



Queensland University of Technology
Brisbane Australia

This is the author's version of a work that was submitted/accepted for publication in the following source:

[Becker, Karen L.](#), Fleming, Julie, & [Keijsers, Wilhelmina](#) (2011) E-learning in traditional industries: balancing the preferences of an ageing workforce with the expectations of a technology-savvy generation. In *25th Annual Australian and New Zealand Academy of Management Conference: The Future of Work and Organisations*, 7 – 9 December 2011, Amora Hotel, Wellington, New Zealand.

This file was downloaded from: <http://eprints.qut.edu.au/48215/>

© Copyright 2011 Please consult the author(s).

Notice: *Changes introduced as a result of publishing processes such as copy-editing and formatting may not be reflected in this document. For a definitive version of this work, please refer to the published source:*

E-learning in traditional industries: Balancing the preferences of an ageing workforce with the expectations of a technology-savvy generation

ABSTRACT *There is widespread argument that traditional organisations and industries with a predominantly older workforce who are not using computers as an integral part of their work, are unlikely to embrace the opportunities afforded by e-learning. However, the challenge remains to engage a younger generation of learners who seem comfortable learning with technology, whilst not alienating those older learners who may prefer to learn in more traditional ways. This paper analyses data from five case organisations within the Australian rail industry to identify how the potential of e-learning can be realised whilst acknowledging the technological divide between younger and older workers.*

INTRODUCTION

In developed economies such as Australia, e-learning has emerged as a powerful addition to traditional models of workplace training. In a recent survey of 800 employers in Australia, 50% indicated that their organisation was already using e-learning, and 60% expected this use to grow in the next two years (Australian Flexible Learning Framework, 2010). E-learning is commonly used to enhance learning, improve performance, develop skills and increase levels of motivation (Ali & Magalhaes, 2008). Moreover, e-learning is often argued to be more accessible, efficient and cost-effective than other forms of corporate training (Kathawala & Wilgen, 2004). E-learning can also provide the opportunity for ongoing learning and information sharing across geographically dispersed organisations (Barnes & Charles, 2004). It is for these reasons that e-learning offers attractive prospects to industries such as rail, and these organisations have embraced e-learning to varying extents. However, there is also widespread argument that traditional organisations and industries with a predominantly older workforce, who are not using computers as an integral part of their work, are unlikely to embrace the opportunities afforded by e-learning.

The emergence of e-learning

Within the broader context of the debate about the technological literacy of different generations and the potential for educational change, e-learning has emerged as a critical approach that enables organisations to keep up with an ever changing world (Wellman, 2007). E-learning has been the subject of wide discussion in the literature, with much of the early research having been conducted in the tertiary education sector and other similar settings (Barnes & Charles, 2004). Corporate university and

vocational education and training (VET) settings have been found more recently in the literature as e-learning adopters. However, there remains a dearth of empirical research to establish the effectiveness or otherwise of different e-learning approaches, particularly in organisational settings (Welsh, Wanberg, Brown, & Simmering, 2003).

Many terms have been utilised for learning involving technology, and definitions are varied depending on the community and the context. Whilst this can create some challenges for reviewing the literature, the concern of Servage (2005, p. 305), that there is an “utter lack of consistency” in the terminology surrounding e-learning, is perhaps an over-reaction. The literature search for this research found that definitions of e-learning range from the simple to the more complex, but typically have similar elements. The simplistic definitions tend to focus on the idea that e-learning is “instructional content or learning experiences delivered or enabled by electronic technology” (Servage, 2005, p. 306), and this is the definition adopted for this research.

The growing importance of technological literacy has impacted on the older workforce in a number of ways. Older adults often face the stereotype that they are rigid, do not want to learn, are resistant to using computers and have great difficulty using them, although that does not mean that older individuals are not interested in participating in e-learning at work (Githens, 2007). To implement e-learning successfully requires, among other things, senior management commitment, an understanding of cultural and technical obstacles, and a need to be compelling to the target audience (Hogarth & Dawson, 2008). If that audience comprises both older and younger employees, a further challenge involves addressing the needs and preferences of both groups whilst also acknowledging the importance of knowledge transfer between older and younger employees.

Digital natives versus digital immigrants: a useful distinction?

Much has been debated about the younger generation who has grown up with technology and how they differ from previous generations. When Prensky (2001) coined the terms “digital immigrants” and “digital natives” over ten years ago, a debate emerged about the differences between the generations in terms of their learning approaches and preferences, and the way in which they view technology. Prensky (2001) argued that those individuals who have grown up with technology have a very different outlook from those who have learnt it at a later stage in their life, likening it to the learning of a

language, and arguing that learning a language later in life engages a different part of the brain, fundamentally impacting upon how we use that language.

Whilst this argument had face validity and was appealing to a wide range of audiences, it sparked a call for evidence to support such claims (Bennett, Maton, & Kervin, 2008; Helsper & Eynon, 2010), with researchers and commentators asking whether age is the only factor that impacts upon ways in which we learn with technology. Senior and Cubbigge (2010) warned against classifying this generation as digital natives, but acknowledged that those born when technology was widespread and mainstream do view knowledge differently from older generations and interact differently with one another, urging educational institutions to consider how these individuals are taught and asking for consideration of how to effectively integrate this generation into the workplace.

Frاند (2000) offered an alternative way to view the younger generation that has grown up with technology, referring to their possession of an “information mindset”. Whilst Frاند (2000) was specifically describing characteristics of those who have been born during the age of technology (digital natives), it is not difficult to extrapolate the alternative, more traditional (digital immigrant) view as summarised in Table 1.

[Insert Table 1 here]

Questions have also arisen as to whether a year of birth defines whether or not an individual is considered a digital native, or whether it is possible to “become” a digital native with sufficient exposure to and experience with technology. In research conducted by Helsper and Eynon (2010, p. 504), it was found that “breadth of use, experience, self-efficacy and education are just as, if not more, important than age in explaining how people become digital natives”. So, whilst the distinction between digital natives and digital immigrants has begun a conversation and critique of approaches to learning and education, it is also clear that more empirical research is essential to separate facts from appealing anecdotal distinctions. With this caveat in mind, it is also clear from the literature that there are generational considerations for the use of e-learning.

The Australian rail industry: The challenge of e-learning in a traditional industry

For the purposes of this research, the Australian rail industry is considered to represent a more traditional and less “high-tech” working environment than might exist in some other sectors. An

industry such as this may, by its very nature, offer additional barriers to the adoption of e-learning. Although there is still a significant move towards the integration of technology into the sector, the workforce in the rail industry remains predominantly blue-collar labour undertaking manual work, the majority of whom hold a maximum of secondary or trade qualifications. Throughout urban and regional Australia, the rail industry employs over 40,000 people in diverse occupations, spread across the continent. The challenge of an ageing workforce is being felt more acutely in the rail industry than in the general workforce, with the ABS Labour Force Survey for 2006 indicating that the median age of Rail Transport workers was 44 years, while the median age of all Australian workers was 39 years (Australasian Railway Association Inc, 2008, p. 5). The Australian Rail Association (ARA) expects almost 20% of the current workforce to separate from the industry, further impacted by another 20% (1413) in retirements before 2013 (Australasian Railway Association Inc, 2008, p. 27).

Coupled with this loss of workers, the industry faces the problem that youth are not attracted to rail and new recruits are not retained, and it has been argued that these groups of younger employees are a major labour pool which could be better accessed for the sustainability of the industry (ARA, 2008, p.13). The overall labour turnover in the rail industry is relatively low in comparison to other industries (Australasian Railway Association Inc, 2006) and retention in general is not seen as a key issue for the industry, with the exception of particular professions and expertise that are subject to shortage beyond the rail industry. However, research has shown that retention is disproportionately low in some demographic groups, especially in the group of employees aged 25 years and below. “It is cause for concern that the stereotypical image of the rail industry as being slow and resistant to change is unlikely to change without a key focus on innovation which in turn is difficult without an element of refresh in the workforce” (Australasian Railway Association Inc, 2006, p. 11).

Workers who intend to leave the industry in the short term report being least satisfied by training, and this concern, amongst others aspects, is given as a reason for considering their exiting the industry (Australasian Railway Association Inc, 2006). Therefore, there is an imperative to develop training delivery resources available to the industry to meet not only the needs and preferences of the current workforce, but also those of the future workforce, and particularly, the younger generation. As the Australasian Railway Association (2006, p.15) emphasises, the view of skills development in the

industry as linear and traditional, “is unlikely to meet the expectations of younger workers joining the industry”. This is because younger generations are more accustomed to rapid, parallel processing and tend to seek immediate feedback and rewards (Prensky, 2001). Therefore, e-learning is argued to be better suited to meet the needs of these younger workers who are more accustomed to the use of electronic mediums. However, it is important to bear in mind that much of the training in the rail industry occurs within the blue-collar workforce which does not use computers as a part of its daily work and is often assumed to have limited technological literacy. Such assumptions, however, have not been tested, and as highlighted throughout this literature review, the implementation of e-learning often relies on assumptions or estimations.

This research aims to begin addressing the lack of empirical research on e-learning in organisational and industry settings, and particularly in relation to a traditional industry with a large contingent of older workers. This research sought to answer the following questions:

1. How is the Australian Rail industry currently using e-learning?
2. What are the key barriers to using e-learning in the rail industry?
3. Can e-learning be used to engage different generations of learners in the rail industry?

In order to answer these questions, a research design and methodological approach were developed and utilised with five case organisations within the Australian rail industry.

METHODOLOGY

The research adopted a qualitative case study approach with a purposeful sample chosen to ensure case organisations ranged in size, location and extent of current e-learning usage. As is predominant in the Australian rail industry, all case organisations are 100% state government owned, and each case organisation is based in a different Australian state; however, some also operate interstate for some services. There are a variety of e-learning systems being used, from in-house stand-alone platforms or systems integrated with the HR Information System through to use of outsourced e-learning systems. Some are quite advanced in their use of e-learning whilst others have only recently implemented limited amounts of e-learning.

These organisations cannot be identified by name, in accordance with the terms of the ethical clearance for this research; however, a general description of each organisation is provided in Table 2.

[Insert Table 2 here]

Semi-structured interviews of one to two hours' duration were conducted with staff identified as those most heavily involved with the design, development and implementation of e-learning in the organisation. In one of the larger companies, this was an e-learning specialist, but in the others, it was typically a learning and development manager. In addition, organisational documents were obtained where available, and demonstrations of the e-learning products currently in use were provided. All interviews were recorded and transcribed to ensure an accurate account of the content, and thematic analysis against the research questions was conducted using NVivo.

FINDINGS

The data collected from the five case organisations were collated and analysed in order to address the research questions identified. Interview transcripts, along with the secondary data in reports and other organisational documentation, provided the basis for the findings.

Current use of e-learning

The first research question focussed on an analysis of how e-learning is currently being used in the Australian Rail industry. Three elements were considered: the type of content being delivered via e-learning, the current e-learning systems and approaches being utilised, and the perceived effectiveness of current e-learning approaches. Each of these elements contributes to a more comprehensive understanding of the current use of e-learning in the rail industry.

All five case organisations were using e-learning to some extent. However, the size of the organisations tended to have a direct link with the amount and extent of e-learning used. The two larger organisations had budgets that provided for e-learning specifically, and could benefit from the economies of scale resulting from a large workforce accessing the training. As one interviewee from one of the large organisations explained:

A large audience is a good start because e-learning's typically more expensive to build than face-to-face but if you've got a large audience the unit cost of delivering e-learning is much cheaper. Ultimately there's a return on investment point in that.
(R3)

The three smaller organisations struggled to justify the large up-front expenses associated with e-learning products, but even these had some form of e-learning or blended learning solution, with an

increase in its use planned for the future. However, many of the rail organisations interviewed were not only responsible for compliance in relation to their own employees, but also had a duty of care to contractors and other third parties. The use of e-learning for these audiences therefore provides an opportunity to significantly boost the audience which, in turn, could bring down the unit cost of training.

The most widely addressed content in e-learning was of a compliance or regulatory nature, and e-learning was identified by all five organisations as a useful vehicle to meet the statutory and legal obligations of their organisation.

A lot of the new ones that we have that fit into the mould of corporate management training, that is that everyone at [R4] has to do them. Things like information security, environmental awareness, code of conduct, building emergency procedures, evacuation procedures for individual buildings. All those sort of courses have to be done on a regular basis, depending on the actual product, some are 12 months, some are two years... (R4)

Even within the single industry, there is significant variation in regulations across Australia, and the ongoing evolution and revision of these offered significant training challenges for every case organisation. The ability to roll out e-learning to address these changes in regulations was seen as an attractive alternative to face-to-face methods:

I think the business is more aware of some of the efficiencies [e-learning] offers and on the backs of things like our own self insurance where we had to have so many people trained in so many things for OH&S ... They recognised that whilst that was all done face-to-face ... it was huge. Tens of thousands of training interventions and the business, when they have to do that, it's a killer. So they're just looking for better ways to deliver some of this [training]. (R3)

However, being able to promulgate training about changing regulations and requirements is only part of the equation. The nature of rail organisations means a widely geographically dispersed workforce. This necessitates extensive travel expenses in order to attend face-to-face training in the larger metropolitan centres and, often more significantly, an accompanying disruption of work to allow for travelling time. Therefore, e-learning was also used to minimise the requirement for travel and time away from normal duties:

One of the main issues with operations is removing people from the job. When you have a face-to-face [training] situation you have to remove people from the job. We have roster processes and things like that and sometimes it's so finely tuned that to remove someone is very difficult. Now by using online and blended learning options that reduces that and managers are quite keen on that. (R5)

In relation to the approaches being used, one notable finding is the fact that all five of the organisations in many cases had chosen the use of blended learning in preference to courses that were entirely online. In these cases, the organisations were attempting to use the benefits of some delivery electronically, whilst not totally losing the face-to-face element valued by many learners. It is of note that e-learning was not seen as the answer to all learning and development requirements, even by those who were strong advocates:

Well ... e-learning is not the best for everything and I mean, I know that. I'm an e-learning developer and my whole career is based on that [but] I do agree that face-to-face can work better than e-learning in certain situations. E-learning can work better or the same as, in other situations. You know, where you might have a two-day course, I might be able to build you an hour long module that covers the same sort of content, have the same sort of learning and outcomes. (R4)

The approaches to “blending” learning, however, differed significantly depending on the content being covered, and the target audience for the training. Some of the approaches to blended learning involved conducting preliminary e-learning modules that were later followed up with shorter, face-to-face, classroom-based training for extension and application purposes. Two of the organisations were involved in training that was conducted as an e-learning course, but participants were still located in a room together to undertake this training to allow for additional support when necessary:

At the moment they don't have the PCs so they're presently coming into the central location, that's in their head office, and there's a number of PCs set aside, they're more or less as kiosks, so people are rostered through to do their training there... We have PC training rooms, so for this procurement roll out, etc, there's PC training rooms set up around various points and training is delivered that way in a classroom, and often all the learning for some of those things is actually offered basically on the PC but there's someone there to hold hands. (R3)

Finally, the focus on the way e-learning is being used in the rail industry turned to the effectiveness of current approaches. The evaluation of any type of training is usually fraught with issues and e-learning is no exception. When asked about the effectiveness of their e-learning efforts to-date, most of the interviewees felt that positive outcomes had been gained:

You know, so, yeah we've had really good feedback from the individuals. Success-wise for the organisation, it's much more flexible. (R2)

However, much of the feedback and evaluation was at best evaluating reaction and learning outcomes, the first two levels of the widely recognised evaluation model by Kirkpatrick (1998).

Kirkpatrick (1998) argues, however, that to show the true value of any L&D program, evaluation of

behaviour change and return on investment is critical, but also more difficult to measure. Evaluation and the ability of L&D practitioners to provide strong empirical evidence for the value of e-learning were noted by all interviewees as critical needs and things to be addressed in the future.

Barriers to using e-learning

The second research question asked, “What are the key barriers to using e-learning in the rail industry?” The critical barriers identified in the analysis related to resistance to change, infrastructure, learners’ technological literacy, and management understanding and support.

E-learning takes place within a learning environment that is fundamentally different from a traditional classroom. Perhaps the greatest challenge for an employee learning online is adjusting to an environment without face-to-face contact with other learners and the instructor. This lack of personal interaction and isolation is foreign to many in terms of their past learning experiences, particularly in the rail industry where face-to-face training has been used for generations. The case organisations all reported struggling with resistance to change, and reported that a large part of implementation related to advocating for e-learning and demonstrating that it is a valid way to learn:

The main barrier for us is getting people to recognise that it is considered relevant training and a relevant way to present training because a lot of people still believe that the old classroom way is a lot more efficient. (R5)

Even those who may have been receptive previously and therefore used earlier “generations” of e-learning systems may have been deterred by the limitations of this primitive technology. In some organisations, the history of e-learning in the organisation represented a significant barrier. When previous e-learning initiatives were implemented in an inappropriate manner, or where there were issues with the technology, employees were less receptive to the use of technology for training. As technology changes, these problems may no longer apply or can be easily overcome; however, the memory of previous “failed efforts” remains.

Because it’s still looked at as a very poor substitute to the current way everything’s done, which means that you have to try and make these things look very, very good and links work and things like that. When things fail you from a technical point of view, it doesn’t matter how good the course is. (R5)

The geographical spread of the organisations studied presented challenges for the use of e-learning. Although flexibility and wider access to learning opportunities are advocated as two of the

benefits of e-learning and therefore should be a way to reach out to those employees not located in major urban centres, ironically, it is these employees who may not benefit due to infrastructure constraints. The organisations interviewed had problems with providing adequate access to computers for training in regional and remote locations, and had associated concerns about the technological issues behind this, such as bandwidth and speed of internet access. In some remote communities, broadband connection is not even available, so any e-learning must be able to cope on low speed dial-up internet access without losing its functionality or appeal.

The awareness of management (as the decision-makers in relation to training) of the potential benefits, drawbacks and costs of e-learning was also reported as an organisational issue. Some of the L&D professionals interviewed were concerned about the perceptions (and sometimes misconceptions) of e-learning and how to effectively educate decision-makers about the use of e-learning. Some organisations had embarked on a program of raising awareness of the appropriate use of e-learning. Others were concerned that it was either dismissed as an unrealistic alternative, or, at the other end of the spectrum, seen as the answer to all training issues. Regardless of how it was being addressed, the issue of management support was a critical factor for all five organisations:

And I think also, I think some of the inhibitors can be higher management, you know. I think they don't necessarily have a grasp of what you're trying to achieve either, and it's ... "what's the cost", number one, ... and then the next thing is, "is it worthwhile?", and you've got to go and preach why it's worthwhile ... So, you know, higher management can have that outlook of "we haven't done it in the past. Why do we need to do it now?" (R2)

Across the five rail organisations, it was clear that whilst e-learning was increasing in uptake, and becoming accepted as a mainstream delivery mechanism, it has some way to go before it will be accepted by all as an appropriate way to facilitate at least some learning in the workplace. This, coupled with the more tangible issues of infrastructure and systems, makes it clear that there is some work to be done to capitalise on the potential benefits e-learning may offer. However, the most reassuring fact may be that all organisations interviewed saw significant uses for the future with regards to the use of e-learning, and were embarking on major initiatives to further utilise e-learning in their organisations.

Future use and potential to engage different generations

The final research question focused on the potential of e-learning to engage all generations of learners in the rail industry. All interview participants were looking to the future and predicted that the use of e-learning would continue to grow in their organisations. They saw the potential for engaging with younger learners who are accustomed to technology whilst also believing there may be ways to engage with the older generation who may not be as technologically literate:

You know, I suppose what would probably be good in the futuristic world would be part of their induction, no matter who they are, is see if they need computer support and start them off and give them some basic computer knowledge. (R2)

It was a common approach to look to the use of e-learning for the younger generations even if they were not involved in roles that typically used computers as a common tool of their trade. Two of the organisations were already using e-learning intensively with their apprentices, recognising the importance of demonstrating contemporary technology use:

Also becoming an employer of choice, providing more innovative ways of providing training, learning and development for the younger generation to try and move them in. Because most of the younger generation don't like the classroom situation, they prefer to be able to jump online and do everything online. (R5)

They also recognised that e-learning offers a way to engage a variety of learners and importantly, did not see it as an answer to all training; instead, they favoured the use of blended approaches that provide wider appeal.

But that sort of approach is what we're looking for. If you've got that blended, combined approach in terms of good change solution, good support solution as well as the training in between and a blended solution, you're going to start hitting everybody's learning styles, everybody's preferences. You've got enough critical mass to get your change happening and most training is about a change. It's considering it as part of the whole strategy and how it's better utilised but they just throw it out there and expect people to come. (R3)

As can be seen from the above, the potential of e-learning to serve the rail industry can be extremely difficult and complex in terms of balancing the demands on employees and employers. However, it was also apparent that the L&D practitioners intend to further the use of e-learning, particularly to engage younger learners who are more accustomed to the use of technology in everyday life. Just as apparent, though, is the potential for the use of e-learning in some situations with other workers.

DISCUSSION AND CONCLUSION

This research aimed to investigate the use of e-learning in a traditional industry containing a large element of blue-collar workers to determine the current usage, the barriers to implementation and the potential use of e-learning to engage different generations of learners. The research provided an opportunity to analyse current and potential e-learning practices of geographically dispersed and varying sized rail organisations from across the continent.

With rapid change in all types of working environments, there is a constant need to swiftly train and retrain people in new technologies, products and services. Ardent proponents of e-learning as an approach to employee training suggest a wide range of benefits to the use of technology in training. When considering the potential effectiveness of e-learning, the recognition of an ageing workforce and the fact that many of the current employees are older workers has weighed heavily on the minds of those interviewed for this research. Concern was expressed that the older element in the workforce was not prepared for the widespread use of technology in the learning environment, and that this may alienate a large part of the workforce. However, it is also acknowledged that to assume all digital immigrants are uncomfortable with technology is a dangerous supposition.

The alternate concern, and perhaps more pressing for the sustainability of the rail industry, was the fact that many younger employees are very comfortable with the use of technology, and are, in fact, often more comfortable using this medium to learn than they are with other approaches. Further, this generation of younger employees is not having its expectations met. This poses a challenge for rail organisations; they must be seen to be “keeping up” with technology, and find ways to better utilise the burgeoning use of technology by their younger workers both in and outside of the workplace. The research has identified that there are barriers to the adoption and use of e-learning across all generations, and the problem for management is to balance the learning preferences of all employees while harnessing the potential of e-learning.

Acknowledgement: The authors are grateful to the Cooperative Research Centre (CRC) for Rail Innovation (established and supported under the Australian Government’s CRC program) for the funding of this research.

REFERENCES

- Ali, GE, & Magalhaes, R. (2008). 'Barriers to implementing e-learning: a Kuwaiti case study', *International Journal of Training & Development*, 12(1), 36-53.
- Australasian Railway Association Inc. (2006). 'The changing face of rail: A journey to the employer of choice', in, Canberra: Australasian Railway Association Inc.
- Australasian Railway Association Inc. (2008). 'A Rail Revolution: Future capability identification and skills development for the Australasian railway industry', in, Canberra: Australasian Railway Association Inc.
- Australian Flexible Learning Framework. (2010). '2010 E-learning Benchmarking Survey - Final Report', in, Canberra.
- Barnes, FB, & Charles, WB. (2004). 'Taking Business Training Online: Lessons from Academe', *Journal of Applied Management and Entrepreneurship*, 9(1), 3-20.
- Bennett, S, Maton, K, & Kervin, L. (2008). 'The 'digital natives' debate: A critical review of the evidence', *British Journal of Educational Technology*, 39(5), 775-786.
- Frand, JL. (2000). 'The information-age mindset: Changes in students and implications for higher education', *EDUCAUSE Review*, 35(5), 14-24.
- Githens, RP. (2007). 'Older adults and e-learning: opportunities and barriers', *Quarterly Review of Distance Education*, 8(4), 329-339.
- Helsper, EJ, & Eynon, R. (2010). 'Digital natives: Where is the evidence?', *British Educational Research Journal*, 36(3), 503-520.
- Hogarth, K, & Dawson, D. (2008). 'Implementing e-Learning in Organisations: What E-Learning Research Can Learn From Instructional Technology (IT) and Organisational Studies (OS) Innovation Studies', *International Journal on ELearning*, 7(1), 87-105.
- Kathawala, Y, & Wilgen, A. (2004). 'E-learning: evaluation from an organization's perspective', *Training & Management Development Methods*, 18(4), 501-506.
- Kirkpatrick, DL. (1998). *Evaluation training programs: the four levels*, San Francisco, CA: Berrett-Koehler Publishers Inc.
- Prensky, M. (2001). 'Digital Natives, Digital Immigrants Part 1', *On The Horizon*, 9(5), 1-6.
- Senior, C, & Cubbidge, R. (2010). 'Enhancing employability in the "ME generation"', *Education & Training*, 52(6/7), 445-449.
- Servage, L. (2005). 'Strategizing for workplace e-learning: Some critical considerations', *Journal of Workplace Learning*, 17(5/6), 304-317.
- Wellman, J. (2007). 'Lessons learned about lessons learned', *Organisation Development Journal*, 25(3), 65-72.
- Welsh, ET, Wanberg, CR, Brown, KG, & Simmering, MJ. (2003). 'E-learning: Emerging uses, empirical results and future directions.', *International Journal of Training and Development*, 7(4), 245-258.

Table 1. Potential differentiators between digital immigrants and digital natives (based on Frand, 2000)

Criterion	Digital Immigrant	Digital Native
View of “what is technology”	Includes computers, internet and applications	Includes new computer applications and emerging technologies but excludes the computer and internet itself
Most important information source	Traditional written materials	Internet
Composing messages/reading and writing	Paper/handwriting	Screen/keyboard
Style of learning	Accumulation of knowledge (knowing)	Accumulation of skills (doing)
Problem solving and learning	By logic	By trial-and-error
Focus of attention	One activity at a time (sequential)	Multi-tasking (non-sequential)
Responsiveness	Allow time for processing and contemplation	Immediate, real-time
Connectivity	At set times and places, synchronous	Ubiquitous
Owner of information	Creator	Users
Nature of reality	Clear distinction between real and virtual	Fading line between real and virtual

Table 2. Details of case organisations

Organisation	Approx no. of employees	Employee Locations*	E-learning approach
R1	1,400	Across the state – geographically dispersed	In-house stand-alone e-learning management system
R2	720	Across the state – geographically dispersed	Open source e-learning management system (limited integration to HRIS) Outsource some training to an external e-learning provider
R3	10,000+	Across the state – geographically dispersed	New learning management system currently being sourced In-house development tools Outsource most e-learning development
R4	10,000+	Across the state – geographically dispersed	Internal fully integrated with HRIS
R5	1,400	Mostly metropolitan but some rurally based employees	In-house stand-alone e-learning system

*Although R1-R4 are all noted as being “across the state”, each represents a different Australian state.