors' professional and personal experiences should be considered to integrate instructors' roles to provide relevant learning opportunities.

Changes in the communication structures which provide more autonomy in the management of e-learning delivery can encourage more support for the role of e-learning in training programs. A greater sense of instructor confidence about managing e-learning occurred where there was opportunity for greater local control over course delivery. Collective representation by training centre managers to senior management that there was a need for a shift in control over e-learning delivery encouraged more flexibility in regional course delivery policy. Various models of e-learning delivery were emerging in the training centres based on training preferences and learners' needs. However, the models adopted reflected traditional instructor-led lessons rather than shifting to more learner-centred approaches, including: shifting back to face-to-face classroom teaching for some modules; using the e-learning modules as independent learning and incorporating more practical training to reinforce the learning; using parts of e-learning modules in instructor-led classroom sessions or replacing some e-learning content with practical training. The use of more mixed modes of delivery were favoured as providing an effective learning environment that encouraged more instructor interaction with trainees, improved opportunities to learn practical skills and flexibility to respond to learners' needs. Furthermore, with the change in control over delivery modes, the role of e-learning was also more supported and integrated with the training expectations of instructors and trainees.

Therefore, expectations of e-learning as expressed in training policies and management directions need to be reconciled with the experiences within the training environment. For organisations using e-learning instructors or facilitators, there should be avenues to provide and act on their reflections and experiences to develop effective learning experiences. For authoritarian organisational cultures, the hierarchy provides accepted procedures to initiate change in the e-learning environment. For less structured organisations, instructors or teachers may have more independence to initiate changes but also may have less organisational support to carry though changes in e-learning design and delivery.

Learners' Needs

E-learning courses provide the opportunity for large organisations to provide standardised training to dispersed employees. Balancing requirements to standardise training and respond to diversity across the organisation should inform understanding of learners' needs and encourage effective training outcomes. However, local diversity in learning requirements and technical infrastructure can influence the effectiveness of standardised training. Feedback from students can provide insights into e-learning experiences and highlight areas where different learning approaches may be required.

The type of course evaluations and the criteria used reflect organisational culture and priorities. Similarly, the actions taken based on trainees' feedback reflect organisational structures and culture. The Army's training evaluation process was structured and "hierarchical" (Headquarters Training Command-Army, 2002, p. 3) which followed Kirkpatrick's (1994) model of training evaluation. Before e-learning was fully adopted this regular formal evaluation process was extended to include extensive trialling and formal and informal trainee evaluation of some early e-learning courses. Experimental testing of comparative differences in trainee outcomes between classroom delivery using face-to-face instruction and e-learning instruction indicated that despite some technical problems, this trainee feedback provided the justification to adopt delivery of the e-learning courseware in the organisation. Routine course evaluation questionnaires were completed weekly by trainees and feedback provided up the chain-of command. Therefore, formal structured feedback processes supported the continuing use of e-learning and informed changes required.

However, assumptions made about students and the learning environment influenced perceptions of learning needs. Despite evidence of diverse learners' characteristics, particularly for reserve (part-time) soldier trainees, there were assumptions of homogeneity. The authoritarian organisational culture was at the basis of these assumptions with a requirement for standardisation in competencies across the service and conformity to generate "one culture, one standard" which "does not tolerate differences" (Training manager interview). Influences on trainee' e-learning experiences reflected current Army experiences and knowledge, educational level, computer literacy and reading literacy. In particular, there were assumptions made about good computer literacy skills as they were a part of "Generation X" (Training manager interview) which did not apply to all of the trainees (Newton, Ashman & Ellis, 2005). While the majority of trainees had adequate computer skills to participate in e-learning courses, frustration and stress were experienced by about twenty percent of trainees with lower computer literacy skills. Similarly, trainees with high levels of computer skills or relevant Army skills were frustrated with the lack of flexibility in accessing e-learning content. Trainees' time management skills also varied which influenced completion rates and motivation. However, awareness of learner diversity has also informed the implementation of more e-learning orientation classes and a shift to greater flexibility in course delivery modes (Newton & Ellis, 2005). Therefore, understanding the inherent cultural influences on e-learning design and delivery can assist in working with organisational priorities to balance aspects of organisational priorities and learners' needs.

Questions Arising from the Model

The model presented (Figure 1) is valuable as it allows the development of further research questions in this situation and for any organisation implementing and using e-learning. Some of the questions arising from this model include:

- How does the content and implementation of *e-learning policies* (or the lack of them) reflect organisational training priorities and expectations?
- How does the provision and diversity in access to *e-learning technologies* reflect organisational culture and structures?
- How are *learners' needs* defined by organisational priorities and culture?
- How does the *instructional design* approach for e-learning reflect the training culture and experiences?
- How do e-learning *development processes* reflect organisational priorities and training experiences?
- How does the *delivery* of e-learning reflect organisational and personal priorities, beliefs, experiences and expectations?
- How do *communication and feedback* processes between e-learning elements reflect organisational priorities, structures and cultures? And, therefore:
- How can an *integrated e-learning culture* be best defined and developed?

Conclusions

This study has provided a model grounded in the experiences of e-learning participants in a large workplace organisation. It was found that decisions influencing e-learning in an organisation reflected implicit and explicit features of the organisational culture. An integrated e-learning culture developed by balancing expectations from the organisational culture with experiences of e-learning. Therefore, it is necessary to understand the interactions between organisational priorities, learners' needs, instructors' roles and the learning environment to inform the discussion and conceptualisation of effective e-learning. By taking the approach that the e-learning environment is not value free it is possible to understand the competing priorities and discourses that influence how e-learning effectiveness is constructed and defined. Therefore, this study informs some of the gaps identified in the e-learning effectiveness literature which were summarised by Derouin et al (2005), including: "…we are aware of no theory that has been the major influence in the design, delivery, and implementation of e-learning systems" (p. 934); "And much remains to be learnt about how to best design the e-learning environment, how to optimise its delivery, and what works when and why" (p. 937). Further research will review this model in relation to the broader literature and experiences in other organisations to further extend and refine the concept of developing an integrated e-learning culture.

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