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Development of an E-Learning Culture in the Australian Army

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Abstract

Invited as a paper from E-Learn 2005

For organisations with hierarchical management and training cultures, e-learning provides opportunities for standardising content, delivery and course management while challenging traditional teacher-student relationships. This research based case study of the Australian Army provided a longitudinal perspective of the diverse factors influencing the development of an e-learning culture. In particular, instructors' perspectives articulated the diversity of interactions between the organisational culture, the learning environment, learners' characteristics and the instructors' role. As the adopters of e-learning, instructors were balancing organisational requirements with their perspectives of the role of e-learning. Providing instructors with some control and flexibility to manage e-learning delivery had reduced resistance and enabled them to develop a range of e-learning models to meet learners' needs. Thus, encouraging coherence between learners' needs, instructors' perspectives and the organisational culture contributes to the development of a supportive e-learning culture.

Introduction

There is a lack of understanding of the interactions between organisational culture and e-learning design and delivery in different educational and training contexts. Schofield's (2003) Australian case study research argued for more understanding of the impact of organisational

context on the adoption of e-learning solutions. The Australian Flexible Learning Framework (AFLF, 2003) recognised the complexity of learning cultures across and within education and training sectors and identified a variety of e-learning models. These models indicated a range of traditional training delivery methods existing prior to e-learning and the dominant e-learning model that has emerged for each sector. Examination of the AFLF's (2003, pp. 10-11) summary revealed that, in general, the traditional learning culture has been transferred to the dominant e-learning model adopted. For example, in the technical education sector teacher-led classrooms and workshops were replaced by teacher-facilitated classroom based e-learning. However, to achieve training efficiencies in the corporate sector there had been a shift from traditional instructor-led group training to an e-learning culture based on "independent, technology-based tutorials" (p.11). However, the AFLF (2003) also highlighted the embedded assumptions in the adoption of e-learning models: "Each sector, quite predictably, takes its defining delivery technology and pedagogical culture as the 'norm' for current delivery, adapts the online environment to that culture, and then pronounces on how well e-learning 'works' - or doesn't" (p.10). Therefore, rather than viewing e-learning as a neutral, value-free environment, it is important to identify and understand the organisational culture and the inherent practices, beliefs and values incorporated into the design and delivery of e-learning.

In particular, these AFLF identified e-learning models reflected changing relationships between the organisation, students and teachers. While these models highlighted differences between sectors, in general they indicated that the adoption of e-learning has shifted the focus from teacher-directed learning to providing more independent student learning opportunities with access to online content and learning activities. However, in a U.S. study of e-learning literature Bonk and Wisher (2000) argued that there has been a trend to transfer knowledge of learning

innovations in one context to another context, particularly from the higher educational sector to the training sector without considering inherent differences in organisational priorities. They discuss the importance of recognising differences in organisational culture, social interactions, motivational and affective factors in designing e-learning. Bate, Robertson and Smart (2003) found evidence of this misalignment in their research in the Australian Vocational Education and Training (VET) sector where e-learning content was primarily being delivered in non-Internet environments while design guidelines were based on Internet settings. Thus, the impact of introducing an e-learning model that conflicts with the organisation's goals and priorities needs to be identified and understood.

For some organisations the e-learning models adopted are explicit and reflect the organisation's training policies and curriculum requirements. The Australian VET sector generally uses a competency performance-based approach requiring evidence of achievement in authentic settings or workplaces against national standards (Booth et al, 2003). The AFLF (2003) summarised the main learning models used in VET to achieve these aims including systematic design of instruction, constructivism, competency-based training, problem-based learning and situated learning. Learning models can also be expressed intrinsically in terms of the experiences and beliefs of teachers. For example, Robertson's (2004) research on e-learning in Australian VET found that official pedagogical influences were "recontextualised'' by teachers selecting their "preferred teaching principle" (p.11). Errington (2001) also discusses the importance of understanding teachers' beliefs about e-learning and managing these beliefs to encourage more effective implementation. Therefore, the impact of various extrinsic and intrinsic influences on the development of an e-learning culture also needs to be understood.

This research focused on understanding the factors influencing e-learning design and delivery in the Australian Army. The military provides a good setting for researching the influences on e-learning in organisations with a well-established hierarchical training culture that may be challenged by e-learning implementation. While there is research into e-learning in the military sector overseas, particularly in the U.S. (Abell, 2003; Barker & Brooks, 2005; Wisher, Sabol & Franklin 2002), this study is the first external research investigating e-learning in the Australian Army. Although this is a specialised context for e-learning this research informs e-learning implementation and development in other settings.

Research Method

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

- What factors are influencing e-learning design in the Australian Army?
- How do these factors contribute to the development of a model of influences on e-learning design 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 soldiers and the development of a model. 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 a qualitative approach was adopted. Gaining an understanding of the perspectives of the key players in the organisation to inform the development of the model was based on the advantages of stakeholder analysis as described by Dick (1997). 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.

Gaining access to soldiers involved negotiations between the researcher and the various staff in the Army's Training Command. Data collection periods involved working within Army training schedules to minimise any disruption to operations. The selection of respondents in the case study followed the tenants of 'theoretical sampling' described in Grounded Theory (Glaser & Strauss 1967, p. 47). This process has led to 118 interviews and 129 responses to questionnaires from soldiers pre-dominantly involved in an all-corp promotion e-learning package for the 'Subject One Corporal' course which has been running for four years. Respondents included senior training managers, instructors, reserve soldiers, active soldiers, e-learning instructional designers and course developers. This paper focuses on the perspective of Army instructors delivering this package. Initial research included face-to-face interviews in 2004 with twelve instructors at their workplace in two Regional Training Centres (RTCs). It was evident from these interviews that there were regional differences in how e-learning was viewed and delivered which was influencing instructors' perspectives and implementation of e-learning (Authors' names removed, 2005b). An invitation to the Army to interview more instructors in the eight RTCs across Australia resulted in fourteen phone interviews with instructors, including Senior Instructors (SI), at six RTCs in late 2005.

This data was collected and analysed using the tenents of Grounded Theory (Glaser & Strauss, 1967). A convergent interviewing technique (Dick 2000) 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. All of the respondents were asked the opening questions: "What do you

think of computer based learning?" and "What are the advantages and disadvantages?" The 2005 instructor interviews included the additional opening question: "What changes have you experienced in computer based learning?" Computer Based Learning (CBL) was used in the questions as this was the term currently used in the Army. The respondents were free to discuss any issues that they considered important and to continue talking with prompts from the researcher for more information and clarification. The instructors' interviews took about 30-45 minutes and allowed the respondents to provide in-depth details of their e-learning experiences. With the respondents' permission, hand-written notes were taken at the interview of the main issues raised or taping was done. Through iterative processes of data collection and constant comparative analysis, conceptual categories were confirmed as important, their properties and reasons for disconfirmation emerged assisting in theory development. The analysis of the findings was assisted by the use of the computer program QSR Nud*ist (QSR International, 2003). Thus, a longitudinal perspective of influences on e-learning design and delivery during 2004-2005 was gained.

Army's E-learning Design

Previous interviews with training managers and instructional designers, and research into Army e-learning policy and historical documents provided an understanding of the organisational influences on e-learning design. While organisational commitment to e-learning development was largely in response to the need for more training efficiencies, including cost savings and standardised training across Australia, managers also aimed to shift from training delivery to learning facilitation (Authors' names removed, 2004b). The Training Technology Centre (TTC) was created in 2000 to co-ordinate the development of self-contained, multi-media rich CD-ROM packages that incorporated Army doctrine, culture and interactive learning

activities and formative assessment tasks (Authors' names removed, 2004a; 2005c). Headquarters Training Command Army (2003, p.7) did not initially focus on the development of networked Web-based learning development or consider it a priority due to soldier's lack of access to the Defence Restricted Network (DRN) while on operations and the limited bandwidth available on the Network. While these CD-ROM packages were originally developed for distance learning, the authoritarian teacher-student relationship, concerns about doctrine security and problems with technical infrastructure led to residential classroom delivery (Authors' names removed, 2004a; 2004b). Some Web-based e-learning courses have been recently loaded onto the DRN to encourage more flexible learning opportunities (Authors' names removed, 2005c). These are mostly commercially developed independent learning computer skill packages (e.g. Microsoft Office programs) which are being used in training establishments with access to the DRN.

The Australian Army has a well-entrenched behaviourist model of learning that is formalised in the Army Training System (ATS) that must be used in all training situations (Training Technology Centre-Army, 2003). TTC's e-learning instructional design and development is based on Gagne's (1985) model of 'conditions of learning' that provides a sequence of nine 'instructional events' and incorporates Keller's (1987) ARCS model of motivation. It was argued by managers, TTC staff and instructors that these behaviourist principles "have stood the test of time" and meet the Army's training requirements (Authors' names removed, 2005b) . TTC instructional designers argued that this approach provided students with the structure and consistency that is used in other Army training and provided a model of the ATS for the Corporal students who needed to learn to train small groups in their course (Authors' names removed, 2005c). While the Army's e-learning packages follow a

behaviourist model, instructional designers described using "constructivist principles" to encourage learning, such as scenario-based problem solving. This model provided a structured approach to learning which was supported by the instructional designers' experiences as regular soldiers and Subject Matter Expert (SME) feedback on content. Thus, the e-learning instructional design was aligned with the organisation's traditional learning models.

The Army's TTC follows the ADDIE (Analysis, Design, Development, Implementation and Evaluation) process of instructional design which is based on Gagne's (1985) principles (Greenberry, 2004). This structured approach to course development fits with the advantages of the Systematic Design of Instruction (SDI) type of e-learning development as discussed by the AFLF (2003, p. 34). This approach is relevant to the Army's e-learning design and development as it involves large-scale centralised production by specialised instructional designers developing expensive products that need to be quality tested during production. It also provided for pre-determined lessons and outcomes based assessment tasks. While the Army's e-learning development method provided a structured and standardised approach to e-learning design, the criticisms of SDI as described by the AFLF (2003, pp. 32-34) are also relevant. These disadvantages included a linear and "instructionist" approach, assumptions about learners' requirements, not allowing for individual teacher's input, difficulties in adapting course content to suit learners' needs in different situations or quickly responding to changing content or learning needs. Therefore, the Army has adopted e-learning design and development processes that align with its hierarchical training and management approaches.

To support the Army's training priorities the e-learning packages are designed with the aim to present doctrinally correct content and modelling of Army values and traditions. For example, providing vicarious learning through the use of virtual mentors who are dressed, act

and speak in the required Army protocols has been integrated into all of the e-learning packages. Instructional designers considered that this aspect was vital to provide a "human feel" and a "sense of empathy" with the characters that model skills and lead the learners through the e-learning packages (Authors names removed, 2004a; 2005c). Thus, the e-learning design and development is explicitly intended to be a part of the enculturation process of students into Army attitudes and procedures (Authors' names removed, 2005d).

The instructors facilitated the CD-ROM package classroom training sessions and provided field training and summative assessment sessions. These roles provided instructors with the opportunity to assess the usefulness of the e-learning for knowledge and skill development and to assess the impact of the changes in the training environment. With increasing operational tempo and need for training, the Army has also piloted distance learning for reserve soldiers using CD-ROM packages at home with limited instructor support using phone and email mostly for course management issues. However, considerable problems emerged due to inadequate support for learners and instructors in distance learning skills and the need for practical reinforcement of learning (Authors' names removed, 2005a). Therefore, understanding the instructor's perspective of their role and of e-learning informs the development of more effective learning environments for residential and distance-based delivery.

Instructor's Perspective

From the analysis of the interview data four key factors emerged as important for instructors:

- Organisational culture
- Learning environment
- Learners' characteristics

- Instructors' role

Within these factors there was a diversity of issues that interrelated and influenced the development of the e-learning culture. The 2005 interviews confirmed the previous findings and also provided insights into the changes in the e-learning environment. The following discussion is very firmly grounded in the data collected.

Organisational Culture

In 2004, The Army's top-down decision-making structure had isolated instructors from decisions about e-learning development and delivery. While some instructors supported e-learning as the "way of the future", others resisted it as they felt that it was imposed on them and they were reluctant to change as "the traditional approach to training was OK". If instructors resisted e-learning they were sometimes called derogative terms, such as, "greybeards" or "dinosaurs" by other staff. There was a sense of resignation to using e-learning when superiors told them: "You have to use computer based learning - make it work". A low sense of ownership and control of the courses was an issue for some instructors: "I am not a passenger. I would like to have some input. It's hard to change the way it is being done" (2004 interviews). It was concluded that understanding instructors' experiences of change was important to provide operational feedback and to understand the social factors impacting on implementation (Authors' names removed, 2005b).

The 2005 interviews confirmed that there were regional differences in practices and perspectives of e-learning but the instructors also described an overall shift in attitude associated with changes in course delivery. A more positive attitude to e-learning had developed with a move which provided instructors with more control over how the Corporal course was delivered. The SI confirmed that in mid to late 2004 they had approached their superiors to ask for more

control over training delivery. With a change in upper training management, the SI were directed that as long as Training Management Package (TMP) objectives were met, each RTC could decide how to deliver the content to suit their needs. Instructors described themselves as drivers in this process: "… that is being spearheaded by training centres…it is definitely not written into the CBL. It has just become a necessity because we know that we have to manually test or practice these skills" (2005 interview). Therefore, providing higher level organisational support had improved instructors' sense of control over delivering e-learning.

Any instructor requests to SI for changes to delivery needed to be supported by justifications that related to learning requirements. Any major changes in delivery had to be approved by Headquarters RTC (HQRTC) and any minor changes reported through the chain of command at the end of the course. This approval process was supported by SI as providing a "rigorous" structure and more local control: "The ultimate power at my level is that I go: 'No, I am not going to teach it by CBL, I am going to teach it face to face' '' (2005 interviews). Most SI encouraged their instructors to provide feedback on which modules should be taught face-to-face or by e-learning. This was described as a "collaborative process" (2005 interview) with SI discussing these decisions regularly with their instructors and at the bi-annual SI conference. However, SI were still concerned about standardisation across the RTCs and suggested some centralised co-ordination of delivery options and preferences. Providing SIs with autonomy to modify training delivery to respond to local conditions within the existing approval structures had improved overall support for e-learning.

However, the SIs were more confident about this change process than some instructors who still reported reluctance to approach their SI to suggest changes. This indicated that

personalities and leadership styles were influencing the feedback process. The hierarchical Army culture also reduced the drive for instructors to provide feedback:

> In some ways it is a bit frustrating. They are a bit reluctant to listen to us. But I am not here in that capacity. The Army works in a different way to everyone else. Basically you are a soldier first and trainer second. (2005 interview)

By encouraging instructors to provide input about training delivery there was overall increased support for the role of e-learning in Army training.

Maintaining content currency was a priority for instructors and a major influence on their acceptance of e-learning. Instructors could provide feedback on content or technical issues through a hierarchical approval processes from the training centres to committees and personnel in HQRTC and the TTC. However, this process was viewed as slow and with many "blackholes" reducing responses to feedback reported in the 2004 and 2005 interviews. Out-of-date content has also provided instructors a base from which to resist e-learning across this period. Active resistance was evident in 2004 with instructors informing students of general problems with e-learning which was influencing students' perceptions and course feedback (Authors' names removed, 2005a). These errors reduced instructors' confidence in the e-learning packages. They also felt that their authority was eroded when it was necessary to explain these errors to students or students reported errors.

While some e-learning packages had been updated over the 2004-2005 period, instructors reported that updating content was still an issue in some modules. In 2005 all RTCs had replaced some e-learning modules with face-to-face classroom or practical classes based on content currency, particularly 'Service Discipline Law' which had very frequent doctrinal changes and packages containing safety regulation changes. In 2005 there was more support for the use of Web-based delivery to improve content updating options. However, there were also associated

concerns about the cost and time involved in updating multi-media content and the current technical limitations of delivering this content on the Defence network.

Therefore, while there was top-down organisational support for e-learning the instructors' views and experience had led to resistance and influenced students' perceptions of e-learning. Improving communication of experiences of e-learning delivery from the training centres to HQRTC managers and to the TTC course designers would improve the design of more relevant and useful e-learning.

Learning Environment

E-learning offered a different learning environment that challenged traditional face-to-face classroom management strategies. From 2002 to 2004, instructors were directed to deliver the e-learning packages to students as self-paced learning within the structured training periods with access to an instructor in the room to answer questions. The self-paced learning aspect was viewed as an advantage with most students completing within TTC suggested times. Different perceptions of the flexibility of self-paced learning were reflected in instructor classroom management styles. Some instructors were reasonably flexible with timing guidelines, such as "finish three modules in a morning session", while other instructors required students to "stay on track" to complete each module within the suggested time period. Some instructors felt that they had lost some authority over the class and expressed frustration about students rushing through packages, "just clicking through" and getting up "whenever they felt like it" (2004 interviews). However, this issue tended to be a more of a problem for instructors who favoured face-to-face classroom teaching. Understanding instructors' perceptions of their role in e-learning classes and providing them with effective classroom strategies was important.

From 2004 to 2005 the main changes in the e-learning environment were that some instructors had implemented a more instructor-led e-learning approach and there had been a push from instructors to combine more practical sessions with e-learning sessions. SI encouraged instructors to use an ATS approach to e-learning lessons by providing a face-to-face introduction and conclusion to the e-learning modules emphasising the importance and relevance of the lessons. However, in 2005 some instructors had changed to an entirely instructor-led blended classroom e-learning approach for some modules. This involved the instructor designing the lesson and directing students to access short sections of an e-learning module on their own or from a data projector and then returning to the instructor's explanations and directions. This delivery approach was defended in terms of ensuring that the students had covered the content and to confirm their understanding of the content by asking them questions: "That works a lot better and the class moves as a single entity and you can sign them off on this and say they are ready for assessment. That works very well" (2005 interview). Using the data projector was also found to be useful to assist with troubleshooting students' navigation and technical issues. This delivery mode was not seen as replacing e-learning but supplementing it: "Then we have big screens as well, so I can stop people and talk and carry on. It's (e-learning) great but it just needs that finishing touch with a bit of hands on, I think" (2005 interview). Instructors were indicating that there was a role for e-learning within their traditional training approach. The impact of this blended classroom delivery on learning needs to be understood.

Modules that instructors considered more effective as e-learning included theory, such as 'Customs and Traditions', simple practical skills, such as rolling flags, administrative tasks and theoretical background knowledge to practical skills, such as occupational health and safety. Theory modules in particular were valued by instructors as providing content that would be

difficult for instructors to present, for example, "The Tiananmen Square and Vietnam footage adds realism and a historical perspective to learning" (2004 interview). However, there was overall concern about learning practical skills using e-learning. Using some face-to-face group discussions or practical sessions with e-learning sessions was occurring in 2004 at one of the centres researched. These instructors were generally more positive about the role of e-learning and retention: "With the pracs closer to the CBL, people learn quickly. They are hands-on learners, most of them" (2004 interview). In 2005, most RTCs examined the e-learning package and many practical skills modules were targeted for additional face-to-face sessions to supplement or replace e-learning: "We've got permission to do a lot of things face-to-face. And the rest of the stuff that we believe enhances the learning skills or ability of the trainee we keep on CBL" (2005 interview). Providing instructors with options for course delivery had provided some flexibility to meet learners' needs.

Most RTCs took advantage of the students completing the e-learning modules faster than allocated period and used this extra time to introduce short face-to-face classroom or outside practical sessions close to the relevant e-learning session, often on the same day. Other RTCs had extended the practical session at the end of the two week e-learning period to one day. Some e-learning modules had been totally replaced by face-to-face practical classes with some RTCs reporting an overall balance of about 60% e-learning to 40% practical lessons as opposed to mostly e-learning sessions run previously in this training period. There was also an awareness of balancing organisational and student needs:

> Yes, we are at a sort of happy medium. Because at the moment after each block of lessons on CBL we back it up with a practical activity which reinforces what they learnt. We are compromising what we fully want but we are balancing what Headquarters Training wants and what the trainees want. (2005 interview)

This change in delivery was related to instructors' concerns about learning practical skills online, especially operational and leadership skills, the currency of some of the content, learning retention and in response to students' course evaluations. Students had generally indicated a preference for practical sessions in these evaluations which confirmed the instructors' views of the need for more practical training. The higher level support for instructors' concerns provided a more definite role for e-learning for instructors and more overall support for e-learning.

The terms used to describe these additional practical sessions indicated that these were seen as extending e-learning and included "reinforcement", "reiteration", "enhancement", "backing up", "embellishment" and "confirming". There was no consistency in the use of these terms which indicated regional perspectives and the local drive for these changes. E-learning and practical learning were described as requiring different skills and provided different types of outcomes: "We added practical sessions because conceptually trying to understand what a computer was saying and physically doing it is completely different" (2005 interview). E-learning was described positively as a "teaching aid" or "teaching tool" that had a role in providing theoretical content and a background for practical skills: "It gets everyone to a certain level when they go into the field" (2005 interviews). It was considered essential to provide hands-on experience for learning practical skills, particularly where some degree of technical skill or knowledge or safety was involved. Providing some experience of the realities of the working environment was also important, which was difficult to gain from the e-learning: "…and they go out the back and physically do that with the barbed wire, with the razor wire and they learn how sharp it is and it scratches your hands" (2005 interviews). Understanding how e-learning and practical training can be best integrated to support learning needs to be investigated.

Learning retention was a major factor influencing instructors' perspectives of e-learning and the need to modify the delivery approach. There were varying perceptions about the levels of retention of e-learning for field based practice and assessment. One popular saying with instructors to describe e-learning was "a data dump-once passed, it was flushed from system" (2004 interview). There was confidence that the combined delivery approach was providing a good learning environment:

> We do lessons on computer based learning and then we go out and do the practical reinforcement of it: "OK, you've seen the little computer graphic set up the barbed wire, now here is a couple of rolls of barbed wire and some star pickets, let's get into it". And they actually take from the CBL and they put it to practical use. (2005 interview)

Instructors also mentioned other factors not related directly to e-learning that influenced retention including individual learning ability, past educational experiences, interests, time of day and Army experiences. Understanding learning retention processes and developing effective learning strategies for different types of knowledge and skills was required.

There was also evidence that e-learning was providing more efficient learning for practical skills: "I was spending less time showing them how to do it and retesting. They can do the practical needing less controlled supervision. They can actually do it - not perfect, but they can do it" (2004 interview). The later confirmed that e-learning was encouraging some time saving efficiencies in learning practical skills: "Yeah, it is quicker for them to pick up the practical skill once they have been through the CBL training" (2005 interview). The use of e-learning as a revision and learning reinforcement tool was also promoted to students:

> They (students) do say that it does help in that they have gone out; they see a proper demonstration done, a proper manual instruction going on out there. And then they have gone back to the CBL after that and the penny has sort of dropped. (2005 interview)

However, there was little evidence available to instructors that students were using e-learning for revision. Providing students with access to e-learning before their summative field assessment and in their units could assist revision.

Some instructors would prefer to not use e-learning at all due to the need for learning practical skills and their preference to interact face-to-face with the students. However, the majority of instructors could see a place for e-learning in Army training with the support of short practical training sessions:

> Basically, the system works. There are problems on both sides. There are problems with total CBL and there are problems with total face-to-face. They are the by-gone years. I guess on either side it is the retention of information by the individual. (2005 interview)

Feedback from instructors and students is required to understand how learning is best facilitated by combining different modes of instruction and how to best respond to the learning needs of different groups of soldiers.

Learners' Characteristics

Army trainees are treated as a homogeneous group regardless of age, gender or previous knowledge and experiences, despite evidence of differences (Authors' names removed, 2005a). The e-learning package was valued for providing a standardised content for all students, regardless of background, experience or location. Instructors also recognised students' individual learning needs and experiences: "The lesson is the same; the person we are talking about is completely different. That will change from course to course" (interview). The instructors thought that the e-learning package instructional design catered for differences in learning styles with a variety of learning modes including visual, audio and text: "This training should provide a wider range of learning - seeing it and doing it" (interviews). E-learning was viewed positively

as providing accessible learning for different types of learners. However, there was a need to provide more flexibility to respond to learning needs of groups or individuals.

Managing individual differences were viewed as more of an issue with self-paced e-learning than face-to-face classes as instructors had less opportunity to interact with students to understand their individual abilities and to provide assistance. There was an alternative viewpoint that e-learning frees up the instructor's time to provide attention for student inquiries. The shift to more instructor-led e-learning instruction in some RTCs challenged the advantage of self-paced learning but these instructors indicated that this structured approach was efficient for students as instructors could "stop it at important points and move quickly through the not so important points" (2005 interview). It was important to understand the relative impact of these different delivery modes on managing diversity.

The instructors' push to introduce more practical sessions was in response to the students' feedback about the course and their requests for more practical sessions and the instructors' perception of the students' need for a hands-on approach to learning: "It is more people's capacity to learn. Some people do not have that discipline, the aptitude to take in information. Some people are better at practical exercises" (2004 interview). However, students' evaluations of e-learning were also influenced by instructors' perceptions (Authors' names removed, 2005b) and technical problems that slowed their progress and sometimes prevented e-learning classes to continue. Some RTCs were experiencing considerable problems with the operating system and local area networks and instructors reported that students submitted very negative reports about e-learning in those sessions and suggested a move to practical sessions. Factors influencing students' preferences for e-learning and practical training needed to be better understood.

Despite managers' assumptions of computer literacy of the 'X-generation' (Authors' names removed, 2004b) varying levels of computer literacy were evident. For example, at least 10-20% of students in each Corporal course had no previous computer experience (Authors' names removed, 2005b). Two RTCs in the 2005 interviews indicated that this rate was 25-40% of students and related this to a lower economic background of the students with low use of computers at home or in work units. Instructors reported that these students became frustrated and found the modules and assessments more difficult and stressful and they generally took longer to do the modules: "The trainees were becoming so frustrated and there would be fists through keyboards because they could see that everyone else was not struggling with it" (2005 interview). However, high stress levels for the online assessments was reported for many of the students as e-learning was a new skill and there was the pressure to achieve at least 60% in the formative assessments. The more computer literate students also caused problems as they could become impatient and try to take shortcuts, sometimes causing technical problems.

As this was an all-corps course, students came from a wide range of Army experience and had different skills and knowledge which included their subject knowledge and computer experience. Infantry soldiers were less likely to have computer skill training in their job than clerical staff or these tasks could involve specialised computer skills that may not transfer to e-learning, for example, "…they might be operating computers for their job but different types of computers. These ones calculate where bombs go off and things like that" (interview). Some instructors also indicated that some students had reading literacy and numeracy problems that were evident in e-learning and in face-to-face classes. It is important to consider the impact of individual differences in experiences and abilities on students' attitudes and progress and instructors' roles in managing differences.

Computer illiteracy had been recognised more during 2005 and computer orientation pre-course sessions had been extended from half a day to one day for students who required extra training. This orientation went through the e-learning packages navigation and students completed some basic online Microsoft program skill packages through the DRN. Instructors reported that these longer orientation sessions had helped the students' confidence. Understanding students' computer skills prior to e-learning reduced the time spent by instructors in providing assistance during e-learning.

Encouraging students to learn computer skills before they came on the Corporal course was suggested by the instructors. The joining instructions for the course indicated that students need to be computer literate before they attend the course, however, administration problems for the course also meant that some students were given insufficient time to prepare for the course. Insufficient access to computers and the DRN in operational units and the lack of support from units to prepare trainees for the course were an issue for some RTCs. The need for general computer skills in the Army especially for training and administrative tasks required in higher positions was recognised. It was also mentioned that computer skills were not a required training competency so students are not accredited for these skills. Providing some organisational support for improving basic skills literacy in the Army would improve motivation.

Instructor's Role

Instructors viewed the shift in role to an e-learning facilitator as a change in their overall function. They felt more isolated from the learning process in self-paced e-learning classrooms than in face-to-face classroom lessons. A facilitator was perceived as an easier role involving less teaching preparation and skill than traditional teaching. The new role was described in terms of providing technical support rather than content learning support: "We are technical

fixeruperers"; "Press play, I'm here to supervise" (2004 interviews). Although instructors had prepared backup face-to-face lesson plans and resources if there were computer problems, there was concern that they would not be adequately prepared. There was also concern that there was some "skills fade" (2004 interview) as they were loosing their face-to-face teaching skills and subject knowledge. Understanding how the instructors' role as an e-learning facilitator could maximise learning opportunities needs investigation.

Support for instructors to perform this new role was minimal in 2004 and involved them going through the modules themselves when they first started with the section. The instructors considered this orientation as adequate for what they were expected to do. However, this mixture of relief and resentment indicated a need for more organisational support for instructors to value this role and to reduce resistance. In 2005 there was an increase in instructor induction for e-learning at some RTCs. This more formal training was introduced as there was a 50% turn over of staff every year and most new training staff members do not have any experience with e-learning. This support included more involvement of IT staff members who went through the course with new instructors, a mentoring system where experienced instructors shared experiences with the new instructors and a more formal two week instructor orientation session where the SI evaluates the new instructors to "identify their learning shortfalls" and works with them as part of their development (2005 interviews). Providing instructors with an induction program that focussed on how to use e-learning to improving training outcomes was valued by SI.

Instructors were also concerned that e-learning reduced opportunities for them to interaction with the students. Prior to 2005 e-learning packages were being used as self-contained learning with very few students asking instructors content-based questions: "You can't

ask a box a question". Most student questions were about computer problems rather than content which also represented a shift in the instructors' role. Instructors acknowledged that students were also reluctant to ask questions as part of the hierarchical culture where soldiers do not want to "look dumb" (2004 interview). However, some instructors saw that e-learning could help overcome this reluctance:

> The computer allows them to replay. Whereas, when we deliver in instructional style they would be less inclined and feel too intimidated for a variety of reasons to say, "can you please say that again?' Whereas with the computer they can replay aspects. That is a definite positive for them. (2005 interview)

There were also limited opportunities for instructor-initiated interaction with e-learning which allows instructors to see if the students understood, to ask shyer students questions and to adapt the questions to see "they see how to communicate" and "who can offer an opinion" (2004 interviews). Increasing opportunities for questions was one of the justifications for introducing the instructor led blended e-learning. Asking questions during the e-learning period was also considered an advantage to break up the lesson and to make it less monotonous. Thus, teacher-student interaction was valued as a learning method that was reduced in the e-learning package design.

Instructors valued their relationship with the students and they were concerned that this relationship was being reduced with e-learning. In particular, with e-learning there had been a shift in their responsibility as role models for students: "There is a difference in the Army. The instructor needs to set an example" (2004 interview). Instructors valued face-to-face training to provide an opportunity to share their Army experiences with students. There was also concern that students see very little face-to-face instruction when this is one of the skills they needed to learn. For example, in the 'Leadership' module, face-to-face role models were considered

important as they were trying to "build leaders-to show confidence" (2004 interview). Although e-learning packages have been designed to include virtual role models whether students assimilated these standards was questioned. It was also argued that "Different face-to-face instructors can provide a range of face-to-face instruction styles that the student can reflect on and model" (2004 interview). Alternatively, e-learning was considered a positive experience as it presented Army standard models of behaviour that all instructors may not provide.

Therefore, the significance that instructors gave to their place as role models for students and the impact of e-learning on this role was influencing their perspective of the usefulness of e-learning. Instructors required a clear definition and support for their role in e-learning delivery and more control over how e-learning was integrated with other training delivery methods to provide effective learning.

Conclusions

This study has provided an overview of Australian Army instructors' perspectives of e-learning and their role in contributing to the development of an e-learning culture. Instructors were attempting to balance the priorities of the organisation, their understanding of learners' needs and their personal beliefs about teaching and e-learning. In summary, instructors' perspectives provided the following insights into improving e-learning design an implementation in this context.

Organisational Culture:

- Instructors' experiences of change need to inform e-learning implementation;
- Areas of support and resistance to e-learning need to be understood;
- Addressing instructors' uncertainties needs to be a part of e-learning implementation;

- Providing communication and feedback channels for instructors improves support for the role of e-learning in training;
- Improving communication between e-learning design and delivery sections will improve user acceptance and improve learning design.

Learning Environment:

- E-learning delivery methods adopted in training centres need to be evaluated and incorporated into the overall design of e-learning;
- Designing flexible learning strategies to cater for skills and knowledge of particular groups of students needs to investigated;
- The impact of blending and combining training delivery methods to improve learning needs further investigation.

Learners' Characteristics:

- Balancing the advantages for students of self-paced learning and instructor-led instruction needs to inform e-learning design;
- Instructors need management strategies to effectively respond to student diversity;
- Understanding and managing the impact of basic skill illiteracies, including computer illiteracy on students' attitudes and progress needs to be investigated.

Instructors' Role:

- Understanding instructors' perceptions of the role of e-learning needs to inform the development of effective training strategies;
- Providing organisational support for instructors to value their role in e-learning is needed;
- Understanding the impact of the reduced teacher-student interaction on learning is required;

- Understanding the importance of instructors as role models and the impact of e-learning delivery on this role needs to be considered.

Therefore, the Army's implementation of e-learning had focussed on a technological approach to the expense of managing the cultural and social aspects of the e-learning environment. Training establishments and their instructors were required to adopt e-learning but they were attempting to modify delivery methods to make the e-learning package more relevant to their learning needs within the constraints of the organisational systems. While there was strong strategic support for e-learning, which has provided infrastructure and managerial support, the impact and role of instructors' beliefs and influence had not been considered. Instructors were trying to balance the directive to implement e-learning with their past training experiences, their perceptions of learners' needs and the impact on their job status and role. Instructors' relative isolation from the e-learning implementation process had created areas of uncertainty about e-learning. This uncertainty had led to resistance from instructors who were in a direct position to be able to influence students' perceptions and final outcomes of e-learning projects.

The instructors' perspectives demonstrated the balancing of two functions of personal belief systems as describe by Rokeach (cited in Errington, 2001, p. 1), "the need to know and understand" and "the need to ward off threatening aspects of reality." However, the flexibility available to university and college teachers to adopt e-learning based on their personal beliefs (Errington, 2001; Robertson, 2004) was not available in the more hierarchical military culture. Thus, the top-down perceptions of certainty from management about the positive features of e-learning due to its alignment with organisational priorities needs to be informed by the bottom-up perceptions of uncertainty about e-learning from its adopters.

In this research, the instructors as adopters have indicated varying levels of acceptance of e-learning. Where instructors had less control over the e-learning implementation process there were more indications of uncertainty about its effectiveness. Where there were avenues for instructors to provide feedback and there was some flexibility to adapt e-learning to fit their expectations and local needs, support and confidence had improved. This finding related to Ellsworth's (2000, p. 27) systemic 'change communication model' of educational technology innovation that emphasised the need for two-way communication within the change process. He argued that a top-down communication approach is "a manipulative process anchored in the paternalistic belief that 'the change agent knows best'" (p. 28). The Army research indicated that e-learning models adopted by an organisation need to include the experiences and perspectives of the adopters, including instructors. Improved bottom-up communication channels has led to the design of a range of e-learning delivery models that reflect the diversity in instructors' perspectives of the role of e-learning. Further, more coherence between instructors' perceptions and experiences and organisational priorities has led to more support for e-learning.

This research has provided understanding of the diverse factors influencing the design and delivery of e-learning in the Australian Army. The importance of understanding the assumptions and beliefs inherent in an organisation's e-learning culture was identified. The need to integrate learners' needs, instructors' perspectives and organisational priorities to develop appropriate e-learning models was proposed. Further research will focus on how understanding the interactions within this e-learning culture relates to other organisations and settings.

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