Transitions in eLearning environments: The Australian Army moves from interactive CD-ROMs to Web-based learning resources

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Abstract

Organisations with established eLearning programs continue to experience the impact of internally and externally driven changes. Sustaining effective eLearning through these changes requires planning that includes an understanding of the organisational culture and the learners' needs. A move to a new eLearning environment can challenge the organisation's communication channels and decision-making culture. Further, producing quality learning resources for technology based training in one eLearning environment does not guarantee an easy transition to another environment. This case study of the Australian Army presents the issues involved within an established eLearning development team that was dealing with rapid change in their work requirements.

Introduction

It has been argued that eLearning requires a major cultural change to be successful (Bates, 2000) or it can provide opportunities for shifts in the culture of training and education (Rosenberg, 2001). However, researchers have also found that understanding the culture of the organisation and adapting the eLearning strategy to fit that cultural environment is more likely to lead to success (Lea, 2003; Newton, Ellis and Hase, 2001; Rogers, 1995). Lea (2003, p. 218) found that understanding the 'inherited culture of learning' in an organisation is a prime consideration for the development of effective eLearning. This included understanding the nature of the target audience, the amount of time people have to train and the 'tone of voice' the organisation uses. Thus, understanding and aligning learners' needs and the organisation's priorities as a part of formal strategic planning should lead to more sustainable eLearning. Further, it can be implied that once effective eLearning is established it will evolve reflecting organisational and technological change.

In considering the stages that an organisation goes through when implementing eLearning, Berge (2001) proposes a four-stage model of maturity or capabilities for sustainability. The stages reflect an increasing institutionalisation of eLearning when in Stage 4:
'A time comes when the level of distance training and education efforts within the organisation meets any and all needs for training. People inside the organization no longer think in terms of moving toward technology-enhanced learning' (p.27).

However, Berge and Kearsleys' (2003) comparative case study of eLearning in U.S. organisations over a four year period (1998-2001) found that changes in the organisations (e.g. mergers, management restructures) can lead to eLearning being
'reintroduced' and not being sustainable. They raise research questions about sustainability including: the evolution of eLearning over time, the impact of organisational and technological change, the role of organisational support and the effect of the philosophy of education/learning within an organisation.

The study

This paper presents a case study of the issues involved within an established eLearning development team in the Australian Army that is dealing with a rapid change in their work requirements. It investigates the past change issues involved in the production of their first Technology Based Training (TBT) in 1996 and the change factors involved in the current move from CD-ROM based delivery to the development of Web-based networked courses. Although the Army was aware in 2002 of a Defence Force Learning Management System (LMS) proposal, no details of products or requirements had been provided. The most recent factor influencing change in the Army's eLearning environment was a directive from the Defence Minister, Canberra, for the Australian Defence Organisation in July 2003. This directive was for the implementation of the Defence Online Management and Instructional Network (DOMAIN) using ThinQ™ Learning Solutions, Inc LMS. Later in October 2003, after various proposals, it was announced that this project would use Outstart's Evolution (for course content development.

To gain an understanding of the impact of this transition, ten interviews were carried out during March 2004 with course designers, developers, instructional designers and administrators involved in the Web-based course development at the Army's Training Technology Headquarters (TTC), Sydney. These were open-ended interviews asking the probe question: What are the issues involved in the transition to Web-based learning? Convergent interviewing (Dick, 1998) provided confirmation of the main issues for the respondents. To maintain anonymity with a small number of respondents' quotations have not been related to particular roles. Army policy and directive documents were also analysed for evidence of change issues and provide the background for the case study. While this is a small case study within a particular training culture, it provides insight into factors involved in coping with change, particularly externally driven change, and the sustainability of eLearning.

Recommendations for managing change that emerged from this study are provided.

Introduction of technology based training

The Australian Army has used Technology Based Training (TBT) since 1993 and with strategic support developed its first multimedia CD-ROM All Corps soldier training packages embedded in the Army Doctrine Electronic Library (ADEL) in 1996, including first aid, navigation and Weapons training. The definition of TBT used by the Army was: 'the use of electronic media to deliver, assess and manage learning. It includes the Internet, intranets, CD-ROM and DVD'. Further, a proposed blended model of TBT qualified this definition: 'TBT will not totally replace current conventional training methods, but will complement and enhance them' (Training Technology Centre, 2003, p.3).

Previous research by the authors traced the factors influencing the development of TBT implementation in the Australian Army (Ellis & Newton, 2004). This research highlighted the importance of vision and determination by individual champions supporting TBT with systematic planning, particularly in a rapidly changing operational environment. The major driver for change to TBT within the Army Training Command was the concern of some senior training staff that traditional classroom training was
not meeting learners' needs and that there was a need to focus on learning facilitation rather than training provision. It was important that the adoption of TBT reflected operational and educational factors. These priorities were summarised by senior Army staff as:

- to minimise the disruption to units, trainees and their families arising from their participation in training;
- wherever possible (and necessary), to deliver the same training to Regular and Reserve members;
- to guarantee the standardisation of training even when delivered in a range of different locations simultaneously;
- to create a reserve of instructor capacity—"a surge capacity"; and,
- "most importantly" to optimise the quality of the learning experience provided to trainees (Ellis & Newton, 2004).

Thus, the decision to adopt TBT was driven primarily from within the training section in response to learners' needs. Also, with conventional classroom training, it was estimated that 70% of the costs were attributable to indirect expenses such as trainee travel to residential training establishments, accommodation and time off from regular duties (Training Technology Centre 2003, p.2). The external directive for improved efficiencies across the Department of Defence (1996) was the policy vehicle to support and scaffold the changes required to refocus priorities for training in the Army.

From 1998, with the top-down support for TBT delivery, it was possible to provide the infrastructure to develop firstly a prototype Regional Training Centre (RTC) in Brisbane and then RTCs in other major concentrations of military population. The fully functional prototype was used to promote the TBT concept to both senior managers and instructors who would be involved in its support, and to determine technical and instructional issues in a working environment. These centres have provided trainees with access to training closer to their homes reduced the cost of transporting trainees to specialist training schools and have provided more standardised training.

The establishment of the Army's TTC in 2000 provided an interdisciplinary skilled team to design, develop and evaluate TBT for the Army's Training Command (Headquarters Training Command-Army, 2003). TTC staff are trained in instructional design and technology, software development, design and audio-visual. Their training has been supported by the Army, including short external courses, internal training through the School of Military Engineering and university degree study in multimedia production and instructional design. External contractors have been employed when necessary to provide specialist skills and to assist with in-house training of staff. However, there have been problems in retaining these staff due to attractive salaries they can attract outside the Army.

With the decision to move to TBT, Army's Training Command considered the technical and operational requirements in the training environment, resulting in a focus on the development of high quality (commercial games quality), media rich, interactive CD-ROM packages. They did not initially focus on the development of networked Web-based learning development or consider it a priority in early 2003:

'With the exception of a learner management system, this will not initially include on-line delivery until a number of issues are resolved, such as:

a. Soldiers spend much of the year training in the field, where they do not have access to the Intranet or Internet;
b. The limited bandwidth available on the Defence Network significantly restricts the
instructional design of electronic and TBT products; and,
c. The Defence Restricted Network (DRN) is not yet considered sufficiently reliable to support the efficient delivery of training" (Headquarters Training Command, 2003, p. 7).

The TTC has produced over 30 multimedia stand-alone CD-ROM learning packages since 1996. These were initially developed in Authorware Professional™ and later in Macromedia Director™. Improvements in the sophistication of the look and feel of the courseware and learning activities since 2000 reflected the software available, the development of the skill base in the development team and their understanding of the capabilities of producing authentic learning activities. Initially the packages contained predominantly text and graphics with limited movement supported by interactive questions and answers. Development then included more scenario-based problem solving using video clips of simulated workplace situations through to games quality animation with interactive drag and drop problem solving and feedback. Providing problem-solving activities to develop higher order thinking skills and application of their learning is an important element of the packages. The aim was create an 'active learning environment' (Interview) with a shift from training delivery focus to learning facilitation. This was described in terms of a 'shift from the "push" concept of training to the "pull" concept of learning where the trainees can extract information/knowledge for themselves from the multimedia' (Interview).

Underpinning the TTC development of the instructional design specifications for TBT has been their research into instructional design, adult learning theories and online usability. The Army has traditionally adopted a behaviourist, competency-based approach to training based upon the Army Training System (ATS), 'the cornerstone for all military instruction' (Training Technology Centre 2003, p. 12). Although TBT needs to comply with the ATS, with the refocus on learner facilitation there has been a shift to include features of other learning orientations, such as a constructivist approach, within the body of a basically behaviourist lesson.

Another important aspect to the design of these packages was that they needed to reinforce the Army culture and considerable thought and reviewing has gone into presenting appropriate details. 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 the packages. This was considered vital to provide a human feel and a sense of empathy with the characters that model skills and lead the learners through the package.

The courses that were targeted for TBT development included subjects that involved high student movement costs and high training costs, such as those courses requiring regular refresher training for all personnel (e.g. navigation and first aid), and core courses for promotion (Subject 1 Sergeant and Subject 1 Corporal). Other legislated courses were also targeted for TBT (e.g. equity and diversity, fraud and ethics) with the aim that all staff will be able to do the courses in their own time and at their own pace.

The TTC has also formulated procedures for the development and quality testing of these products that reflects priorities for content and technical checks and trialing and evaluation of the products with learners. Trial evaluations of learning effectiveness, design and usability of these packages provided results that supported TBT development. Test outcomes (both post test and retention testing) indicated that trainees learning by TBT were achieving grades that matched the training effectiveness of traditional classroom instruction. There was overall good user satisfaction with
positive reports of self-paced learning and interesting scenarios and graphics. The TTC also received external accolade with two 'Australian Interactive Media Industry Awards' in 2002: the 'Best of the Best' and the 'Best Education & Reference' awards.

Thus, from 1996 to 2003 there was a substantial process of growth and development involved in the introduction of the concept of TBT. Initially driven by visionary individuals it is has now become an established part of Army training. It has involved a change process that was aligned with Army culture and it was initiated and driven by training middle managers who appreciated high level pressures and inspired lower level work teams. Considerable investment had been made in the staffing, infrastructure and evaluation procedures to support this development in line with Army training requirements and individual training needs. This commitment resulted in the necessary strategic support from Army Training Command to sustain TBT development through frequent managerial and operational changes.

**Move to Web-based learning**

The first phase of Project DOMAIN, which is one of the largest eLearning project ever undertaken in Australia, went live in November 2003 to the Defence Materials Organisation (DMO) and Army staff. The full roll out which will be completed by December 2004, will involve Navy, Army, Air Force and 11 defence civilian groups (Mills, 2003). The rulings governing the content development for the ThinQ™ LMS come through the Information Systems Directorate (ISD) that is the guardian of the Defence Restricted Network (DRN) in Canberra. However, as this development was in response to a top-down external directive imposed on the Army Training Command with no consultation with staff there were likely to be impacts on course development.

Accompanying this change was a new Training Command-Army Instruction in February 2004, 'TC-A's Flexible Learning Plan'. This builds on the previous policy of promoting blended delivery methods with a more specific description of 'multiple learning pathways' within courses to maintain the quality of learning (p. 3). There has also been a shift to the use of the term 'eLearning' that reflects a learning process definition rather the previous TBT delivery focus: 'Elearning is the broad term given to a number of 'types' of learning that result when course information, learning resources, instructional modules or ultimately, complete courses are accessible on-line. In a mature state, eLearning makes significant use of Web Based Technology (WBT) to support communication between trainers and learners, among learners and between learners and learning resources' (Headquarters Training Command, 2004, p. 4).

This definition also suggests that there is an understanding of an inherent evolution of stages in the development of eLearning within the organisation. This focus on learning facilitation is reflected in the issues raised in the interviews with TTC staff that follow. Reflecting changes in understanding of the role of eLearning in policy documents has provided strategic support for sustaining change.

**Experiences of the change process**

There have been previous impacts on TCC staff due to changes in TBT development. This included the shift from analogue film and video as learning tools to CD-ROM. For instance, audio-visual staff had to research and learn about digital production technology and techniques, including initial quality problems in compression when converting from analogue to digital media. They were able to build on their previous skills and knowledge of the learners to develop relevant and good quality digital video.
Learning new computer skills in using Authorware Professional™ and Director™ advanced them forward in digital video integration. Learning was often through trial and error on the job, but they had the time and support to learn these skills. However, the shift to Web-based learning has been much more sudden and it has had a greater impact on the staff with some sensing an erosion of their status due to a reduced need for their current skills. Recognition of the time needed to adapt existing skills and to learn new skills in the new learning environment was important.

Similarly, for instructional designers and developers, Project DOMAIN involves a 'total shift' (Interview) in the way that courses may be designed and presented. Over the previous four years they had developed high-level skills in using Director™ that enabled them to produce high quality interactive multimedia. Director™ enabled them to develop all the multimedia that they wanted for the CD-ROM packages: The 'look and feel was beautiful-it allowed subtle shadings. It gave all the functionality that they wanted, such as, scenarios' (Interview) and allowed them more options to develop 'authentic learning and assessment activities beyond multiple-choice' (Interview). Many of the staff also enjoyed being a part of video shoots as role models on the CD-ROMs. There was a sense of pride in their work and satisfaction in being involved in the production of a complete product 'from go to whoa' (Interview). While there was a need to continually update skills, they found the multimedia was challenging and interesting to develop. Some resistance had developed from a sense that these skills will not be as relevant in the Web-based courses.

The prime concern for the instructional designers with the shift to Evolution® was the pressure placed on management to go to Web-based learning without consultation about the impact on learners: 'The pressure to put things on the Web is a financial decision... It does not provide effective content for all learners' (Interview). Thus, some concerns had emerged with the shift to more centralised decision-making about the choice of eLearning format which was not necessarily based on learners' needs which was their priority. Maintaining communication channels to express these concerns was important.

Development of CD-ROM packages involved considerable investment in infrastructure and new software, such as Director™. Also, as Director™ was not simple to learn to use, expert external contractor coders with this experience were employed and provided on-the-job training for Army staff. However, using Director™ to create eLearning was likened to 'cracking a walnut with a sledgehammer' (Interview) and it was suggested that simpler (and cheaper) ways of presenting learning activities may be effective. Thus, re-evaluating the design and development of eLearning was being influenced by the Project DOMAIN requirements.

Some management without any consultation; it was a matter of 'You will do it...' (Interview). The speed of the changeover left them short on the necessary skill-base to develop courses in Evolution™ or the Web tool related skills, such as, Flash™. There has been considerable external pressure to produce a Web-based course for trialling in early 2004 despite the time needed for planning and trialling. During early 2004 the development and trialling of the Army's first Evolution™ based course for 'Grade 2' (an officer promotion course) was being undertaken. While there was resistance to change from this external directive there was also optimism that they will manage the change, given time.

This was called a 'consolidation period' (Interview), where they need some more time to understand the new medium. There will also be a need for more evaluation to determine the 'proof of the concept' (Interview) in the Army environment. Having an
established work team with knowledge of the learners' needs and experience in implementing eLearning packages, supported by organisational guidelines, procedures and training will assist this process. Some of the main change issues described by the respondents are discussed and recommendations are made based on these issues.

**Technical factors**

Although the Army had a well-established infrastructure for CD-ROM delivery the demands of implementing ThinQ were underestimated: 'Setting up the infrastructure for Project DOMAIN could have been a whole project in itself' (Interview). The territoriality (described in an interview as 'turf wars') of the many disparate groups in the Army who needed to cooperate to make this work was more of an issue than with stand-alone CD-ROM implementation. Also, when initial technical trials were done for ThinQ problems arose with differences in the configuration of individual computers even though all computer equipment needs to conform to Army Standard Hardware and Software Environment (ASHSE). There was need for time to inform and organise these groups into a transition plan to consider these differences.

Evolution® has also caused some initial problems as it is a new product both inside and outside the Defence Department so there is a low skills base. However, it has been relatively easy to learn on-the-job. The main issue has been the reduced options for designing learning activities and assessment items, compared with the CD-ROM courses, and its lack of compatibility with other programs, such as Director™. Designers have found that directions from the ADO about the 'look and feel' (Interview) of the courses have further exacerbated these inherent limitations. These restrictions on course design compared to the relative creative freedom the team experienced using Director® has created some resistance.

For example, the ADO predetermined frame theme must appear on each Web page, controlling the design and editable area available. This has prohibited the use of full screen Web pages or Flash animations. Also, due to compression problems all graphics for the Evolution based course had been to be done in Flash 6, rather than Flash 5 as required by the ADO. These directives represent a change in the autonomy that the TTC had in developing design features that were relevant to the learners' needs. Good communications between the centralised decision making organisation and the development teams will be essential for efficient and effective course development in this changing environment.

Many of the technical problems associated with the introduction of Web-based learning are related to the bandwidth available through the Defence Restricted Network (DRN) and the associated directives coming from the Australian Defence Organisation about file sizes. ADO has placed a limit on all files, limiting the use of any video based multimedia and larger Flash files. Transferring higher-level learning experiences developed through Director® to the Web-based environment was desired in the team. Flash has been used to attempt to provide adaptive feedback to the trainees' replies in assessment activities similar to those provided on the CD-ROM packages. That is, the response the learner receives depends on the answer given. However, there have been issues with the interface between Flash, Evolution® and the ThinQ® where the results of such tasks cannot be recorded automatically on ThinQ®. Recording progress and grades is important, particularly if more online summative assessment is to be introduced. Applying previous experiences in providing effective learning assessment activities provides challenges that could ultimately improve the Web-based learning environment.
Related to technical change was the need for a skill shift from multimedia software to authoring software for the Web. The course developers were trained at the School of Army Engineering in Web design and Web related software and multimedia programs (e.g. Dreamweaver®, Flash™, Fireworks®, Adobe After Effects®, 3D Max®, Photoshop®, Illustrator®) but most of this was only basic training. As there are Web masters used in the Army, the TTC team has not had the opportunity to develop more advanced Web-based skills. An external contractor skilled in Flash was recently employed to provide the necessary expert skills and on-the-job training for the staff. There was a positive attitude to learning these new skills but the pressure of time to develop Web-based courses had not given them the opportunity to 'play and learn' on the job (Interview). Building on existing enthusiasm to learn new skills will help overcome initial resistance to change.

They have found Flash™ easy to learn but limited in its graphic capabilities compared to Director™. It has been used initially for graphics that provide 'amusement' or 'interest' (Interview) rather than for creating learning activities. There has been a consequent shift in visual quality in the courses from 3D to vector quality: 'They only get a book on the computer' (Interview). Learning to apply Web related tools to provide effective learning based on past experience would involve investment in staff training and trialling and evaluation of the packages. The impact of the use of 2D and 3D animation and video on learning also needs further research.

The role of multimedia course content was forced to change with the introduction of Project DOMAIN. There had been a shift from using 3D interactive multimedia for learning facilitation to a focus on mostly text-based Web content with Flash™ animation support. Various compression software programs for video files were being explored, such as QuickTime™ and Flash™ Codex that should provide more options for visual production. The shift to DVDs from CD-ROMs also provided the possibility for more capacity, better quality and greater length in multimedia production. It is expected that video or animation on stand-alone DVDs will be used to provide additional course information until the available bandwidth improves. Thus, a blended model was suggested where the trainees read the Web-based course text and then go to an executable to call up multimedia from a file or be asked to insert a DVD with 'immersive animation' (Interview). However, respondents suggested that this could introduce another level of technical complexity of compatibility between systems and it could add to the complexity of use for the trainees. This will need further research and testing. Thus, with the ongoing change, being able to adapt previous knowledge and skills to the changing learning environment will be advantageous.

Providing interactivity in terms of using Internet communication (e.g. discussion forums and chat) in Web-based courses had not been explored at that stage. This was viewed as a more mature stage in the development that will come later. Other implementation issues had a higher priority at this transition stage. This may also reflect the way that the multimedia has been utilised as mostly residential based learning, rather than true distance learning, or the culture of Army training. The communication opportunities provided in the Web-based learning environment in relation to the learning needs and culture will need further investigation.

**Learners' needs**

The main area of concern was that the features of Evolution™ and the ADO directives would result in insufficient control over the design of an effective learning environment. Instructional designers stressed the importance of understanding soldiers' learning styles, which from their experience in the field is predominantly auditory and visual.
Evolution was viewed as 'a rapid way to put text on the screen' (Interview) but not necessarily an effective learning environment. It was argued that while more focus on text-based learning would suit some courses for highly literate (reading and computer) learners, and for some topics, such as project management, there are other courses that would provide more potential for using multimedia: 'If they need to deliver content with practical skills to low literacy learners, this will be a failure' (Interview). It was considered important to understand when trainees learn best with text, video or graphics. There was also concern about the look and feel of the courses authored in Evolution™ for the trainees who had already used the multimedia packages: 'its absence may affect how they feel about Web courses' (Interview). There was also confirmation that some assumptions about the learners had been made previously and that there was a need for more research into their learning preferences and literacy capabilities (including computer literacy).

The higher level learning activities they had become accustomed to producing in Director™, such as simulations and problem solving scenarios, were not considered currently possible in Evolution™. Instructional designers also realised that they have to understand and work within the limits of Evolution™ to be successful and that part of the frustration is coming from the assumption that CD-ROM multimedia is the only way to present learning activities. The change in perspective was expressed as: 'If Evolution can effectively deliver the content then it should be used - if the learner can get something from it' (Interview). There was optimism that the instructional designers would produce quality learning but it would be different: 'The effectiveness may not be as good but the trainees will still be competent' (Interview). Thus, the relationship between the Web environment and learners' needs was being evaluated in terms of previous experience with CD-ROM course development. By applying the knowledge and experience of the learners, new ways of providing effective learning are likely to evolve.

For the instructors, this is also a new learning environment that will take time to learn to use effectively. There have already been many challenges for them with CD-ROM training due to the traditional nature of Army training and the need for demonstration of practical skills. It is important that they are consulted and included in the communication and implementation process. Instructors are vital in the trialling period and further research into their perceptions and needs is important. Similarly, further research into the learners' perceptions of these eLearning environments and their effectiveness is essential.

The future

Despite some initial resistance, there is optimism that they will manage the ongoing technical challenges. As bandwidth access improves there is the expectation that, with developing knowledge and skills, they will be able to exploit the opportunities to continue to provide effective eLearning. The respondents provided some visions for eLearning that reflect the need for alignment of technological change and organisational culture. These include:

- The need to investigate security issues for more online assessment;
- Synchronous chat, threaded discussions with a moderator assessing people on comments but 'they are not at that stage yet' (Interview);
- Using multimedia DVDs for learning within a Web-based environment with the different media being transparent to the users;
Assistant (PDA). Soldiers can use these in combat with wireless technology;

- More distance learning for residential learning in the workplace and during operations;
- DOMAIN based courses that are truly embedded in learning regimes and truly embedded in the formal part of the course, not as trials; and,
- Courses to be totally engaging and interactive based on educational theory principles.

While the conservative culture of the organisation provides challenges for eLearning it can also provide the strategic support and planning to encourage sustainability with ongoing changes in technology and operations.

**Conclusion**

Within the TTC, collaboration and support was important as it allowed workplace learning that: 'inspires inventiveness and gives them latitude for making mistakes and fosters a sense of worth of the technology' (Interview). Reflecting the changing nature of technology, Hedberg and Sims (2001) highlighted the evolution towards collaborative eLearning development teams, with the warning: 'Without involving all members of the development team in all phases of the production, the likelihood of a technology-pedagogy mismatch is increased' (p. 206). This creativeness and flexibility in the TTC had allowed the development of eLearning that reflected the Army culture and the skills, knowledge and attitudes required of the learners. In the face of change, the multidisciplinary strengths of individuals and their collaborative skills need to be encouraged to maintain a durable and sustainable team structure.

This study has also shown that rapid, externally driven change that does not include effective collaboration and communication can lead to resistance and reduced support for the new innovation. Rogers (1995, p. 4) argues that 'the diffusion of innovations is a social process, as well as a technical matter'. Further, he argues that understanding the 'characteristics of the decision-making unit' and maintaining communication channels are important for effective diffusion of an innovation (Rogers 1995, p.163), such as eLearning. Ellsworth's (1995, p. 27) 'Change communication model' also proposes that establishing two-way communication channels between the change agent and the adopters is essential to provide feedback about stakeholders' needs and concerns. However, Ellsworth (1995, p. 28) also recognises that encouraging bottom-up communication may represent 'systemic change' in the change environment. Thus, improved communications across the defence forces and within the Army may be important to effectively manage this changing eLearning environment. However, the conservative, top-down nature of the decision-making units may make this a difficult process.

The perception of Web-based learning by the respondents was based on their previous experience of CD-ROM development and its use. The perceived nature of the innovation's attributes and their affect on adoption rate is also considered in change theories (Ellsworth, 2000; Rogers, 1995). To understand the areas of resistance in the TTC it would be useful to consider Roger's (1995, p. 207) 'Perceived Attributes of an Innovation' that contribute to the rate of adoption: 'Relative Advantage, Compatibility, Complexity, Trialability and Observability'. Similarly, Ely's (1990, p. 299) study of the implementation of educational technology in education-related contexts led to eight 'Conditions for Change' some of which are relevant to this study including: 'sufficient knowledge and skills to do the job', 'time', 'commitment' and 'participation' in the change process. It is proposed that by providing strategic approaches that focus on these change variables, the goal of developing effective eLearning in a changing
environment could be sustained.

This case study has provided a snapshot of the issues involved in the transition to Web-based course development for Army staff in early 2004 within the context of their previous TBT development. This was a unique opportunity to gain a perspective of change processes as part of an on-going research project into eLearning effectiveness in the Australian Army. It is hoped that an update of this case study can be delivered at the AusWeb05 Conference.

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