
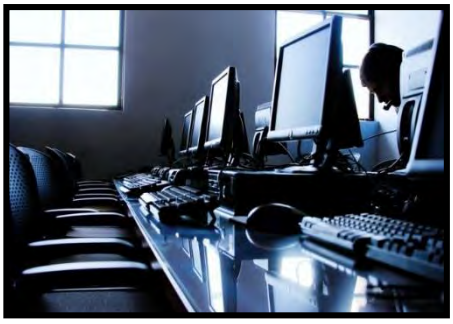

To e-learn or not to e-learn: an investigation into the efficacy, efficiency and effectiveness of converting compulsory staff training from classroom to computer

A dissertation presented to the
Department of Information Systems
University of Cape Town

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(INF5004W)

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ABSTRACT

The purpose of this dissertation was to describe the introduction of an online course to replace the current classroom-based staff training. The long term objective was to measure the efficacy, effectiveness and efficiency of the online training, and to establish whether a transfer of knowledge back to the workplace had occurred.

This dissertation defines the relevant and persisting organisational concern that the previous training on offer was not efficient and not always effective either. The in depth literature review of e-learning implementations, success factors and barriers to adoption is followed by the discussion of the research philosophy and objectives. Action Design Research (ADR), a combination of Action Research and Design Research, was the research methodology chosen as it was deemed a good fit to address an actual problematic situation, in an organisational setting, by building an innovative IT artefact. This artefact addressed not only organisational and practitioner concerns, but also produced learning and academic theory. The implementation of the alpha and beta versions of the online course is then described. The results of the implementation and the link to both the ADR principles and the e-learning literature are discussed in detail.

This research sought to address the core of the IS discipline by bringing an artefact into existence that would solve a need in the real world, and at the same time respond to calls from practitioners to provide practical solutions. The result was a tailor-made, in-house training course which facilitated the empowerment of the trainees whilst enhancing their knowledge and skills regarding the finance reporting system.

This dissertation may be of interest to practitioners or organisations contemplating implementing online training courses, particular those seeking to further their knowledge regarding the efficacy and sustainability of computer-based learning in the workplace. Researchers may be interested in the use of ADR as an effective methodology. Future research could be undertaken concerning interaction in the organisational training environment, such as whether a “Q&A” type of interactive contact is more appropriate in the workplace than a discussion board, as well as the role job responsibility plays in both motivation and successful online training outcomes.

Table of Contents

Index of Figures

Index of Tables

List of appendices

List of abbreviations

ADR	Action Design Research
AR	Action Research
BIE	Building, Intervention and Evaluation
CET	Centre of Electronic Technology
CLT	Cognitive Load Theory
DBR	Design Based Research
DR	Design Science Research/Design Research
EMT	Error Management Training
ID	Identification
IS	Information Systems
IT	Information Technology
KPIs	Key Performance Indicators
LMS	Learning Management System
NCIs	Negative Critical Incidents
PPT	MS Office PowerPoint
RIO	Real Internal Order (part of Finance System components)
SAP CO/CO	Component of Finance System used by the organisation
SSM	Soft Systems Methodology
UCT	University of Cape Town
WWW	World Wide Web

1. Introduction

As global changes to products, services, technology and legislation are occurring with increasing frequency, organisations are experiencing more and more challenges to the sustainability of their businesses (Ali & Magalhaes, 2008; Becker, Fleming & Keijsers, 2012; Ho, 2008). In order to stay competitive, organisations are being forced to continuously examine their operations and review their performance. As technology and the use of various software systems become ubiquitous, the need for a skilled workforce that can operate these systems or extract the relevant information becomes ever more critical. As the business systems are upgraded or changed, one of the many issues facing the organisation is the training and retraining of the staff (Agarwal & Ferratt, 2002; Krunić, 2010; Major et al., 2007). This includes not only the professional Information Systems (IS) component, but also other staff in the organisation, both skilled and unskilled.

With the advent of the internet and the connection to the World Wide Web (WWW), use of technology is now so interwoven with business processes and daily procedures, that it has become almost an imperative that all staff are computer literate (Becker et al., 2012; Moolman & Blignaut, 2008). Before being able to access the information required for performance of their tasks, regardless of their organisational level or department, employees need to be able to use the relevant technology, if only to receive information (Ali & Magalhaes, 2008). Employees should, therefore, not be regarded purely as manual workers, but as assets to the organisation, and valued for the knowledge and expertise they can bring to the overall performance of the business, if effectively trained (Agarwal & Ferratt, 2002; Ho, 2008; Norton, Coulson-Thomas, Coulson-Thomas & Ashurst, 2012; Schmeeckle, 2003). It should be a matter of consequence for organisations wishing to increase their competiveness and institutional knowledge that their staff can contribute to the intellectual capital and enhance the business processes of the organisation. Appropriate training and skills development should mean that the human capital component of the organisation is regarded as an asset and not a liability.

Training is critical in most organisations today (Bondarouk & Ruël, 2010; Grossman & Salas, 2011; Sung & Choi, 2014). Employees are expected to upgrade, or at least keep their skills and qualifications current, whilst still maintaining their usual work duties and meeting their stated objectives. At the same time, there are many changes to both statutory and professional regulations which need to be complied with. There may also be changes to business

processes or systems. Training needs to be relevant to the job and offered in a supportive organisational culture (Cheng, 2011; Kisielnicki & Sobolewska, 2010; Schumaker, 2004). Organisations will reap the benefits of effective training interventions, but similarly, they stand to lose not only financially, but their reputation and goodwill could be at stake if the training is not effective. Mistakes are costly both tangibly and intangibly, particularly in service industries where customer relations are critical.

Staff training, can have a major impact on all aspects of a business and its processes, as well as having a direct input into knowledge transfer and organisational learning (Atkinson, Howells, Reilly & Ross; 2012; Wang, 2011). No matter how innovative an organisation is, if the innovations do not become part of the organisation's business processes, there will be no increase in the organisation's competitiveness. In order for the innovations to be embedded in the business, staff have to first be alerted to the changes, and then be trained how to use them. At the same time, the organisation has to ensure it remains efficient and effective. Productivity and professional levels need to improve and remain high in order for the business to continue to exist and profit. The input of the human factor into a firm's performance should not be underestimated (Ho, 2008; Kisielnicki & Sobolewska, 2010). For example, customer service requires that employees are able to deal with clients in a professional and effective manner. They need to be able to answer questions and respond quickly to requests, and in today's business climate, this usually involves the use of IT systems. Effective financial reporting in an organisation requires staff that can not only run the reports, but are also able to select and analyse relevant source data. Organisational effectiveness can only be achieved if the workforce is enabled and skilled in their respective responsibilities (Major et al., 2007). Regardless of how sophisticated or advanced the technology is, all business processes require human interfaces at some point, and these interfaces need to be proficient and knowledgeable if optimal organisational performance is to be reached.

1.1. Background and problem definition

For some time, there has been a sense of dissatisfaction with the staff training that is offered by the Finance Department at the University of Cape Town (UCT). Over time, reservations and concerns have been expressed by senior managers, the finance trainers themselves, as well as staff members who attend the training courses. This concern has been expressed verbally, both formally in finance meetings, and informally to the finance training team, and on the

classroom course evaluations. The institution requires an informed, skilled body of staff, and the workforce needs meaningful, practical and flexible instruction. The workforce that requires training consists not only of individuals with a professional qualification, but also includes those who fill entry level positions. However, any staff member who requires access to the finance system is compelled to attend the same training courses. In addition, anyone who has not accessed the finance system for more than a year has to repeat the training. There are also staff members who have voluntarily requested repeat or refresher training. The pool of trainees is drawn from many different backgrounds. Some have only basic school leaving qualifications, whilst others hold doctorates. The roles range from administrative assistants to heads of departments, and whilst these heads are highly qualified in their own field, some have no financial background. Simultaneously, the group may also consist of finance managers who have at least a three year financial qualification. Trainees may be newly appointed staff, and unfamiliar with not only the institution, but in some cases, the city or country, whilst other trainees may have been at the institution for many years but owing to a changed role now require access to the finance system. After attending the training, all trainees are expected to perform as knowledge workers in an information intensive sector of the organisation. The financial system used at UCT is a well-known ERP application. The current classroom finance system training system consists of four main training courses: an overview of financial system and reporting at UCT, a hands-on introduction to the system (logging on, password setting, how to access the help), the Funds Management module and the Controlling module. There is also a hands-on course for purchasers, and separate purchasing reporting courses. All the courses build on from each other, and all have to be completed, in the correct order, in order to progress through. This excludes the Purchasing training, which is only for purchasers. Most staff require the first three courses in order to fulfil their roles. The Controlling module is limited to staff who need to perform management accounting functions. The classroom training is lengthy, taking trainees out of the office for at least five days. Missing any of the courses means waiting another month before being able to access the finance system.

The problematic situation is complex as it affects the whole institution at some level. It requires some action to be taken that attempts to improve the current situation and resolve some of the tensions experienced by the different parties concerned, i.e. trainees, their managers, the trainers and the institutional financial operations managers. Any attempt to alleviate the problematic situation requires that all stakeholders are in agreement that the

solution is at least reasonable, if not perfect. Thus although the current training was acceptable, a more flexible, efficient and effective solution was under consideration.

Owing to the severe limitations on resources, both human and financial, the option of offering more courses, and based on pre-assessment, assigning individuals to different classes based on their knowledge and experience, was not viable. Therefore the option being considered was to convert the current classroom-based courses to computer-based courses by implementing e-learning. The word or phrase "e-learning" is defined by the Chartered Institute of Personnel and Development (2012) as "learning that is delivered, enabled or mediated using electronic technology for the explicit purpose of training, learning or development in organizations" (p. 1). Therefore, in this study, the term "e-learning" is used broadly and interchangeably with "online learning" and "computer-based" learning/training.

According to previous research on e-learning, it would appear that computer-based training should be able to address most of the issues presented by the current problematic situation as detailed above (Hamid, 2002; Hay, Peltier & Drago, 2004; Kisielnicki & Sobolewska, 2010). To start with, the problems faced by supervisors who are experiencing difficulties releasing staff due to the clash of organisational needs with training times would be alleviated if not resolved as the dates and times for training would be flexible rather than fixed (Ali & Magalhaes, 2008; Schmeeckle, 2003; Becker et al., 2012). From the trainees' perspective, e-learning offers convenience, flexibility and individualisation. Trainees can choose the location, date and time, as well as the speed at which they wish to proceed. They can repeat a module, or part thereof, whenever they feel it is required, skip sections if they already feel competent in that area and only attempt the final assessment when confident of their ability to pass (Becker et al., 2012; Van Merriënboer, Kester & Paas, 2006; Welsh, Wanberg, Brown & Simmering, 2003). The learning is, to a great degree, under the control of the trainee, and provided the courses are properly designed, should be relevant and immediately applicable to the work situation. This in turn should enhance knowledge transfer for adult learners (Lai, 2011; Merriam, 2001; Wang, Ran, Liao & Yang, 2010).

1.2. Objectives and research question

Based on the above outline of the problem, the related literature and assuming the worldview that e-learning will indeed enable a flexible schedule of course offerings, making them more accessible, controllable, dynamic and examinable, the objective of this study is to convert the current classroom-based finance training courses to computer-based courses.

Based on this objective, the research questions how the implementation of e-learning will affect the learning outcomes of staff training in the workplace. This implementation involves all members of the workforce that require access to the financial system at the institution. The finance training section is part of the finance department of the institution, and is responsible for all finance training courses. It is completely autonomous and there is no integration with either the HR or IT departments, apart from the online booking system and the network/server service supplied by the IT department. It is envisaged that this change of delivery will not only make the courses more flexible, but will assist the staff members to learn, and/or upgrade their technical skills and financial knowledge so that they are able to access the processes required to perform the various financial operations and run reports. The long term goal is to improve the accuracy of the inputs into the finance system, and the financial reporting skills of the institution's workforce, thereby increasing the competitive advantage of the organisation (Figure 1).

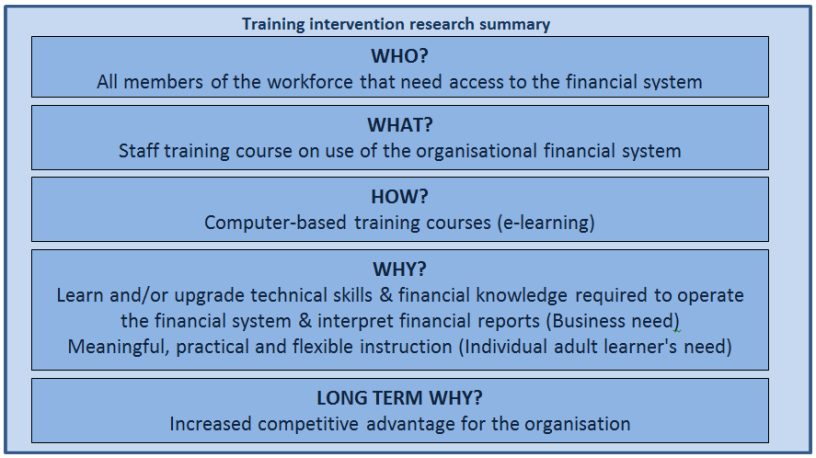


Figure 1: Research to investigate the change from classroom-based to computer-based training for compulsory finance training

The researcher, who is the staff member responsible for finance training in the organisation, first explored the best practices of e-learning, and using the principles that were most appropriate for the particular organisation, as distilled from the e-learning literature, developed and implemented computer-based courses for the finance training modules. The researcher was an integral part of the study and with the dual role as lead trainer, was responsible for implementing the changes that resulted in the emerged e-learning artefact. The research also describes the challenges of implementing and managing the change in a real world situation. Based on feedback from the trainees and trainers, the researcher continually intervened to make further changes to the online course offerings. The study subsequently measures the efficacy, effectiveness and efficiency of the training, and whether there was a transfer of knowledge back to the workplace. As defined by Checkland and

Poulter (2006), efficacy informs the practitioner as to whether the transformation is achieving its desired outcome, efficiency concerns achieving the desired outcome without any wastage of resources, and effectiveness involves the implemented solution meeting long-term or high level objectives.

1.3. Research process

Arising from the debate regarding the use of Action Research (AR) and Design Science Research (DR) in IS research, as well as the similarities and differences between the two approaches (Baskerville, 2008; Cole, Purao, Rossi & Sein, 2005; Iivari & Venable, 2009; Järvinen, 2007, Papas, O'Keefe, & Seltsikas, 2012), Sein, Henfridsson, Purao, Rossi and Lindgren (2011) propose using a research method which they have designated Action Design Research (ADR), and it is this methodology which has been applied to this study. ADR addresses an actual problematic situation in an organisational setting, by building an innovative IT artefact, whilst learning from the intervention, and producing academic theory. Sein et al. (2011) feel that ADR addresses the relevance challenge for IS research, and by combining the reflectiveness of AR with the prescription of DR, results in research that is both rigorous and pragmatic. The different research approaches, that is, AR, DR and ADR are discussed in detail in Chapter 3, as well as the debate around their usage in IS research. The research process follows the four stages of ADR, with close adherence to the principles aligned to each stage. The research begins with the initial stage of “problem formulation” and this is followed by the “building, intervention and evaluation” stage, with concurrent reference during both of these stages, to the “reflection and learning” stage. The research concludes with the last stage, the “formalisation of the learning”. As part of the ADR research methodology, an artefact evolved which contributes to the e-learning body of knowledge. By linking practice and research, ADR facilitates the emergence of new insights into existing theory. This emergence is based on a cycle of theory informing practice, which in turn leads to more theory being generated, which directly affects practice (Baskerville & Wood-Harper, 1996; Checkland & Poulter, 2006; McNiff & Whitehead, 2006; Raelin, 2007).

1.4. Relevance of the study

In the light of the need to accommodate the continually changing business environment, the swift dissemination of relevant, up-to-date information is essential. When using an integrated finance system, changes in the system necessitate almost instantaneous communication, and are often accompanied by training issues. Apart from system changes, there is a basic

requirement that the workforce have a working knowledge of the system, and the skill to extract relevant information from it. If as a consequence of insufficient or ineffective staff training, employees are not skilled or technically capable, then a major source of competitive advantage is lost, and the organisation's workforce cannot realise its full potential as a source of intellectual capital.

Additionally, there appears to be a need for more input from IS research into the practice of e-learning in the workplace, specifically its effectiveness and ongoing usage. This research may be of interest to any organisation or training department that has a need for a skilled and knowledgeable workforce, and to remain current with training trends. It is hoped that the results of the research may offer insights into the practice of workforce training, contribute to empirical research on the effectiveness or otherwise of e-learning, as well as add to the theories of organisational learning and training.

E-learning is becoming widely implemented and its usage is spreading globally both in the academic and corporate environments (Becker et al., 2012; Harden, 2008; Lin, Ma & Lin, 2011; Wang, 2011). However, despite this movement towards the adoption of e-learning as a viable learning method, DeRouin, Fritzsche and Salas (2005) submit that "research on e-learning's effectiveness in workplace organisations is scant and often limited with regard to the type and level of evaluation conducted" (p. 926). This lack of research on the effectiveness of e-learning in the corporate environment is also mentioned by Macpherson, Elliot, Harris and Horman (2004), and Garavan, Carbery, O'Malley and O'Donnell (2010). Similarly, Becker et al. (2012), suggest further research is needed on the effectiveness of e-learning approaches in organisational environments,

> Corporate university and vocational education and training settings have only started to emerge in the literature more recently. However, there remains a dearth of empirical research to establish the effectiveness or otherwise of different e-learning approaches, particularly in organisational settings. (p. 386)

This is reiterated by Wang et al. (2010) who observe that most e-learning research papers are based on formal courses in educational institutions, whereas the use of e-learning in corporations is relatively neglected. Additionally, Mueller & Strohmeier (2010) submit that an edited or concise version of the set of major design characteristics of e-learning courses would be valuable. This suggestion for further research is echoed by Moon, Passmore, Reiser and Michaels (2014) who call for research-based design principles that would facilitate the

greater growth of online professional development courses. There is also a suggestion that more research should focus on the pedagogical issues associated with e-learning initiatives, rather than the technical ones (Lai, 2011). According to Wang et al. (2010), "E-learning in the workplace remains a fragmented, complex, and challenging area of research and practice" (p. 168).

1.5. Limitations

As this study attempts to contribute to practice by intervening in a real world situation, the study is limited to the compulsory training, in a specific system, of the workforce at a single institution, namely UCT. The training modules affected are the responsibility of and are run by the Finance Department systems and user support team. It would be questionable to make statistical generalisations from the findings. However, according to Lee and Baskerville (2003), "In interpretivism, a theory's pertaining only to the setting where it was developed would not detract from its validity or scientific status" (p. 230). Therefore, as this is a qualitative study, the objective is to generalise from the individual findings to a theory within a particular setting, rather than to generalise from the sample to the population. It is believed that individual first-hand observations can be used to generate new perceptions regarding the phenomenon under investigation and contribute to theory building in this way (Conboy, Fitzgerald & Mathiassen, 2012; Lee & Baskerville, 2003, Merriam, 1988). This study is set within the workforce of a cosmopolitan South African university that employs a sophisticated, integrated finance system. Whether the findings may be applied to other organisations, both in Africa and abroad, is uncertain due to the composition of the workforce and the nature of the system. However, it is hoped that the descriptive, analytical and practical nature of the research may enable other researchers and practitioners facing a similar problematic situation within their organisations to use the theory and findings as a base to develop effective online staff training courses and additional theories or practices of their own.

1.6. Overview of the dissertation

Following on from the introduction, the next chapter of the dissertation covers a review of the current literature that addresses the research area. Amongst the topics reviewed are e-learning implementations around the world, barriers that prevent e-learning adoption, and conversely, the factors that facilitate this adoption. The literature review also covers the strategies and learning approaches that enable e-learning implementations. The last topic in the literature review chapter deals with the problems associated with measuring the success

of an e-learning implementation. A summary of this chapter and presentation of the research objective follows. Chapter 3 discusses the research methodology, and gives a detailed overview of ADR, the proposed research method. This chapter also details the research strategy, data analysis, ethical considerations, and concludes with a review of the research approach. Chapter 4 describes the development of the alpha version of the research artefact, and the lessons learned during these iterations. The building of the beta version of the artefact and further analysis of the results of its implementation into the organisation is explained in Chapter 5. Chapter 6 discusses the points arising from the research, with particularly reference to the principles of ADR. The dissertation concludes with Chapter 7, a summary of the foregoing chapters, and includes the practical implications arising from this research, as well as suggestions for future research. References are listed in Chapter 8, and other pertinent information, such as ethics approval, evaluation forms and participants' comments are provided in the appendices.

2. Literature review

The need for continuous, flexible, up-to-date training would appear to be a challenge for many organisations in both the corporate and public sector (Barker, 2005; Harden, 2008; Luor, Hu & Lu, 2009; Kisielnicki & Sobolewska, 2010). According to Hamid (2002), "The fate of their companies rests on their employees' ability to absorb information rapidly and learn the skills necessary to adapt to a constantly changing business environment" (p. 311). Organisations need to be able to offer specialised training to anyone, at any time, from any place, which is both effective and efficient. To remain competitive, there would appear to be a need to offer staff training and retraining as new products, services, technologies and legislative regulations are implemented (Acampora, Gaeta & Loia, 2011; Krunić, 2010; Mørch, Engen, & Åsand, 2004).

2.1. Re-thinking corporate training

Having an organisational climate that is supportive of learning and actively encourages training is vital to the implementation and continuation of any training initiative. Grossman and Salas (2011) define training as "the systematic acquisition of knowledge, skills and attitudes, that together lead to improved performance in a specific environment" (p. 104), while Bondarouk and Ruël (2010) define training as "the planned efforts to enhance job specific competences" (p. 150). Van den Bossche, Segers and Jansen (2010) suggest that it is the support provided by the organisational environment that is the critical factor when attempting to ensure that transfer of training has occurred and that the newly acquired knowledge or skills are taken back in the workplace and used in the performance of duties. Similar findings are reported by Ali and Magalhaes (2008), Grossman and Salas (2011) and Schumaker (2004). There is a need for senior management to recognise the value of an organisational learning climate, where training is an integral part of the business processes. "Organisations must ensure that e-learning is not being adopted simply "because we can", but because it facilitates effective learning that will result in genuine business outcomes and return on investment" (Becker et al., 2012, p. 399). Effective training should be an integral and valued part of the business processes (Becker et al., 2012; Sung & Choi, 2014).

E-learning can offer a flexibility and accessibility that is hard to replicate in an instructor led setting. In the corporate environment, the appointment of new staff does not always fit scheduled training sessions, and this can lead to considerable delays before the new appointees can access the knowledge or skill required to become operational. In addition to

the individual issues, there are also those of the business where supervisors experience difficulties releasing staff due to the clash of organisational needs with training times (Ali & Magalhaes, 2008; Schmeeckle, 2003; Becker et al., 2012). Another benefit of e-learning is that it can enable, on a virtually immediate basis, the distribution of training to staff, across geographical boundaries. This is particularly important when organisations are faced with critical changes in legal and statutory regulations. In this regard, the efficiencies offered by e-learning cannot be matched by traditional training practice (Mueller & Strohmeier, 2010, Wang, 2011).

The same efficiency applies for those courses which are offered on a regular basis, and also for those courses where the volume of staff requiring training is high, such as staff induction courses or where a regulatory change to processes needs to be demonstrated and explained. Many organisations have various company systems, whether informational or physical, and require employees to be trained on these before attempting to perform their job (Welsh et al., 2003). Additionally, in the twenty-first century, with the proliferation of e-mail and e-calendars, there is virtually a business need, and possibly a social responsiveness one as well, to ensure that all employees are technologically literate, particularly in the knowledge-based industries (Becker et al., 2012; Schmeeckle, 2003). Furthermore, in addition to the accessibility, flexibility and convenience offered by e-learning, it guarantees that the training offered by organisations is consistent, across all levels and branches. With e-learning all trainees receive the same content and there is no possibility that organisational strategies or directives can be misinterpreted by different individual trainers (Bondarouk & Ruël, 2010; DeRouin et al., 2005; Welsh et al., 2003).

Among the generally cited reasons for implementing e-learning is reduction of costs, both for the actual training and the costs associated with subsistence and travel. If employees have to travel to a head office or training venue, particularly where organisations are widely spread, the costs can be very high, particularly if international travel is required (Mørch et al., 2004; Schmeeckle, 2003). However, according to Welsh et al. (2003), “Upfront cost was the most frequently mentioned drawback of e-learning. E-learning initiatives can require considerable investment in both information technology and staff” (p. 249). Reduction in costs is usually only realised once the e-learning is established. There are also the on-going costs associated with licencing and upgrades of software, plus technological support. This needs to be off-set against the savings on venue hire or maintenance, travel and subsistence and instructors’

salaries (Ali & Magalhaes, 2008; Bondarouk & Ruël, 2010). In their study, Kisielnicki and Sobolewska, 2010, found that though:

> Implementing e-learning is indeed connected with high Initial costs, the costs of e-learning and traditional training level off in a relatively short period of time. The introduction of e-learning as a method of training employees, analysed in a long period of time, becomes a much more cost effective investment than the training methods used in a traditional way (p. 171).

The change in training to online versus classroom can also benefit the trainees. Due to the increased accessibility, they no longer have to travel, and can fit in the training sessions around their workload and other commitments. A less frequently mentioned benefit that is realised from e-learning is the ability to reduce informational load delivered at any one time. When learners are overwhelmed by information, their recall ability is negatively impacted and training becomes ineffective. By allowing self-paced learning, trainees can choose at what speed they wish to proceed, and can repeat a module, or part thereof, whenever they feel it is required (Van Merriënboer et al., 2006; Welsh et al., 2003). This should be particularly relevant in a corporate environment where the training involves adult learners. On an organisational level, many of the e-learning platforms, such as learning management systems, offer a tracking component of completed courses, together with assessment scores or completion data. This assists the organisation to not only be able to deal with compliancy issues, but also to address gaps in employee knowledge and issues arising from performance reviews (Govindasamy, 2001; Welsh et al., 2003). Assuming the above arguments regarding e-learning are convincing, and an organisation decides to change their training from classroom-based to computer-based, there are a number of significant issues that still need to be considered.

2.2. E-learning implementations in corporate environments

Training is an expensive cost item in the corporate budget and there is a strong requisite to investigate the impact on the business, and on employee performance before proceeding with an e-learning implementation (Dublin, 2004; Mueller & Strohmeier, 2010; Schmeeckle, 2003). However, e-learning continues to be viewed as an efficient tool to enable corporate training and its implementation across industries around the world is growing (Becker et al., 2012; DeRouin et al., 2005; Macpherson et al., 2004; Mortagy & Boghikian-Whitby, 2010). A few case studies have addressed issues encountered in the corporate or public sector when

implementing e-learning. These case studies describe the problems and successes faced in countries such as Greece, Kuwait, Malaysia, Norway, South Africa, Spain and Taiwan (Ali & Magalhaes, 2008; Andreu & Jáuregui, 2005; Chatzoglou, Sarigiannidis, Vraimaki & Diamantidis, 2009; Lai, 2011; Moolman & Blignaut, 2008; Mørch, Engen & Åsand, 2004; Yunus & Salim, 2008).

In their study, Mørch et al. (2004), explain the difficulties faced by the introduction of a web-based learning system into two Norwegian companies. They conclude that a more effective learning support system is required in the case of petrol station attendants and that computer literacy, or ease of use, was a significant problem. In general, participants were happier using the traditional ways of gaining information, such as phoning the relevant expert. In contrast, Moolman and Blignaut (2008) who considered the effect of an e-learning implementation on warehouse workers in the health industry in South Africa, conclude that not only was the implementation successful, but that even though the workers were mostly computer illiterate, with good course design and sufficient guidance, they were motivated and inspired to learn in an e-learning environment. The importance of expert instructors in this instance was highlighted.

Ali and Magalhaes (2008) indicate important differences between the rankings of barriers encountered in the West against those experienced in Kuwait. “Western practices show barriers as 1) cost, 2) time, 3) technology & 4) resistance to change. (Conversely) …Kuwait (rankings were) 1) lack of management support 2) language barriers 3) IT problems & 4) workload and lack of time” (p. 49). It should be noted that according to this study, both cultures identified technology and time constraints as barriers to e-learning implementations. Other barriers discussed in this paper reflect a commonality with developing countries, such as South Africa, where language and the lack of management support is also mentioned as an issue (Moolman & Blignaut, 2008). Resistance to change is a common factor mentioned in most of these case studies, as was cost.

However, the outcomes of the Greek study by Chatzoglou et al. (2009) were more centred on learners as individuals, with recommendations being the need to focus on good course design and content. To succeed with an e-learning implementation, these researchers place the greatest importance on engaging the learner and guiding them through the process to a positive completion.

> For a successful web-training program, managers should design and create an environment where the trained employees will be convinced of their personal knowledge and abilities, they will feel free to overcome challenging on-the-job problems and they will learn how to use their mistakes in order to improve their job capabilities (Chatzoglou et al., 2009, p. 886).

Likewise, Andreu and Jáuregui (2005) found that the foremost factors in the e-learning experience at a Spanish bank were the content, the learners themselves, the instructor and the technology. This study recommends the use of structured content that is provided in short courses rather than one long one. Learners need to be motivated and encouraged. Instructors should be part of the business and enthusiastic about online learning. The flexibility of being able to use the training anywhere, any place and any time was a major contributor to the positive results of the implementation, together with the ability to proceed at their own pace, using their own learning style. The main problem encountered was the lack of computer capacity at the bank's branches.

Yunus and Salim (2008), who studied the Malaysian public sector, concluded that it is the pedagogical principles which guide the course design and content that should be the focus if e-learning implementation is to be successful, rather than the technology. Lai (2011) emphasises learner characteristics and found that self-directed learning readiness was critical to the successful acceptance of e-learning for civil servants in Taiwan. This study also highlighted that the pedagogical principles of learning are more important than the technological aspects, although technology is a base factor and has to be considered.

These are isolated case studies of e-learning implementations in various countries, but the findings are comparable with other literature and follow the general trends of e-learning research. It may be of interest to note that the Norwegian case study reported more problems with computer literacy than did the South African study, when the former country is part of the developed nations, whilst the latter part of the developing ones. The main consideration arising from these case studies is that once technology and course design are taken out of the equation, the success or failure of an e-learning implementation rests on the human factor, i.e. the learners and the instructors. Both groups are stakeholders in the initiative and their willingness to change from traditional classroom-based instruction to online instruction is vital. According to Dublin (2004), it is the human issues that are more difficult to manage in the e-learning environment than the technological ones. When contemplating how a smooth transition and an acceptance of all parties to the change of

delivery can be achieved, it is important to consider the literature regarding the differences between the two methods.

2.3. Traditional classroom versus online instruction

Traditionally workforce training has been delivered face-to-face in classrooms, led by an instructor. This has meant that employees have to attend the course on a fixed date, at the same time and at a specific venue. In some instances, this has meant travelling to another location, city or even country. This has not always proved to be the most efficient method of training, particularly where courses are offered on a regular basis, or the number of attendees is large. Consequently, more and more organisations are making use of e-learning as a method of course delivery (Ali & Magalhaes, 2008; Bondarouk & Ruël, 2010, Schmeeckle, 2003). However, the change is not always acceptable to the learner for various reasons. Schmeeckle (2003) found that there was no difference between learning in the classroom and learning online. It appears that even though some trainees stated they preferred classroom instruction, mainly for reasons of interaction and ambience, if given a choice they would still prefer to complete the course online. This preference seems to arise from purely practical reasons, that is, the convenience factor. This same finding reoccurs through various other studies, with the main objection to e-learning being the lack of interaction with both the instructor and other classmates (Garavan et al., 2010; Hamid, 2002; Krunić, 2010, Otter et al., 2013; Welsh et al., 2003).

To counteract this possible barrier to user acceptance and usage, e-learning does offer the possibility of setting up discussion boards, online chat rooms, and even at the most basic level, using email to ensure social interaction occurs on some level. Zhang, Zhao, Zhou and Nunamaker (2004) indicate that the lack of immediate feedback is also considered to be a barrier in the e-learning environment. Schmeeckle (2003) suggests that an online training course could finish with an instructor led session in order to address any questions and other problems encountered. This would also address the problem of delayed feedback.

Apart from the practical consideration of convenience with regards time and place, a striking difference between traditional and online training is the very flexible, accessible training offered by e-learning. Online training enables a learner centred focus instead of instructor centred (Zhang et al., 2004). Apart from being able to fit in training around their own work schedules, learners can repeat modules, change the order of the content and take breaks at will. The only limitation is the course design and technology. The control of the course passes

to the trainee. E-learning also lends itself to the maintenance of a sense of anonymity which may suit introverted individuals. For the instructor, online training offers the ability to change content quickly and efficiently. Courses can be designed to take cognisance of how individuals learn differently. It is noted that user satisfaction is usually assessed as higher in the online environment (Andreu & Jáuregui, 2005, Hamid, 2002; Hay et al., 2004; Mortagy & Boghikian-Whitby, 2010; Schmeeckle, 2003).

The disadvantages of online training, apart from the lack of social interaction, can mostly be accrued to the instructor side of the equation, from a stakeholder perspective. Changing to an online delivery system means having to author and update the program(s), up-skill one's technological ability and liaise with the Information Technology (IT) staff regarding access, system support and bandwidth availability (Schmeeckle, 2003). In addition, as the instructor will no longer be face-to-face with the learners, the course content needs to be designed to ensure that the learner's attention is firstly captured and then maintained. The individualisation expected from an e-learning course places a high degree of responsibility to deliver on the instructor or course designer (Andreu & Jáuregui, 2005; Otter et al., 2013).

Welsh et al. (2003) pose a number of questions regarding the similarities and differences between classroom and online training, and whether or not e-learning can be considered to be a suitable alternative to face-to-face learning. Their meta-study found that on average e-learning did in fact score slightly better than classroom training, or at least, it did not score lower, as an effective way to assist employees to learn. These findings are supported by other research carried out by Hay et al. (2004) and Mortagy and Boghikian-Whitby (2010). Govindasamy (2001) further believes that there should be no difference between the learning outcomes achieved as the same pedagogical principles apply to both delivery methods, although for online delivery, these principles should be extended to account for the changes in technology. Similarly, Hamid (2002) maintains that the main differences between classroom and online learning are the technological architecture, including the user interface design, and the content strategy. However, several studies indicate that pedagogical principles are often omitted altogether from e-learning strategies, and implementations focus on the technology rather than the learning (Bedwell & Salas, 2010; Bondarouk & Ruël, 2010; Hamid, 2002; Wang et al., 2010). It would therefore seem that it is *how* the e-learning courses are designed and presented, together with the human factors of the learners and instructors, which should be given greater prominence when considering an e-learning implementation.

2.4. E-Learning: barriers and success factors

Apart from the barriers to, or negativity associated with, a successful e-learning implementation that have been mentioned in Chapters 2.2 (E-learning implementations) and 2.3 (Traditional classroom vs. online instruction), there are additional factors to be considered. Many e-learning initiatives appear to fail as a result of insufficient planning and consideration given to the design of the course, as well as poor quality content (Blass & Davis, 2003; Govindasamy, 2001; Hadjerrouit, 2010; Strother, 2002). In their study, Luor et al. (2009) found a gap between the intentions of a corporate organisation to use e-learning and the actual usage ten months after the implementation. They attributed this gap to two main factors, namely learner attitudes and technology failure. "Employees of an organisation can be the impetus for innovation and change, conversely, they can be a major stumbling block along the organisation's path to optimal performance" (p. 728).

Human characteristics such as motivation, self-efficacy, time management, cognitive ability and adaptability to change also have a part to play (Bondarouk & Ruël, 2010, Garavan et al., 2010; Luor et al., 2009; Kisielnicki & Sobolewska, 2010). As many corporate training courses are compulsory, elimination of individuals that exhibit low levels of these characteristics cannot be imposed. E-learning courses therefore need to be designed to overcome individual limitations or attitudes as far as possible. The learners themselves may perceive barriers to their ability to learn online, "Employees lack confidence in their ability to apply computer or internet skills" (Cheng, 2011, p. 294). The online environment may also cause feelings of anxiety and confusion (Ali & Magalhaes, 2008; Zhang et al., 2004). In some instances, learners have to master an entirely novel set of skills before they can even begin engaging with the online course.

However, although computer illiteracy can lead to a negative attitude towards e-learning, assumptions should not be made about technological competency based on age, despite the digital native (those born in the computer age) versus digital immigrant (those who have had to learn computer skills as adults) debate (Becker et al., 2012; Bondarouk & Ruël, 2010). In the instance of developing countries, it cannot be assumed that all the younger generation have the same access to the internet and digital technology (Ali & Magalhaes, 2008; Moolman & Blignaut, 2008, Schumaker, 2004). In addition, regardless of geography, Becker et al. (2012) caution against regarding age as a barrier to learning in an online environment. Individuals of all ages possess very different levels of expertise, skill and ability when it comes to engaging with technology. This is particularly so when involved with attitude to learning, information

gathering and the absorption and analysis thereof. Lai (2011) comments that “older learners showed more positive enjoyment toward learning than younger learners” (p. 104), and this illustrates that age should not necessarily be regarded as a barrier. There may also be a language barrier to be addressed if content is delivered in English, and it is not the first language of the trainees, again a problem in developing countries (Ali & Magalhaes, 2008; Moolman & Blignaut, 2008).

Notwithstanding the above human and pedagogical challenges, there is the very real threat of technology failure, such as systems being down, bandwidth speed and inadequate technical support. These appear to be key factors in triggering learner frustration and feelings of negativity towards e-learning. With the implementation of online learning, the importance of reliable computer software, hardware and network infrastructure cannot be underestimated. Without the supporting technology, e-learning cannot happen (Ali & Magalhaes, 2008; Kisielnicki & Sobolewska, 2010)

It appears that the qualities of the course design and content have a significant impact on the success or failure of online training programs (Bondarouk & Ruël, 2010; Mueller & Strohmeier, 2010). According to Chu & Robey (2008), “Online learning initiatives often underestimate the extent to which content must be adapted to online learning environments” (p. 96). Mueller & Strohmeier (2010) concur and further believe that inadequately designed e-learning programs may actually be harmful. Lack of clear objectives and assessments at the end of an online course also appear to have a negative effect on online course completion. “Our review suggests that in studies where there was no powerful rationale for completing a course, completion rates for technology-delivered training were lower than those for instructor-led classes” (Welsh et al., 2003, p. 254).

There are also organisational barriers. The support of top management and the importance given to staff development in an organisation can be essential to a successful integration of online training. Despite the flexibility offered by e-learning, employees do require time to be set aside for training, and successful completion of such courses needs to be recognised by the organisation in some form. In addition to lack of management support, inadequate learner support is also considered a barrier to e-learning. Online learning needs to be carefully planned at an organisational level, with clear guidelines for users, and opportunities for interaction, both with the course content and other trainees. Feedback processes should be incorporated into the course design. E-learning success is dependent on an organisation climate that encourages learning and does not lead to feelings of isolation. It requires that

there is some strategic planning and direction, and that training requirements are aligned with business objectives. Emphasis on cost may also prove a barrier, particularly in the light of the high start-up costs faced by most organisations, and the amount of time needed from both technical and instructional staff to set up the initial programmes (Ali & Magalhaes, 2008; Hay et al., 2004; Kisielnicki & Sobolewska, 2010; Krunić, 2010).

Having discussed some of the barriers to a successful implementation of e-learning, it is also necessary to consider the success factors. According to Holsapple and Lee-Post (2006), the success predictors of an e-learning implementation are system design, system delivery and system outcome. They base their e-learning success model on the model developed by DeLone and McLean in 1992, (updated DeLone, 2003), which was used to measure information systems success. The six dimensions of success categorised in the DeLone (2003) version are system quality, information quality, service quality, use, user satisfaction, net benefits. Holsapple and Lee-Post (2006) adapted this model to produce their e-learning model (Figure 2).

To meet the system design success criteria, the system, information and service quality dimensions all need to be achieved. The second measure is to attain system delivery success by ensuring the use and user satisfaction dimensions are met. Finally, system outcome success is determined by realising the net benefits dimension.

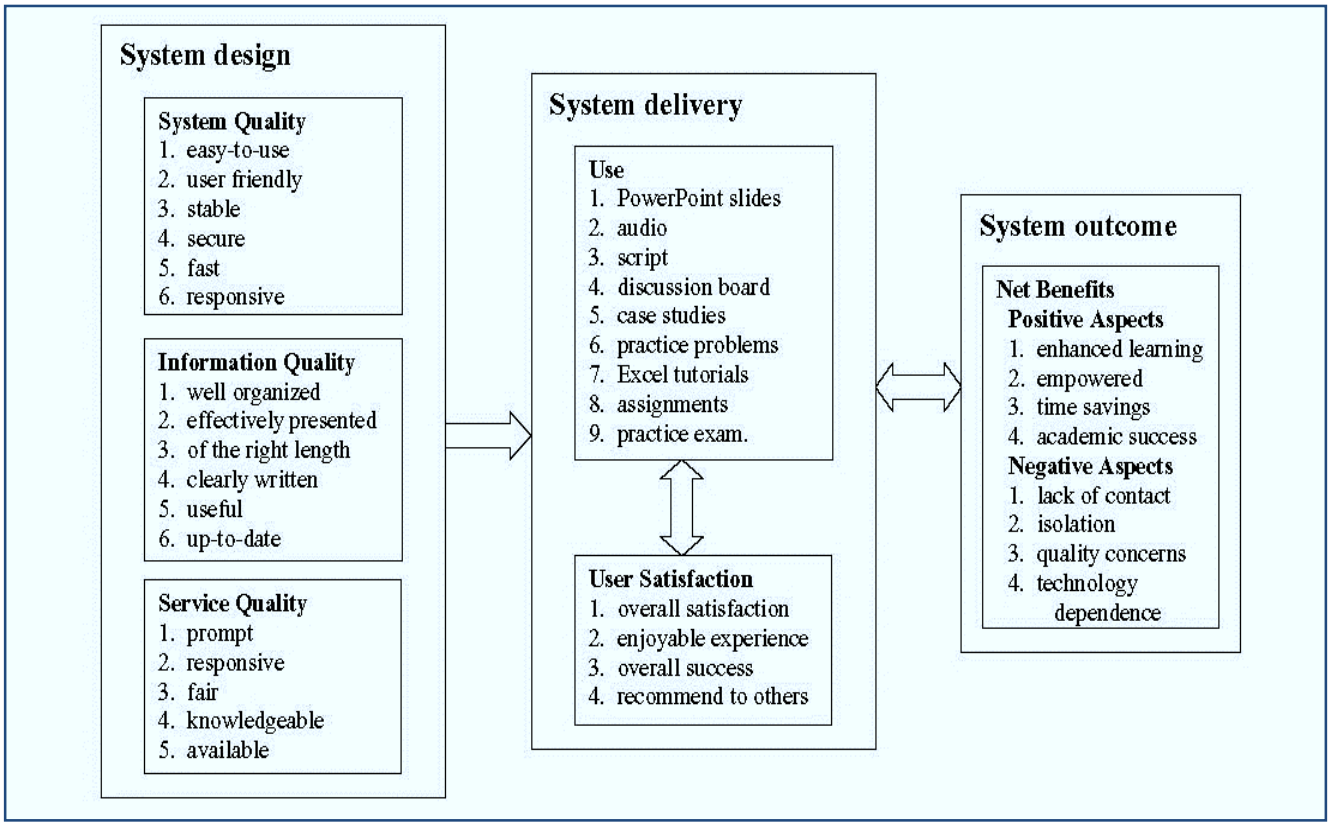


Figure 2: E-learning success model (Holsapple & Lee-Post, 2006)

As this chapter investigates the various components of the predominant success factors described in the e-learning literature, as well as the barriers previously discussed, an attempt has been made to simplify and adapt the model by summing up the dimensions identified by Holsapple and Lee-Post (2006) into a single descriptive header, whilst still using the three measures (Figure 3).

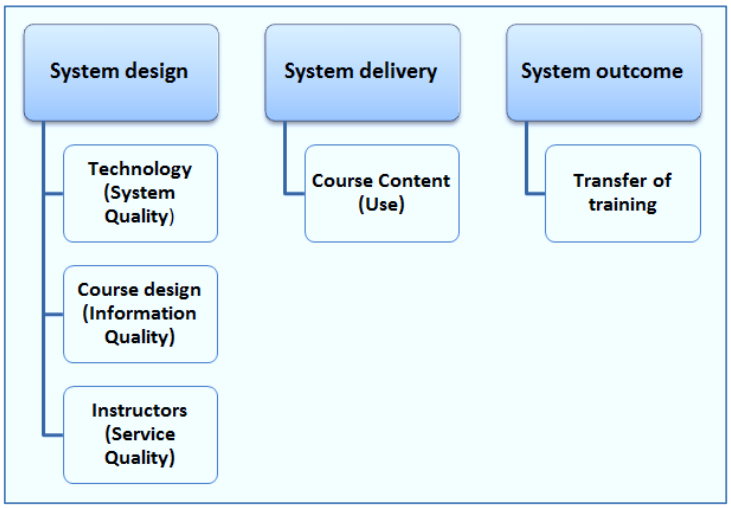


Figure 3: Simplified view of success factors identified in e-learning literature (own construct, informed by Holsapple & Lee-Post, 2006)

The second dimension of System delivery in the Holsapple and Lee-Post (2006) model, "User Satisfaction", and the System outcome component, "Net Benefits", form part of the evaluation of this research after the e-learning intervention, and will be used to provide input into measuring the effectiveness of the implementation, and therefore, are not discussed in this chapter, and are not shown in Figure 3.

Assuming the System Quality dimension suggested by Holsapple and Lee-Post (2006), can be characterised as "Technology", the importance of having a reliable, responsive and secure system would seem obvious. In addition, the technology should be both user-friendly and easy to use (C. Lin et al., 2011; Mueller & Strohmeier, 2010). The technological medium also has to be able to offer a certain amount of learner control and flexibility. Poor quality equipment, delays and crashes can anger and frustrate learners (Andreu & Jáuregui, 2005; Bedwell & Salas, 2010; Luor et al., 2009; Welsh et al., 2003). According to Schmeeckle (2003), "Information technology has the potential to revolutionize training and learning by integrating businesses' two greatest assets: people and information" (p. 205).

The next dimension is Information Quality, and this has been characterised as the Course Design component of an e-learning initiative in Figure 3. The course should be structured allowing for easy navigation through the content and users should be able to find information quickly. The purpose of the training requires explicit definition upfront, as do the learning

outcomes. “Providing clear course requirements, communicating expectations and defining successful completion criteria are all elements of an advanced organizer. This information should be explicitly stated in the beginning of the course, located in an accessible place throughout the duration of training” (Bedwell & Salas, 2010, p. 245). In the online learning environment, the course design takes the place of the face-to-face instructor; it is the interface between the learning and the learner. Therefore, the course designer’s first consideration should be to identify the audience who will be taking the course. It should be clear from the outset to both the trainees and the organisation what the course is about and who should be attending. There needs to be an alignment between the courses being offered and the organisation’s strategic mission (Becker et al., 2012; Dublin, 2004; Gagné & Deci, 2005; Schmeeckle, 2003).

With no instructor present, learners can become confused. This in turn can lead to anxiety. To overcome this confusion, learning guides, with context relevant help are considered an essential part of a well-designed course (Bedwell & Salas, 2010; Gagné & Deci, 2005; Krunić, 2010). Mueller and Strohmeier (2010) suggest that the learning history should be clearly visible, and all progress tracked. All completed courses, together with the assessment marks, should be recorded. As one of the benefits of e-learning is its flexibility, some amount of learner control should be built in when the course is designed. In some instances, being able to control the viewing of a video is sufficient. Bedwell & Salas (2010) propose grouping relevant material and ensuring a good fit on the computer screen, whilst Krunić (2011) recommends including a list of frequently asked questions or common errors to reduce frustration. “It is important to remember the delivery mechanism is not the determinant of effectiveness, but rather the soundness of design” (Bedwell & Salas, 2010, p. 241). The focus of good content design is to make the learning enjoyable whilst increasing performance and enhancing learning. Varying the instructional content with practical exercises assists with short term memory demand and consistency across the screens reduces cognitive load. The screen design should be uncluttered for the same reason (Gagné & Deci, 2005; Hay et al., 2004; C. Lin et al., 2011; Mueller & Strohmeier, 2010).“Content quality concerns the relative usefulness and how up to date the content is. It also highlights issues such as how well the content is presented, the level of interactivity, flexibility, and the degree of breadth and depth” (Garavan et al., 2010, p. 165).

The last dimension of the System design measurement is Service Quality. This has been summed up under the label “Instructors” in Figure 3. In the classroom setting, instructors are

able to read the audience and make adjustments to the content, pace or understanding. They are able to change direction or impart extra information based on the reactions of the learners. In the e-learning environment, this is not possible and as a result, instructors in an e-learning environment need to make provisions for many different eventualities when compiling the course content (Hamid, 2002; Mortagy & Boghikian-Whitby, 2010; Otter et al., 2013). As in the classroom situation, instructors need to be able to keep learners engaged and motivated. Both Andreu and Jáuregui (2005) and Lin, Chen and Fang (2011) emphasise the continued importance of the instructor in the online environment. It would appear advantageous if the instructor is part of the organisation and therefore understands the cultural background and business processes. At the same time, the instructor needs to be technologically competent and an expert in the subject matter. Additionally, it would appear that more effort and time is required from instructors when engaging in online courses, both when setting them up initially, as well as running them. Therefore, instructors should be committed and interested to online learning (Blass & Davis, 2003; C. Lin et al., 2011, Otter et al., 2013; Stansfield, McLellan & Connolly, 2004). In an e-learning implementation, instructors will also be expected to monitor forums, discussion boards and chat rooms, as well as responding to all emails timeously. By being actively involved in these social interactions, instructors will be providing trainee support which is often lacking in online training. It must also be noted that the learners themselves may undervalue the role of the instructor, and feel that undertaking an online course requires more self-direction and effort on the part of the student (Otter et al., 2013). In order to counteract this negativity, instructors need to be prepared to engage in both online and face-to-face interactions. Blass and Davis (2003) note that it will be the instructor's responsibility to provoke a discussion or arouse interest on a discussion board or in a chat room. There are many learners who do not ask questions in the classroom environment, and there will be many who do not wish to engage in online forums. When important conceptual principles are misunderstood, and this becomes apparent as a result of either online interaction or course exercises, instructors may find setting up face-to-face meetings an effective way to correct misunderstandings. In this way, they can engage on a personal level with individual learners and add positivity to the learner's perception of online learning (Arbaugh, 2014; Schmeeckle, 2003).

"Feedback and recognition address issues such as confidence building, dealing with computer anxiety and providing feedback on progress. These are important issues in increasing participation in e-learning" (Garavan et al., 2010, p. 165). Instructors are the vital link in

overcoming the perceived barrier of feeling disempowered or isolated in the online environment. K. Lin et al. (2011) report, “In the e-learning service context, our findings reveal that NCIs (Negative Critical Incidents) are classified into four categories: administration, functionality, teaching and interaction... we find that NCIs in teaching and administration are more important than functionality and interaction” (p. 86). In fact, Arbaugh (2014) maintains it is the actions of the instructors that have the most influence on the outcomes of online courses for Masters of Business Administration students, but also cautions that there is a strong need for social interaction between students and instructors, even at this level. In the e-learning environment, trainees expect immediate responses to their queries or perceived problems, as well as relevant, up-to-date content in the course. It is the instructors who are responsible for maintaining the high service quality of teaching and administration.

According to Holsapple and Lee-Post’s (2006) model, the next measurement is System Delivery and the dimension is “Use”. Figure 3 characterises this dimension as “Course content”. Hamid (2002), states “Given that technology is equal, the content is now the only differentiating factor that separates an effective e-learning initiative from an ineffective e-learning initiative” (p. 312). It would appear that the content and type of material used for online learning is critical. As the control of the course is now in the hands of the trainee, content should be both creative and innovative in order to maintain engagement (Blass & Davis, 2003, C. Lin et al., 2011). The organisation of the content and its presentation are considered to be vital to its quality. In the online setting, content also needs to be flexible and delivered in several short modules. Online learners do not always read every word, but rather scan the screen, so content design needs to take this into account (Garavan et al., 2010, Hamid, 2002). The appearance of the e-learning content needs to appeal to learners and needs to engender a positive response that encourages interaction and challenges learners. It should be constructed to stimulating thinking and reflection. Uploading slides, previous lecture notes or just publishing content online is not considered to be a viable option in this medium.

All forms of multimedia should be used to assist with learning, where relevant. Words and pictures, where text is placed near graphics are thought to enable problem-solving. The use of audio can assist where learners are overwhelmed with visual data. “Cognitive learning theory states that human visual and auditory information processing takes place in two separate channels, learners are likely to manage and integrate greater amounts of information when material is presented through both audio and text” (DeRouin et al., 2005, p. 933).

Assessments of performance should be incorporated into the e-learning package, and should include constructive feedback. “Assessment methods provide influential means for stimulating and supporting reflection, for example by focusing on applied issues, problem-solving tasks, integration activities and other assessment techniques that move beyond simple memorization of material” (Hay et al., 2004, p. 174). Feedback is an essential part of the course as it can influence the overall user satisfaction. It needs to be provided both during the course and after the course is completed (Bedwell & Salas, 2010; Garavan et al., 2010; Schumaker, 2004). To maintain involvement, trainees should be presented with simple questions, possibly in the form of pop-up screens, at frequent intervals. It is hoped that this intervention will aid recall and reinforce learning content without an instructor being present to do so. Additionally, in an e-learning environment, frequent challenges or tests may prevent trainees from omitting or skimming through some of the content (Blass & Davis, 2003; DeRouin et al., 2005; Gagné & Deci, 2005; Granger & Levine, 2010; Mortagy & Boghikian-Whitby, 2010).

A number of papers have mentioned the importance of setting goals, as well as maintaining deadlines in the e-learning environment (Blass & Davis, 2003; Wang et al., 2010, Welsh et al., 2003). In their study, Wang et al. (2010) use Key Performance Indicators (KPIs) to measure employee performance in the workplace. By setting objectives that are based on the employee’s job position, and the identified knowledge gaps, these KPIs provide extrinsic motivation to learners to complete the online courses.

Companies that had some form of accountability and/or incentive for learners to complete the training, whether it was eventual participation in a classroom session, advancement towards a development goal, payment of overtime, or the use of a tracking system, did not have significant problems with completion rates. Also, strong job-relevant and useful course content appears to be an adequate incentive for learners. In contrast, it seems that if courses are perceived to be optional or have little impact on the learner, lower completion rates will likely occur (Welsh et al., 2003, p. 254).

In discussing the factors that lead to a successful implementation of e-learning, it should not be forgotten that although the learner is possibly the most affected stakeholder, there are many others in the workplace who are also involved. Senior management, line managers or supervisors, as well as the instructors themselves, are all part of the stakeholder group who have their own set of concerns. All stakeholders should be considered when any intervention of this nature is planned (Dublin, 2004).

In a work environment, the use of pre-training or screening interventions mentioned in some studies is not always possible (Grossman & Salas, 2011; Holsapple & Lee-Post, 2006; Schumaker, 2004; Weissbein, Huang, Ford & Schmidt, 2011). In most cases, once workers join the organisation, they need to be trained, regardless of whether or not they exhibit the desired learner characteristics. Nevertheless, there are various strategies and tools that can be used to encourage the transfer of skills back to the workplace. Course completion must be seen to be an achievable goal, and that it is possible to acquire the requisite knowledge and skills in an online environment. If course designers understand how learners learn, the transition to online instruction can be considerably eased. The following chapter discusses the various strategies and tools that can be employed to overcome learner negativity and reluctance to engage with training initiatives, particularly in the online setting.

2.5. E-learning: strategies and tools

As the use of e-learning in both the educational and business sector continues to spread (Garavan et al., 2010; Harden, 2008; Hislop, 2009; Newton & Doonga, 2007), the focus of a number of research papers is on the strategies and tools that are used in organisations to enhance online training (Dagada & Jakovljevic, 2004; Dublin, 2004; Kim, Bonk, & Zeng, 2005). Ideally trainees should be evaluated prior to commencement of the course (Govindasamy, 2001; Krunić, 2010; Weissbein et al., 2011) and, based on background or previous experience, allocated to different classes. In general, given the constraints of the resources of organisations, this is not a feasible option. Cognitive ability appears to be a strong predictor of successful training outcomes and whether the learned skills will be retained (Grossman & Salas, 2011; Schumaker, 2004). Again, in the workplace environment, it is not always viable to carry out pre-testing exercises. Although this may in part be due to financial and human resource constraints, this type of testing may also have labour law consequences. Additionally, in most organisations, the instructors do not have any input into the appointment of the staff they are expected to train. Therefore, despite literature emphasising the importance of this factor when assessing trainee characteristics, it cannot be considered as an aspect for all learning or training situations. As a result, it is crucial that the online training course is designed to accommodate all levels of cognitive ability, and other means to alleviate anxiety and/or assist learners with low levels of self-efficacy need to be employed. A carefully designed online course that makes use of various tools and strategies may assist in meeting the goals of successful e-learning initiatives. These goals, based on the literature reviewed, are summarised in Figure 4.

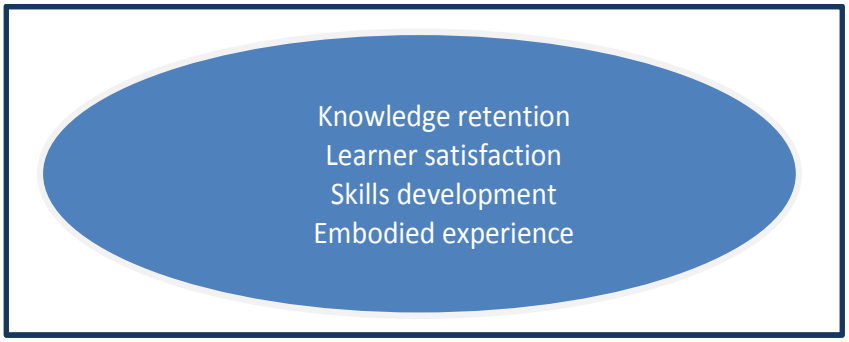


Figure 4: Own construct: summary of the goals of an e-learning implementation

One strategy that can be implemented easily in the e-learning context is to convey information both verbally and visually. Using a multi-modal, multi-media approach would seem to assist learning by spreading the cognitive load. It would also accommodate those learners who have preferred learning styles by utilising both sight and hearing. Course notes or hand outs could be supplied to support those learners who prefer to read. By using interactive tools, learners should be engaged and challenged. Active learning stimulates cognitive ability as well as increasing retention and recall (DeRouin et al., 2005; Schmeeckle, 2003; Stansfield et al., 2004).

Supplying feedback can be used as a strategy to encourage reflection and self-direction, which appear to assist in retention of learning (Aczel, Peake & Hardy, 2008; Anseel, Lievens & Schollaert, 2009; DeRouin et al., 2005; Gagné & Deci, 2005; Lai, 2011). Hay et al. (2004) explains reflection as "the ability to stand back and understand what is happening and why" (p. 170). Reflective practices allow a sense of meaning to emerge for the individual. It is critical that the course be learner centred in order to encourage meaningful engagement with the learning material (Jordi, 2011). Every attempt should be made to promote deep and thoughtful learning, and to elicit an embodied experience so that the knowledge is retained. It has been suggested that active participation such as e-mailing or participating in discussion boards, encourages this type of reflection. Learners should be inspired by the course design and learning content to make comments and ask questions. Self-efficacy, that is a belief in one's ability to succeed at a task, is an important motivator to effective learning (Bandura, 2012; Hamid, 2002; Schumaker, 2004). Believing that one is capable of completing the course tends to assist with a successful learning outcome. It may be interesting to note that Vancouver and Kendall (2006) found that when self-efficacy is very high, it can result in a negative effect, as the individual feels that they know more than the instructor. This can be a problem in the workplace training situation, and it must be ensured that the instructors delivering the online content are experts in the field.

One of the key benefits of the e-learning model is considered to be the giving of control to the learner. Learner control is part of the course design and is a powerful strategy that can be invoked to enhance the e-learning experience. Having the ability to control their learning experience appears to have a positive effect on learner reactions to e-learning, particularly adult learners (Fisher, Wasserman & Orvis, 2010, Schmeeckle, 2003). In addition, as one of the advantages attributed to the e-learning environment is that learning is flexible, any e-learning implementation must endeavour to offer at least some control to the learner (Blass & Davis, 2003). As defined by Fisher et al. (2010), "Learner control is the degree to which an individual is given control over instructional features that influence pace, content and structure of the training environment" (p. 199). Depending on the degree of control that is built into the course design, learners can choose how fast or how slow they proceed through the module, in what order they view the content, which content to view, and when to undertake the practical exercises. They can review content as required and practice as often as they feel is necessary before completing the assessment. This can lead to a reduction in training time as learners who have prior knowledge of the material can skip the sections where they are already competent, and focus on those where they are not. Again depending on design, there may be links to additional information either through a pop-up tool or to another site. It is for the learner to decide whether or not they want to view these extra resources. A willingness to explore the course material is often attributed to this freedom of choice (Granger & Levine, 2010).

However, if the design allows a high degree of learner control it can result in learners experiencing a cognitive overload if they have to make a lot of decisions. Cognitive overload impacts on the ability to concentrate and should be avoided (DeRouin et al., 2005; Schmeeckle, 2003). Fisher et al. (2010) report that when given the option, many learners elected to use an extremely complicated set of control features just because the controls were available. There did not appear to be any clear purpose involved in the selection process. For some learners this proved confusing and added unnecessary clutter to the learning module, with no added benefit to the actual cognitive learning. Together with Schmeeckle (2003), Fisher et al. (2010) feel that the degree of learner control has significant consequences on learning and should be used with caution, with due regard for the task complexity and the learners skills. In particular, this high level of learner control has been shown to have negative effects, particularly where the learners have low levels of cognitive or technical skills (Granger & Levine, 2010; Schmeeckle, 2003). Fisher et al. (2010) observed that

the high level of user satisfaction that was reported when allowed extensive learner control was, to a large extent, an emotive response, and that the tool itself did not improve learning. Therefore, whilst there appears to be no doubt that there should be a certain amount of learner control, the extent of the control should be monitored and adjusted according to the learning situation. “Specifically a high degree of learner control can be especially detrimental to cognitive and skill-based learning outcomes when the training content is high in complexity” (Granger & Levine, 2010, p. 189).

When considering strategy regarding e-learning in a corporate environment, it is important to note that the training will only involve adults. Therefore, due attention should be paid to basic principles of adult learning if any training intervention is to be successful. These principles apply irrespective of whether it is delivery in a classroom or online (Becker et al., 2012; Lai, 2011; Wang et al., 2010). It is suggested that adults bring a particular set of characteristics and requirements to the learning environment. Courses should be designed with these requirements in mind. Although instructors should be experts in their particular field, the trainees are often experts themselves in their own fields. The relationship is therefore peer to peer, rather than child to adult, which may cause entirely different dynamics to operate. According to Merriam (2001), in order to be receptive to learning, adults need to feel accepted, respected and supported. However, she also notes that with regard to structure, some adults are heavily reliant on the instructor. Not all adults can be assumed to have high degrees of self-efficacy and may be confused and anxious when presented with online courses. The emphasis for adult learners in the workplace should be on the ability to actively use and apply the knowledge gained, rather than just employing rote learning in order to pass exams (Aczel et al., 2008; Garavan et al., 2010; Govindasamy, 2001; Hamid, 2002). Hadjerrouit (2010) remarks on the importance of using a user-centred approach, where learners can not only proceed at their own pace, but also control how they work through the course, “in order to function as active, self-reflected and collaborative learners” (p. 115). Adult learners appear to need to actively engage with real life problems in order to be motivated to finish the course and to retain the knowledge offered by the course. They learn by doing. Presenting adult learners with conceptual knowledge alone is not sufficient (Moon et al., 2014; Mørch et al, 2004; Yunus & Salim, 2008). “Information given during training must be relevant and immediately visible because adults learn best when they see how they can immediately use the material being taught” (Schumaker, 2004, p. 54). Apart from enabling learning, when training programs include exercises that are relevant to the

workplace, staff motivation and retention over time is significantly higher (Sung & Choi, 2014). Motivation, as defined by Schmeeckle (2003), is both a willingness to learn, coupled with an ability to learn. Whilst intrinsic motivation is difficult to address in a compulsory training environment, the course designer can seek to stimulate extrinsic motivation by focussing on the value of the course to the adult learner. By completing the training module, the learner is acquiring a new set of skills or competency, and is therefore increasing their marketability. If the learning is linked to the employee's KPIs, this will prove an even greater extrinsic motivator. It has also been suggested that describing the big picture and how the training intervention relates to both the workplace and the trainee's job position, can be useful as a way to increase motivation. The training itself can stimulate motivation if the course is sufficiently well designed (Bondarouk & Ruël, 2010; Chillargege, Nordstrom & Williams, 2003; Gagné & Deci, 2005; Grossman & Salas, 2011). Despite Schmeeckle (2003) asserting that "Organizations may find employees highly motivated simply because they need to learn in order to perform their job" (p. 212), this is not always the case. Wang et al. (2010) found linking KPIs more effective. Increasing competence appears to trigger both intrinsic and extrinsic motivation. Another proposed solution is to emphasise the importance of the trainees' work to the organisation. Ensuring that the training area is comfortable and trainees feel safe and at ease, should affect motivation positively. It is important that there are feelings of trust and confidence in the organisation (Gagné & Deci, 2005; Schumaker, 2004). Based on the above literature, the use of e-learning should positively enhance adult learners' reactions to training, as it gives more control over their learning than would be the case in a traditional classroom setting. The self-pacing and flexibility features of online learning offer adults the opportunity to choose when, where and how quickly they want to complete the training. There is a chance to explore the system with no pressure or time constraints, in as much depth as is required, and to engage in problem solving tasks. This type of environment should be beneficial to adult learners (Chillargege et al., 2003; Krunić, 2010; Moon et al., 2014). However, the system and information quality is critical, as it should be noted that "Adults have very low tolerance for technologies and new processes that don't work" (Dublin, 2004, p. 293).

Where it is hoped that there will be a transfer of training to the workplace, it is important that employees are presented with learning goals rather than performance goals (Chatzoglou et al., 2009). Individuals that are learning goal oriented aim for mastery of new competencies, learning for learning's sake. On the other hand, those individuals that are driven by

performance goals tend to be competitive and measure themselves against others. They are adversely affected by negative assessments (Anseel et al., 2009). As individuals who are performance goal oriented are unlikely to ask questions or seek assistance in training situations, measures should be taken to encourage the setting of learning goals instead. This can be elicited by ensuring that all informational instructions to trainees are carefully edited so that there is no allusion made to high performance, intellectual ability or comparison to other trainees (Chillargege et al., 2003). According to Chatzoglou et al. (2009) "Learning goal orientation significantly affects all models' constructs and has the second strongest total effect on usage intention" (p. 886). Again, the e-learning setting is an ideal environment to focus on the individual and their own learning goals, with all elements of classroom competition removed.

Another factor that can be considered a strategy that enables an efficacious e-learning implementation is organisational support. Becker et al. (2012) feel that strategic commitment at senior management level is critical to the success of any e-learning intervention. There needs to be an understanding at this high level, of both organisational cultural and technical obstacles that may need to be overcome, to ensure that the implementation is effective. There are also the costs and time factors that initially will be high and that need high level approval (Bondarouk & Ruël, 2010; Lai, 2011; C. Lin et al., 2011; Macpherson et al., 2004). Innovation and high level performance from employees appears to be correlated with organisational learning practices and the value the organisation places on internal training (Sung & Choi, 2014). The size of the investment an organisation is prepared to make also seems to lead to a higher retention of a skilled workforce. However, from the findings of a study conducted by Sung and Choi (2014), it is the training offered and run internally by the organisation, rather than training run by external parties that is the key factor in determining this relationship. Within the organisation, there should also be social support. According to Van den Bossche et al. (2010), social support is one of the key factors that lead to effective transfer of training to the workplace. This support can be provided by both supervisors and peers. Supervisors have input into goal setting or KPI initiatives and they also need to give assistance when required. At the same time, the importance of receiving positive feedback from both supervisors and peers should not be forgotten. There is also the support required by the e-learning environment itself. Lai (2011) feels that "the higher the participation in online discussions and interaction with colleagues and instructors, the better the learning

results and the overall learner satisfaction" (p. 100). The online support can take the form of forums such as chat rooms, e-mail or even text messages (Garavan et al., 2010).

In order to increase the likelihood of a successful implementation of e-learning, it is important not to forget to utilise and incorporate the various strategies and tools discussed when designing the online course (Figure 5).

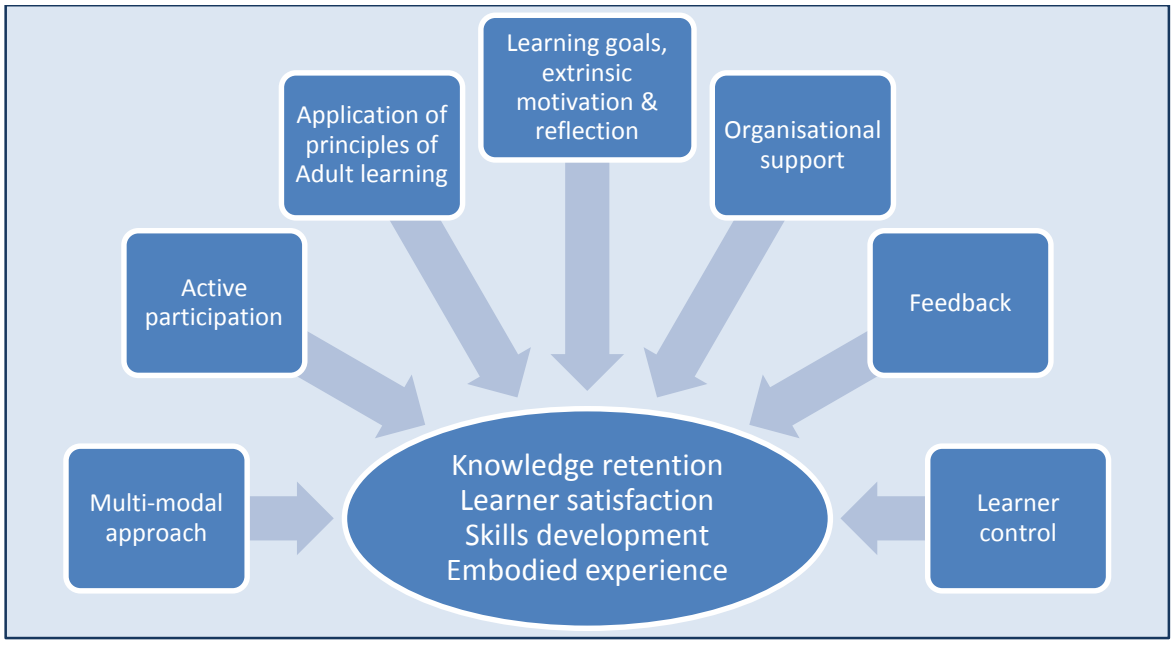


Figure 5: Strategies and tools that encourage successful e-learning initiatives in the workplace

The beneficial effect achieved by incorporating learner control into the course design has been emphasised, but its appropriate use is perhaps of even greater significance. As the training is taking place in the workplace, the requirements of adult learners must be acknowledged if the training intervention is to succeed. Motivation, reflection and learning goal orientation are to be encouraged, and online courses should be designed to elicit such responses. Of equal importance is having an organisational climate that recognises the value of training and supports the employees. Integrating interactive tools, challenging exercises or simulations, supplying feedback and employing all forms of online media into the e-learning course should not be omitted if the learning objectives are to be achieved. In addition to these strategies, there are also a number of learning approaches which have been found to affect e-learning acceptance, usage and success.

2.6. Enhancing the e-learning experience: approaches and theories

Consideration of some of the underlying pedagogical principles concerning practical learning would seem to be essential if the training intervention is to be successful. This review does

not cover all the learning theories but rather focuses on those that have been mentioned in the e-learning literature, and that appear to have high relevance to online learning.

According to the constructivist model, learners perform better when they can explore and discover things on their own (Andreu & Jáuregui, 2005). Learners need to try different approaches, actively participate in testing them and find solutions to the problems. Using their prior knowledge, they build new constructs as they assimilate the new learning. Therefore it is important to give learners as many opportunities as possible to practice, and the training environment should be as realistic as possible. The online environment is ideal for this type of intervention, as not only can learners control the pace of the learning, but it also allows for simulations and other interactive activities. These factors should assist learners to increase their knowledge base (Granger & Levine, 2010; Grossman & Salas, 2011, Hamid 2002).

Cognitive Load Theory (CLT) is based on the assumption that humans have a cognitive architecture that is comprised of a limited short-term (working) memory and long-term memory, which is unlimited. Working memory is used for all conscious cognitive activities and is the part of the memory that is used when new concepts are presented (Kirschner, 2002). As individuals master and accept the new concepts as being valid, the knowledge “package” is moved into storage in their long term memory. All knowledge that is stored in long term memory can be retrieved when necessary, to support subsequent learning (Bannert, 2002; Kirschner, 2002). According to Van Merriënboer et al. (2006) intrinsic load is determined by the expertise of the learner as they engage with the learning task. Thus a learner who is encountering a complex task for the first time will have a high intrinsic load. The most important load is called the germane load. This is load that directly affects the cognitive structures and increases the knowledge of that individual. “In general, well-designed instruction should decrease extraneous load and optimise germane load, within the limits of total available capacity in order to prevent cognitive overload” (Van Merriënboer et al., 2006, p. 344). However, Van Merriënboer et al. (2006) indicate the importance of balancing intrinsic load when producing learning content. If the task is complex and the cognitive load is high, then transfer of training is unlikely to be effective.

Error Management Training (EMT) proposes that if errors are included as part of the training intervention, and promoted as being opportunities to learn, rather than mistakes to be avoided, trainees will develop skills to deal with them. When errors are regarded as mistakes that need to be avoided, the resulting stress and frustration may lead trainees to avoid similar

situations by not engaging with the system or technology (Chillarege et al., 2003). EMT supports the constructivist approach as it encourages exploration and increases problem solving capabilities. This in turn tends to lead to deeper and long lasting learning. "In order for computer training to be truly effective, it must acknowledge that errors will inevitably occur during training and on the job" (Chillarege et al., 2003, p. 370). According to EMT, learners will actually benefit from dealing with errors during the course of the training. The difficulties they encounter aid the learning experience, and the problem solving invoked will be of great use when similar errors are encountered back in the workplace (Granger & Levine, 2010). Being actively encouraged to make errors tends to lead to a deeper exploration of the system, and a lessening of anxiety. "Error based training allows trainees to anticipate what can go wrong, and equips them with the knowledge of how to handle potential problems" (Grossman & Salas, 2011, p. 111).

Table 1: Summary of learning approaches and theories that may enhance e-learning experience

Theory/Approach	*Summarised description*	*Application in this research*
Constructivist	Build on prior knowledge – need to explore, actively participate, problem solve	Provide opportunities to practice, real-life problems to solve, simulations. Take examples and exercises from work situation.
Cognitive Load Theory	Only a limited amount of memory, need to optimise germane load and avoid cognitive overload, particularly when facing new and complex tasks	Keep modules short (not longer than 20 minutes), balance introduction of new concepts with practice and exercises, repeat key learnings
Error Management Training	Errors are opportunities to learn, not mistakes to be avoided – dealing with mistakes during training, decreases anxiety and encourages system exploration	Ensure that learner is comfortable, environment must be one of learning, not testing, clear comments in voice-over that mistakes will happen, but can be dealt with, examples must be constructed so that common errors are reviewed, exercises should test these constructs and handed back personally so face-to-face discussion possible.

The three learning approaches discussed above are by no means inclusive. However, the Constructivist Theory would appear to work well in an organisational environment with adult learners. Acknowledging the concerns of CLT would address some of the issues mentioned as barriers to successful e-learning implementation, i.e. courses being too long or content too complicated when introducing a new skill or concept. Finally, in order to facilitate the transfer of the training to the workplace, it would seem that using the principles of EMT when designing the course content and exercises in the online environment, would be an effective

approach. Whilst various strategies can be used to make online training more palatable and simultaneously incorporating some pedagogical principles into the course design, it becomes apparent that the main purpose of all this background research is to make the e-learning experience a positive one for the learner/trainee, who is one of the main stakeholders. As it is not usually possible to pre-test or pre-select employees based on their learning characteristics, particularly at entry level jobs, what may be significant for the course designer is an ability to encourage and draw out those characteristics that support online learning.

Having examined some of the barriers, the factors of success, the learning strategies, approaches and learner characteristics that contribute to or inhibit the usage and acceptance of online learning, it is important to consider how to assess the effectiveness of the e-learning intervention, particularly in the long term.

2.7. E-learning: measurements of success

When considering an implementation of this nature, there must be an evaluation, or a way of measuring results, and this needs to be incorporated into the design of the course (DeRouin et al., 2005; Holsapple & Lee-Post, 2006; Strother, 2002). However, although user satisfaction can be measured quite easily, a positive evaluation does not mean that the training was effective. Of greater importance to the organisation, is whether the training has effectively changed the performance of the employee once they are back in the workplace. It is only when the organisation is functioning more efficiently in the whole area affected by the training intervention, for example, the company's financial reporting, that it can be accepted that the purpose of the training has been achieved (Blass & Davis, 2003).

It may be difficult to concretely measure the results of the training in the organisation, and DeRouin et al. (2005), suggest that more lateral measurements need to be applied, such as, is the employee able to answer questions more quickly and accurately, or have the sales in a particular area increased. The end result of successful training should not merely be a mark, but rather visible evidence that there has been a transfer of knowledge to the workplace. "In work contexts, desired benefits from online learning occur when learners maintain skills and acquire new knowledge that is incorporated directly into their work practices. Where learning is not embedded within users' work practices, online learning applications may not meet expectations" (Chu & Robey, 2008, p. 80).

Transfer of training is difficult to achieve despite intensive learning programmes. "It is estimated that only 10-20 percent from what is learned during the training is applied in the

workplace" (Van den Bossche et al., 2010, p. 82). Their study concludes that transfer of training requires strong organisational support. It will only occur in a positive transfer climate. This means that there are sufficient resources to provide timeous and relevant training. Additionally, trainees require opportunities to practice new skills once they return to the workplace. Social support is another important element to successful transfer of knowledge. Supervisors need to be sensitive to the demands placed on trainees, and lack of time to practice newly acquired skills has been cited as a barrier to transfer (Bondarouk & Ruël, 2010; Grossman & Salas, 2011; Park, Sim & Roh, 2010; Welsh et al., 2003).

Knowledge has become a commodity and a source of competitive advantage. Organisations need to ensure that their business provides an effective training element, where employees can practice and acquire new skills and knowledge. There needs to be a strong learning community where knowledge can be created and exchanged (Cheng, 2011; Kisielnicki & Sobolewska, 2010; Wang et al., 2010). Organisations need to recognise that in order to maintain a competitive advantage, the effective training of employees is of utmost importance. They are the human capital of the business and should be skilled and well-informed if they are to perform their jobs optimally.

2.8. Summary of literature review

This literature review highlights some of the benefits offered by e-learning, and attempts to illustrate why several authors feel it is virtually an imperative to re-think the corporate training strategy. It discusses a few case studies of corporate environments where they have endeavoured to implement e-learning, and then it examines possible barriers to e–learning acceptance and usage. According to Dublin (2004), "E-learning enables you to change your current learning processes to be more efficient and more effective. And, if done right, it becomes a critical force to improve the performance of your workforce and your organisation as a whole" (p. 293). Adults, and indeed all learners, are individuals. They all bring their own worldviews, as well as different educational and working backgrounds to the classroom, whether physical or virtual. Additionally, in the workplace, each employee has their own job responsibilities. Depending on these responsibilities and worldviews, each learner has very different expectations and requirements that need to be addressed by the training intervention (Wang et al., 2010).

Another critical factor for e-learning to be successful in the workplace is that the courses are relevant to the job (Holsapple & Lee-Post, 2006; Mørch et al., 2004; Schumaker, 2004). After

completing the training, employees should be able to demonstrate the acquisition of the new knowledge or skills when they return to the workplace. It is important, therefore, that trainees then have ample opportunity to practice these skills as part of the training. Failure of e-learning initiatives is frequently attributed to "insufficient consideration of the design and implementation of e-learning product" (Blass & Davis, 2003, p. 228).

Some pedagogical theories that are particularly relevant to online learning are discussed. In summary, DeRouin et al. (2005) state, "For positive change in cognitive, skill-based, and/or affective learning, the delivery methods must positively affect active learning states. The three active learning states include motivation, mastery orientation and mindfulness" (p. 934). It would therefore seem effective to endeavour to stimulate these learning states when designing the e-learning course content, whilst aiming to encourage learning goals rather than performance goals, reflection and a transfer of the newly acquired skills back to the workplace. Organisational support is imperative, on both management and peer levels. Finally, any e-learning implementation requires evaluation and some measurement to determine success.

2.9. Research objectives and research question

The objective of this study is to design an artefact that replaces the current classroom-based finance training courses for employees at a tertiary institution with computer-based courses, in order to create a learning environment that meets both the business need for a knowledgeable, skilled body of staff, and also the individual adult learner's need for meaningful, practical and flexible instruction.

Arising from the research objective, the overarching question of this research is:

How will the implementation of e-learning affect the learning outcomes of staff training in the workplace?

The three sub-questions are:

(1) *If the implementation can be considered efficacious, i.e. it is achieving the desired outcome of training staff to use the finance system, how has the change from classroom-based courses to computer-based courses affected the trainees and their line managers?*

(2) *If the implementation is not efficacious, in spite of numerous attempts to re-shape the online course (artefact), why is it not working in this particular setting?*

(3) Assuming that the implementation is efficacious (it works), how does the solution to the problematic situation measure against the criteria of efficiency (uses less resources) and effectiveness (trainees have increased skills on return to workplace)?

This research involves the researcher, who is also part of the organisation's finance department staff, being directly involved in a practical implementation of an IT artefact (e-learning course), in an organisation, and considering the impact of such an intervention on the end-users, as well as the organisation itself. As the staff member is responsible for the institution's finance training, she is able to directly intervene in the implementation of any changes to this offering.

The research objectives and research question are summarised in Figure 6.

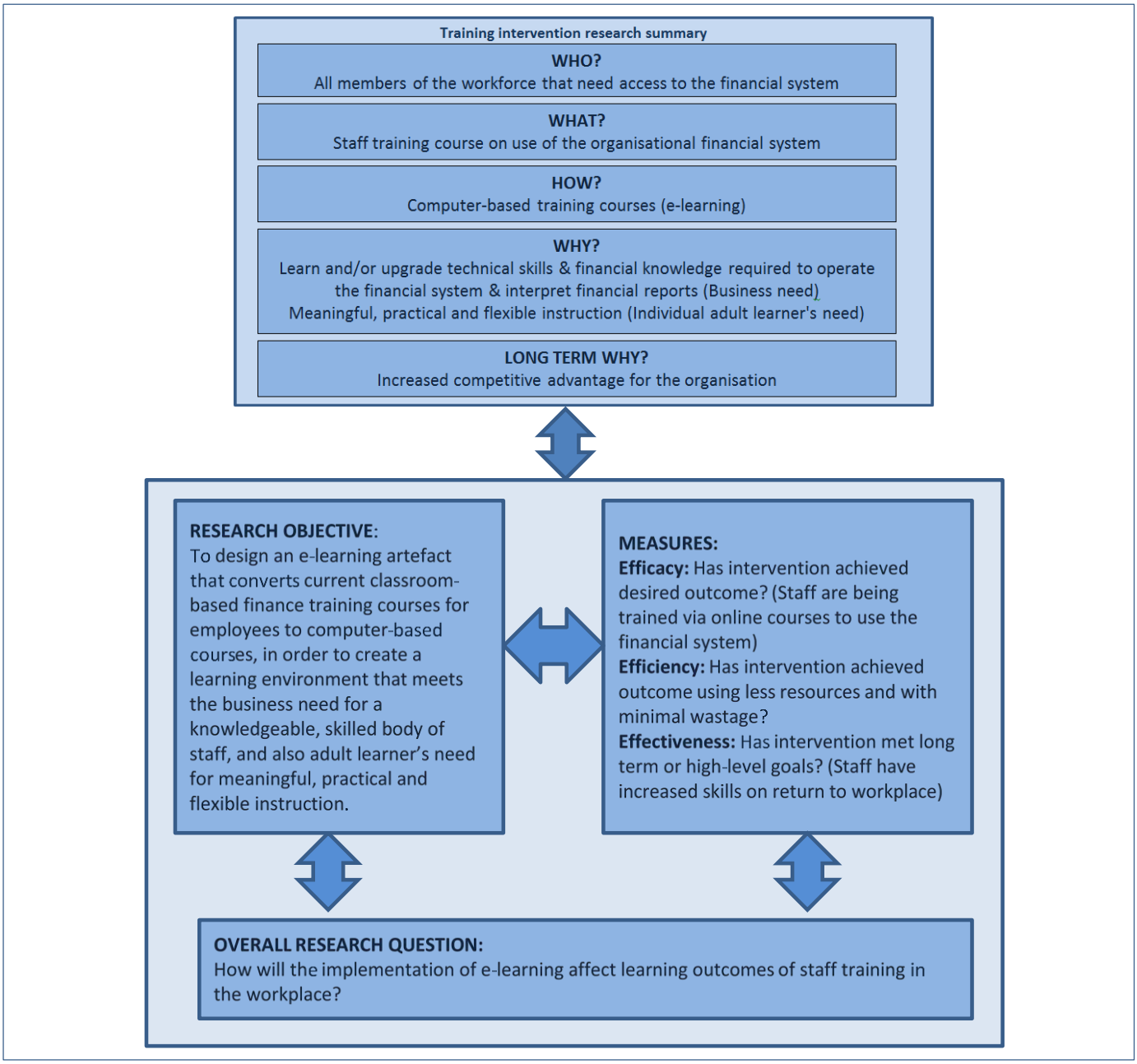


Figure 6: Research to investigate the change from classroom-based to computer-based training for compulsory finance training, including research objective, research question and measures

Hislop (2009) states that “Corporations and other organisations increasingly rely on digital technology to conduct day-to-day functions” and refers to the “unavoidable forces of change” (p. 95) in reference to online learning. The continuing publication of a number of papers concerning e-learning would appear to indicate that this is not only where the future of learning lies, but is also a matter of concern to educationalists, as well as organisations (DeRouin et al., 2005; Hadjerrouit, 2010; Strother, 2002; Yunus & Salim, 2008). This research used an ADR methodology, which is discussed in Chapter 3. It was considered that this would be the most suitable way of addressing the specific training concern, whilst at the same time, attempting to contribute towards improving knowledge in respect of e-learning implementations in the workplace and the measurement of the efficacy, efficiency and effectiveness of such training (Iversen, Mathiassen & Nielsen, 2004).

3. Research methodology

For some time there has been debate as to the nature of IS research and where it situates itself (Lee, 2010; March & Niederman, 2012; Rosemann & Vessey, 2008; Walsham, 2012). Lee (2010) examines key concepts of IS research and concludes that the future of IS research may lie in "sciences of the artificial", as distinguished from the "sciences of the natural" by Simon (1969). The over-riding knowledge requisite for this type of discipline is "its efficiency and effectiveness for bringing into existence an artifact needed to solve a given problem, achieve a given goal, or otherwise fulfill a given need that is facing people in the real world" (Lee, 2010, p. 346). This is an opposite view to that of the sciences of the natural, which seek to theorise about things that are already there.

Arising from this ongoing debate regarding the IS discipline and the challenge of how it should differentiate itself from other disciplines, such as computer science, it is suggested that IS should address the issues that arise from the intersection of people, organisations and technology (Gregor & Hevner, 2013; Lee, 2010; March & Niederman, 2012; McKay, Marshall & Hirschheim, 2012). Gregor and Jones (2007) discuss the importance of design theory in IS research, and conclude that it is "the construction of mutable artifacts where complexity arises from the interaction of humans with information technology" (p. 331) that defines the uniqueness of the IS discipline. This research attempts to address an organisational concern, and provide a practical solution that not only assists the practitioners involved, but also answers the proposed research questions, whilst adding to academic theory, in a systematic and rigorous manner.

The researcher is assuming a subjectivist or constructivist ontology. In the context of IS research, this means that human beings are viewed as having the ability to choose, to act voluntarily and therefore may not react in similar fashions. Organisations and society are social constructs, and can be interacted with differently, with different outcomes, and technology is a "malleable structure" which can be manipulated or controlled by individuals (Iivari, Hirschheim & Klein, 1998, p. 172). The ideographic viewpoint is also assumed whereby the researcher needs to fully understand the complexities and worldviews of the other participants, and that each individual is unique. However, due to the empirical focus of actions, artefacts, actors and change, an ontology of symbolic realism should also be considered as relevant to this study, where "meaningful action based in evolutionary social interaction" forms the driving assumption (Goldkuhl, 2012, p. 142). As the researcher will be directly involved in the research, the individual's lived experience and understanding will

affect the study. The objectivity and separateness of a positivist approach would not be possible in this research. The participants and other stakeholders will also have their own worldviews, which are also subjective. The underlying philosophy of this research is also not critical, as the objective is not emancipatory, and the changes are to the artefact, not to social or economic conditions of the participants (Myers & Klein, 2011).

The study aims to both describe the implementation of e-learning in a business environment, and to explore the effectiveness of using e-learning as a means of practical staff training, which requires intervention and changes in both the work and technical processes. The researcher is engaged in making changes and is seeking to generate constructive knowledge for general practice, as well as producing the data through assessment and intervention. This is indicative of a pragmatic paradigm (Baskerville & Myers, 2004; Goldkuhl, 2012). However, the principles of interpretive research are also present, as interpretation of the participants' and practitioners' co-constructed meanings and beliefs are required to analyse the data. The researcher's and practitioners' interpretations of the evaluations also affect the construction of the IT artefact. According to Walsham (2006), "our theories concerning reality are ways of making sense of the world, and shared meanings are a form of inter-subjectivity rather than objectivity" (p. 320).

The research is both exploratory and descriptive, as the researcher is not only attempting to explore the area of concern from different stakeholder perspectives, namely the trainees, the trainers and the finance managers, and the relevant literature, but also to provide an accurate depiction of this experience (Saunders, Lewis & Thornhill, 2007). Once the e-learning artefact is evaluated and refined in its beta version, the research becomes prescriptive, as the research objective is to achieve an effective and efficient implementation of computer-based courses in the workplace. This research was conducted using ADR as described by Sein et al., (2011). It is anticipated that this approach, which draws on an interpretive research philosophy, combined with pragmatism, will meet the objective of this research and satisfy the applied nature of IS (Cole et al., 2005; Goldkuhl, 2012; Hevner, March, Park & Ram, 2004). IS research should consider assisting practitioners, as well as adding to theory about IT and organisations, and the humans in the organisations that use the IT. As the researcher is making a change in a real world setting, other research methodologies, such as grounded theory, which seeks to generate theory, or ethnographic studies, which are used to gather observations from field studies, do not seek to intervene in, or change the problematic situation, would not be suitable.

This study initially used an inductive approach as prior to implementation of the computer-based courses, a thorough review of literature on the problems associated with e-learning was conducted, and from the learning discovered, some tentative concepts or theories were formed (Saunders et al., 2007). However, as these concepts were tested during implementation, the approach became deductive, but the resulting iterations of the ADR "Building, Intervention and Evaluating" (BIE) stage, led to more inductive theorising or reasoning, with new theory only emerging at the conclusion of the study.

As the purpose of the research was to intervene in a real world setting, and to make changes based on a designed artefact, two research approaches were initially considered, namely Design Research (DR), also known as Design Science Research, and Action Research (AR). These approaches are summarised below, together with a chapter discussing combining the two approaches, which led to the final decision to use ADR. A similar research approach, used in the Education field, is also presented.

3.1. Design Science Research (DR)

According to Iivari (2007), DR is problem focused and seeks to design an innovative product, or artefact, that addresses unsolved problems within an organisation. In the context of this paper, artefacts are defined as software and/or hardware that are assembled to form the object to be implemented. This "object" inscribes certain organisational structures into its form as it emerges, involving more than just technology in its conceptualisation and goals. Sein et al. (2011) describe artefacts as "ensembles emerging from design, use, and ongoing refinement in context" (p. 38). There is a build and evaluate process which forms a loop which is usually iterated as the design is refined, before the final artefact is produced (Gregor & Hevner, 2013; Hevner et al., 2004). DR must also contribute to research by making "clear and verifiable contributions in the areas of the design artifact, design foundations and/or design methodologies" (Hevner et al., 2004, p. 83).

However, a possible limitation of DR is that the building of the artefact is separate from the evaluation step, and the value of the research lies in its ability to solve the original problem, rather than testing it in a real life setting (Cole et al., 2005). In DR, the primary factor concerns the actual design of the artefact and testing is often not taken out of the laboratory. Although the contribution to practice must be evident, the intervention or introduction of the artefact into the organisation remains a secondary factor for much design science research (Cole et al., 2005; Sein et al., 2011). This separation of the building of the artefact from other

organisational perspectives may be problematic, particularly in respect of unintended consequences (McKay et al., 2012). Conversely, the goal of AR is to intervene in a social situation and make a change, and the artefact becomes the secondary factor (Baskerville & Myers, 2004; Conboy et al., 2012; Papas et al., 2012).

3.2. Action Research (AR)

According to Baskerville & Wood-Harper (1996, p.243), "Action research is regarded by many as the ideal post-positivist social scientific research method for IS research". They base this statement on the premise that IS, being a highly applied field, requires integration with the psychological and social facets of changing or introducing a technology into the workplace. People in the organisation are directly affected by these changes, and both monitoring and evaluating their reactions should perhaps be considered an important part of the research. It has been suggested that providing a learning environment that satisfies the learner is an important part of user-acceptance (Fisher et al., 2010; Holsapple & Lee-Post, 2006). Therefore, making changes to the course design directly based on end-user feedback and evaluations would seem to be beneficial, and AR would appear to be ideally suited to allow for this. AR involves a strategy of formulating theory whilst interacting with practitioners (Baskerville & Pries-Heje, 1999; Mathiassen, Chiasson, & Germonprez, 2012; Papas et al., 2012). The researcher not only intervenes in the real world setting, but participates in the study, which supports an interpretive, anti-positivist philosophy. AR is iterative in nature, and the implemented process or object is refined during the cycles. It also includes what McKay and Marshall (2001) refer to as the duality of AR, i.e. the researcher is both participant and observer. As the study progresses, the researcher actively participates as the main actor in both roles, whilst simultaneously maintaining a clear distinction between the two roles. The researcher is required to alternate between being the manager/director of the intervention and being the independent observer. These observations and reflections on the process are required when answering the research questions and formulating theories or themes. There is a practical or problem-solving cycle which results in a practical outcome and at the same time, a research cycle which gives rise to the research outcomes. The researcher applies their theoretical or researched knowledge to the problem at hand, which results in new knowledge, whilst working with practitioners and the problem itself produces new insights which can then be added to the body of knowledge. The steps taken to resolve the problem also results in more knowledge creation (Baskerville & Myers, 2004; Mathiassen et al., 2012). According to McNiff and Whitehead (2006, p. 13), "The purpose of action research is to

generate living theories about how learning has improved practice and is informing new practices". However, AR has frequently been criticised for the occurrence of personal bias, over involvement of the researcher, and lack of rigour. The practice has sometimes been labelled as consulting rather than researching (Baskerville & Wood-Harper, 1996).

3.3. Combining DR with AR

There has been some discussion regarding the similarities and differences between DR and AR, with some papers claiming they are the same, and others taking an opposing view (Baskerville, 2008; Cole et al., 2005; Iivari & Venable, 2009; Järvinen, 2007). In their paper, Papas et al. (2012), conduct their research using AR, and then reflect on it through a DR lens. They conclude that although "epistemologically, there is little to separate the two methodologies…there are subtle differences in practice" (p. 147). Amongst other observations, Papas et al. (2012) conclude that this difference may lie in the role of the artefact and the organisational change. In AR, the artefact is often a by-product of the research, and not the intended outcome as it with DR. Similarly, in AR the change effected in the organisation is a major concern of the research, whereas DR addresses the organisational change as a "second order" objective. In response to this ongoing debate, Sein et al. (2011) propose using a research method, ADR, addresses the relevance challenge for IS research, and by combining the reflectiveness of AR with the prescription of DR, and results in research that is both rigorous and pragmatic. This result is achieved by building an IT artefact to address a problematic situation which exists in the real world, whilst learning from the intervention and producing academic theory

The need for this type of IS research is endorsed by Baskerville and Wood-Harper (1998) from the AR perspective, Hevner et al. (2004) from the DR perspective, and Cole et al. (2005), from the perspective of using both research methodologies. ADR endeavours to respond to the limitations of both methods, and using both the similarities and the differences, draws out the best practices from each method, and combines them to form a synergistic approach to address a certain type of IS research. A similar suggestion is proposed by Baskerville, Pries-Heje and Venable (2009), who integrate DR with soft systems methodology, calling it a soft design science methodology. Their paper emphasises that "explicit, valid and specific requirements are ideal in both approaches" (p. 9), and this approach would be best suited where the research involves interaction between the artefact and a social system. Both AR and DR seek to create knowledge by changing something in real-world situations, and

evaluating the outcomes, but AR is more client-orientated, whilst DR tends to be situated in the laboratory (Baskerville et al., 2009; Iivari and Venable, 2009).

Whilst reviewing the AR and DR approaches, and soft design science methodology, it became apparent that in the educational research area, a combination of the two approaches has been used for some time, and appears to have been reasonably effective in primary, secondary and tertiary institutions (Anderson & Shattuck, 2012). This approach has been renamed over time, but currently appears to be designated as Design Based Research.

3.4. Design Based Research (DBR)

In the educational arena, a very similar research approach, that is, DBR is being used where the aim is to solve real world problems whilst building research theory (Amiel and Reeves, 2008). In their paper, Anderson and Shattuck (2012) review the past decade and debate whether the promise of this methodology is being realised in educational research. As with ADR, DBR seeks to bring researchers and practitioners together in collaborative tasks with the intention of improving teaching practice. At the same time, DBR requires that equal importance is given to building research theory and articulating design principles for use in the educational environment. It is rare that a design-based intervention will accomplish its goal with no problems or errors in the first instantiation, particularly when addressing a social situation with learners involved. Thus, DBR also involves multiple iterations, and mixed methods are encouraged (Amiel & Reeves, 2008). Careful documentation of "time, commitment, and contingencies that are involved in the creation and implementation of the intervention" is required in order that it meets the criteria of repeatability and credibility (Anderson & Shattuck, 2012, p. 16-17). Finally, the researcher is required to reflect on the whole intervention and generate design principles, advancing the previous literature and impacting on practice. There appear to be a number of similarities with the principles of ADR. As with interventions in the classroom, an e-learning implementation in an organisation needs to involve practitioners (trainers) as valued partners in the research. Practitioners should not be regarded only as consumers, a point which is highlighted by DBR, the use of which is increasing in the educational field (Anderson & Shattuck, 2012; McKenney & Reeves, 2013).

Having reviewed the above research approaches, and with the objectives of this IS research in mind, it was felt that the research method proposed by Sein et al. (2011), namely ADR, would be the most effective way of investigating an implementation that involves intervening in an

actual area of concern in an organisational setting. The research encompasses the building of an innovative IT artefact, whilst allowing feedback from the users and the organisation to influence the construction thereof in reiterative cycles, allowing both learning from the intervention, and simultaneously producing academic theory.

3.5. Action Design Research (ADR)

Cole et al. (2005) suggest IS researchers consider combining DR and AR in order to achieve a rigorously designed artefact that is evaluated in a real life organisational context to solve or to ameliorate a perceived problem within that organisation. They highlight the need to proactively address the requirements of practitioners in organisations, as well as meeting the meticulousness of academic enquiry. ADR, as described by Sein et al. (2011), "is a research method for generating prescriptive design knowledge through building and evaluating ensemble IT artifacts in an organizational setting" (p. 40). ADR has been designed to address the challenge of assisting IS practitioners by intervening in real world situations, whilst also building theory that is academically rigorous. This also serves to answer the call of making IS research relevant to practitioners and other IS professionals, and "promoting engaged scholarship through action and design" (Conboy et al., 2012, p. 114). ADR seeks to overcome the perceived limitations of DR and AR, as well as addressing Iivari's (2007) concerns regarding the differences between the two methods. By placing the IT artefact at the centre, this methodology also addresses Orlikowski and Iacono's (2001) call to "increase attention and explicit consideration of IT artifacts in all (IS) studies" (p. 130). ADR has strict, explicit principles which are sometimes lacking in AR. On the other hand, the iterations and simultaneous building, intervention and evaluation address the sequencing difficulties of DR, when attempting to use the designed artefacts in organisational settings. By not taking the setting or context of the organisation into account, whilst designing the artefact, DR does not usually capture its emergent nature. There is interdependence between design and use in the organisation, which needs to be captured or inscribed into the artefact. This interdependence is highlighted by ADR.

There are four stages in the ADR method. These are (1) problem formulation; (2) building, intervention and evaluation; (3) reflection and learning, and finally, (4) formalisation of learning. It is important to note that these stages are cyclical and reiterative. When engaging with the four stages, a step or waterfall sequence is not to be used. Sein et al. (2011) also describe seven principles of ADR. These principles are summarised in Table 2, with particular

application to the current research on implementing e-learning in the workplace. These principles are discussed in detail in Chapter 6 after the research was concluded.

Table 2: The seven principles of ADR (Sein et al., 2011) as applied to this research

#	*Principle*	*Description (Sein et al., 2011)*	*Application of ADR principle in this research*
1	Practice-inspired Research	The problem is drawn from the real-world and is used to create knowledge regarding a class of problems, which are typified by this particular problem.	Real world problem: Need to accommodate continually changing business environment by swift dissemination of relevant, up-to-date information. Class of problem – effective, efficient use of e-learning as a tool that is accepted by both the business and the trainees. This problem – converting current instructor-led training to online training that continues to meet business need for knowledgeable, skilled workforce, whilst accommodating the trainee's need for practical and flexible instruction.
2	Theory-Ingrained Artifact	The original design of the artefact is based on existing theories and technologies, but the design may change once it is evaluated within the organisation.	Extensive literature review of current e-learning body of knowledge resulting in an artefact (the online training module) that encompasses many success factors identified, and allows for learner feedback and evaluation. Review covers system design, system delivery and system outcome; learning approaches and strategies.
3	Reciprocal Shaping	This is where the IT artefact and the organisational domain influence each other, causing an iterative cycle to be set in motion. The design of the artefact will change as it is used in the organisational setting, and the organisation may be changed by the use of the artefact.	Alpha version of artefact tested by other trainers, changes to module will be made based on feedback. Beta version to be launched in controlled conditions (i.e. in lab, with instructor present, but all other conditions of online environment met – trainee to choose time and speed, test taken when trainee indicates readiness). Further changes will be made to module based on trainee/trainer feedback. Appropriately trained, motivated and enabled workforce has positive effect on organisation's financial reporting, leading to more modules, with targeted objectives, being offered online.
4	Mutually Influential Roles	This refers to how the multiple participants in the ADR project share their specialised knowledge and learn from each other. The researchers bring in the theory and the practitioners bring in the work practices.	Researcher designs course module using knowledge of best practices gained from literature on e-learning, with input from practitioners regarding course content, and specific working environment. With reiterative cycles, workforce input also influences shaping of module.
5	Authentic and Concurrent Evaluation	This means that the process of evaluation is never separated from the building and intervention, but is an integral part of both. Depending on the form of the artefact, evaluation can be either formative or summative, but must always be allowed to occur spontaneously in the organisational context, rather than in a controlled setting.	The initial course module is built and offered to trainees, in working environment. Feedback and comments will be discussed by researcher and trainers, and changes made to artefact as appropriate. Unexpected consequences should be immediately visible, and can be acted upon promptly. The artefact is continuously being evaluated and implemented in on-going cycles in a dynamic, real-time environment. Changes to artefact made regularly as organisational processes and circumstances also change.
6	Guided Emergence	This highlights the interaction between the initial design and how its implementation in the organisational setting causes a continuous evolvement and re-working of the emerging artefact.	The artefact is rolled out into the real life situation, and feedback from participants and the involved practitioners is immediately acted on by course designer/researcher, with re-designed module being offered live almost immediately. Feedback will arise from course content and organisational environment, i.e. equipment, setting, timing, control. Each cycle will result in a re-working of the artefact (course module) as required by the evaluations.
7	Generalized Outcomes	This ensures that the learning that has occurred during the iterations is developed so that the solution of the specific problem can be generalised to a class of problems.	The researcher will describe the learning and re-design of artefact based on user feedback and practitioner evaluation. This learning will in turn be linked back to current literature on best practices of e-learning in organisational environment.

Each of these seven ADR principles is aligned with the one of the ADR stages, and should be realised during the relevant stage. Thus, the first stage of problem formulation is addressed

by the principles of “practice-inspired research” and “theory-ingrained artifact”, the second stage of building, intervention and evaluation is addressed by the principles of “reciprocal shaping”, “mutually influential roles” and “authentic and concurrent evaluation”. The third stage of reflection and learning is addressed by the principle of “guided emergence”, and the fourth stage, formalization of learning, is addressed by the principle of “generalized outcomes” (Refer Figure 7, Sein et al., 2011).

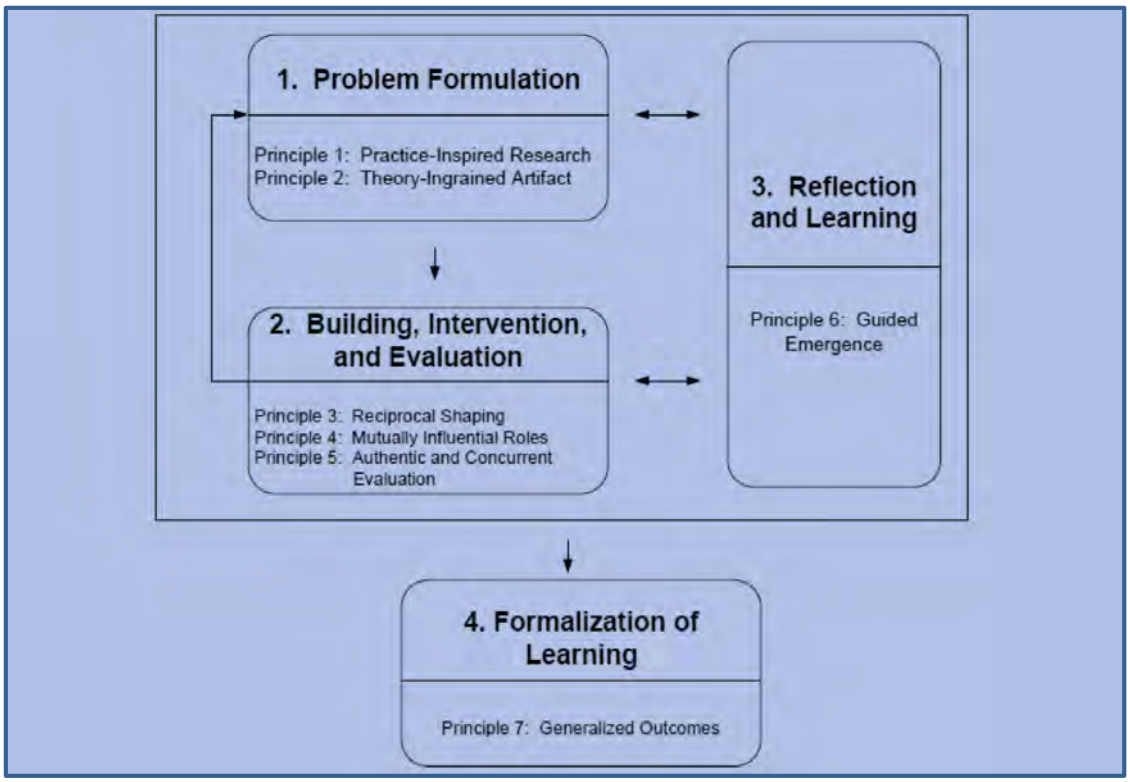


Figure 7: The ADR method: Stages and principles (Sein et al., 2011)

The perceived problem which is to be investigated can arise from many sources within the organisation, such as practitioners, end-users, and the existing technology. In this research, the problems with the current classroom-based training have been remarked on by trainees, trainers, line managers and financial managers. To summarise the four stages, with the inherent principle or principles, the first stage of ADR, “Problem Formulation”, requires that the researcher identifies and conceptualises the research opportunity; formulates initial research questions; casts the problem as an instance of a class of problems; identifies contributing theoretical bases and prior technological advances; secures long-term organisational commitment; and sets up roles and responsibilities (Sein et al., 2011, p. 41). The aim of the principle of practice-inspired research is that the researcher produces “knowledge that can be applied to the class of problems that the specific problem exemplifies” (Sein et al., 2011, p. 40). The principle of a theory-ingrained artefact, which is also aligned to this stage, ensures that the artefact to be designed and tested within the

organisation is based on current theory, or theories. These theories should assist with the problem formulation, the identification of possible solutions and the initially created artefact, which is then introduced into the organisation for evaluation, as part of the second stage, "Building, Intervention and Evaluation" (BIE). This introduction of the artefact into the real world situation should result in further cycles of re-designing or re-shaping, and re-evaluation of the artefact. Where the IT artefact is the focus of the research, Sein et al., (2011) suggest that alpha versions of the emerging artefact are tested and evaluated by the practitioners. After this strongly participatory process, a beta version of the artefact is introduced to the end-users, and again, the resulting evaluations refine and shape the artefact (Figure 8).

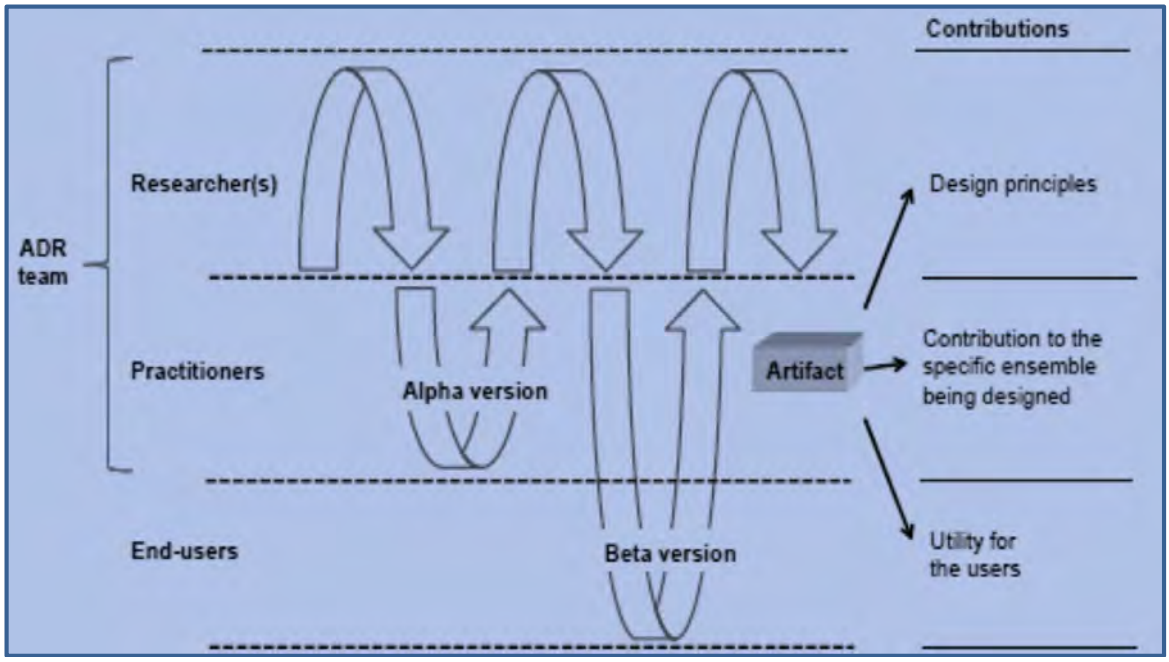


Figure 8: ADR generic schema for IT-Dominant Building, Intervention and Evaluation (Sein et al., 2011)

The principles of "reciprocal shaping", "mutually influential roles" and "authentic and concurrent evaluation" are addressed during the BIE stage. ADR suggests that the influence of the IT artefact and the organisational context are mutual and inseparable. This may result in the original stance of the researcher being changed by the feedback from the organisation, and the ultimate version of the IT artefact quite different from the original version. Additionally, the researcher and the practitioner also influence each other. The different insights offered by these ADR team members into the creation of the artefact, mean that the end-result should be more effective, being a combination of both theory and practice. It should be noted that individuals in ADR can perform multiple roles, but that these roles are clearly identified and responsibilities assigned in Stage 1, "Problem Formulation". In Figure 8, the generic schema for IT-Dominant BIE, it is clear that ADR does not separate evaluation from building. It is hoped that any unanticipated consequences are surfaced during the

evaluation of the alpha version, which then allows for refinement of the artefact, before the beta version is introduced to the end user. The decisions regarding the shape of the IT artefact and the intervention in the real organisational setting should be entwined with constant evaluation. Sein et al. (2011) emphasise that due to the emergent nature of the artefact, the setting is not controlled. It is their belief that achieving authenticity in a natural setting is more important for ADR. The tasks in Stage 2, "BIE", are therefore to:

- discover the initial knowledge-creation target;
- select or customise the BIE form;
- execute the BIE cycle(s); and
- assess the need for additional cycles (Sein et al., 2011, p. 43).

Stage 3, "Reflection and learning", is continuous, and runs alongside both Stages 1 and 2. This is where the contributions to theory arise, and as the artefact emerges, adjustments to the research process need to be made as the researcher's understanding of it increases. The principle that is attached to this stage is "guided emergence". Stage 3 tasks are to:

- reflect on the design and redesign during the project;
- evaluate adherence to principles, and
- analyse the intervention results according to the state goals (Sein et al, 2011, p. 44).

The last stage of ADR is the "Formalisation of learning". The effect of the artefact on the organisation should be described as formalised learning, and it is hoped that the changes that were made during the BIE stage, will now be able to be explicated in order to enhance the original theories that were used to create the initial alpha version of the artefact. During this stage, the principle of "generalised outcomes" should be applied. Sein et al. (2011, p. 44) suggest this implies a shift from "the specific and unique" to "generic and abstract", and that three levels are involved, the "generalisation of the problem instance, the generalisation of the solution instance, and the derivation of the design principles from the design research outcomes". The tasks that should be accomplished during this stage are:

- abstract the learning into concepts for a class of field problems;
- share outcomes and assessment with practitioners;
- articulate outcomes as design principles;
- articulate learning in light of theories selected; and
- formalise results for dissemination (Sein et al., 2011, p. 45).

According to Sein et al. (2011), ADR has been developed with the ultimate goal of innovative design knowledge for the particular class of problems. The method acknowledges that the artefact being designed emerges from the meeting of IT and the organisation. Any unanticipated consequences of implementing the artefact can be addressed immediately. This benefits IT, from a theory perspective, and the organisation, from a practice perspective. It is felt that this approach, which combines AR with DR will be the best approach to realising the objectives of this research, as well as delivering research that is "efficacious for solving the practical problems at hand" (Lee, 2010, p. 345).

3.6. Research strategy

The research strategy employed for this research was qualitative rather than quantitative as the data collected was verbal or written, using evaluation forms, interviews, completed exercises, assessments, document reviews and summaries. The researcher captured self-reflections and learnings throughout the research process. As the experience was unique to each participant, there were no standard responses (Saunders et al., 2007). The researcher was the primary instrument and the findings were interpreted, based on the researcher's understanding and observations (Creswell, 2009). The data required reflection, classification and analysis by the researcher, who was searching for patterns in the collected data. The collection of data was mainly through evaluation forms (Appendix 1) and verbal feedback, with some unstructured interviews as well. For these interviews, only notes were taken in order not to constrain the responses of the interviewee. Other data was extracted from the review of the literature. The participants were drawn from those members of the 4UCT workforce who required access to the finance system for a particular module from February 2014 to June 2014. All participants have experience of the classroom-based training as the converted course is the last of the finance system components that require training before access is granted, and the prerequisite is to have completed the other courses. Completion of the evaluation was voluntary, although the actual training was compulsory. The training was carried out by the current Finance training staff, led by the researcher, who managed the practical process of converting the current classroom-based course to a computer-based e-learning module, as well as performing the research.

Therefore, the researcher was the principle instrument and has provided a detailed description of observations, reflections and actions. The meetings with the other trainers relating to the e-learning implementation were informal, and suggestions for changes were

verbal, or in point form, recorded by the researcher. Proposed changes to the course were discussed by the training team, and any actions taken were agreed to by all role players. Although this research was subjective, every effort was made to ensure personal bias from the researcher was avoided as the evaluations were reviewed and outcomes debated by the training team. The user evaluations are also available for scrutiny. Such information, supported by additional research material, formed the data which was analysed with the intent of establishing, with impartiality, whether or not the implemented training module is realising the efficacy and effectiveness goals of the research.

3.7. Data analysis

The results of the end-user evaluations were transferred to a spreadsheet, and assessed by the training team. The review discussions were informal but immediate. Where possible, and especially when there appeared to be a problem for multiple end-users, an immediate re-shaping of the e-learning artefact was initiated. The researcher noted accompanying reflections and learnings, in parallel with the BIE stage. The researcher looked for themes that re-occurred by organising, reviewing and examining the information obtained during the course, and in subsequent interviews. The researcher used previous research and principles discovered during the literature review to compare emerging themes, particularly if any conflicting or surprising elements surfaced. The researcher then interpreted the data and established a framework, with reference to the literature review. The researcher also discussed the emerging theory with other trainers to determine whether it appeared to be an authentic reflection of the results of the implementation. It is noted that in order to be credible, strict attention to the formulation of theory is required. The researcher needs to ensure that readers are not only willing to accept the conclusions, but to understand the researcher's observations and interventions (McNiff & Whitehead, 2006).

An effort was made to use triangulation of data in the form of captured evaluations, together with the researcher's reflections and detailed description of the results, moderated through discussion with other trainers, to ensure the credibility and dependability of the research results. The transferability principle was addressed by making the assumptions and context of the research unambiguous. The exact confirmability of results to another study is not possible in an interpretive study, as the setting and combined worldviews would be different each time. However, it is expected that descriptions of this research are clear and rich enough so that other researchers could replicate the study in their own settings, with similar results.

The study itself was longitudinal. The alpha version of one of the finance training courses was first offered to other trainers in March 2013, and changes were made to the artefact based on the feedback. Subsequent alpha versions were trialled with the trainers. Owing to a problem with software acquisition, the beta version was only available in February 2014. The first computer-based version of one of the finance training courses was introduced in the work situation in March 2014. Evaluations were completed as part of the course, and, if required, follow up interviews were conducted by the researcher when the final assessment was handed back. Based on the evaluations and interviews, and after meetings with the other trainers, the researcher implemented changes to course content, presentation, exercises and assessments at regular intervals. The online course has subsequently been through much iteration. It should be noted that although the study is longitudinal, the trainees are different each time, unless repeating the module.

The performance or outcomes of the final version of the implemented modules of the computer-based finance system training course will be measured using the criteria of efficacy, efficiency and effectiveness (Figure 9).

Measures

Efficacy:

- **Measure 1**: Trainees able to extract relevant financial reports and make accurate inputs in financial system
  - ***Tool***: Extracted financial reports, interviews with line managers
- **Measure 2**: Trainees satisfaction with training
  - ***Tool***: Evaluation form

Efficiency:

- **Measure**: Number of freed trainer hours
  - ***Tool***: Report comparing classroom & e-learning trainer hours

Effectiveness:

- **Measure 1**: Improved quarterly financial reporting submissions
  - ***Tool***: Comparison of quarterly financial reports pre & post implementation
- **Measure 2**: Improved financial job performance as rated by financial managers
  - ***Tool***: Interviews

(For all 3 measures, additional tools are researcher notes, minutes of meetings)

Figure 9: Proposed research measures to investigate the efficacy, efficiency and effectiveness of the computer-based training for compulsory finance training

These measurements are considered an essential part of Soft Systems Methodology (SSM), which evolved out of the Systems Engineering approach. SSM was originally developed to examine situations or systems that involve human interactions, and which are generally fuzzy or complex, as opposed to pure systems thinking which deals with well-defined problems (Checkland & Poulter, 2006). The SSM approach emphasises the importance of reflection and learning, and it was felt would be a good fit for measuring the outcomes of an e-learning implementation. As defined by Checkland and Poulter (2006), efficacy informs the researcher

as to whether the transformation is achieving its desired outcome, efficiency concerns the achievement of the desired outcome with less resources and minimal wastage, and effectiveness involves considering whether any long-term or high level objectives are being met by the transformation.

The research methodology, together with the research outline, and including the research objective, questions and measures, are summarised in Figure 10.

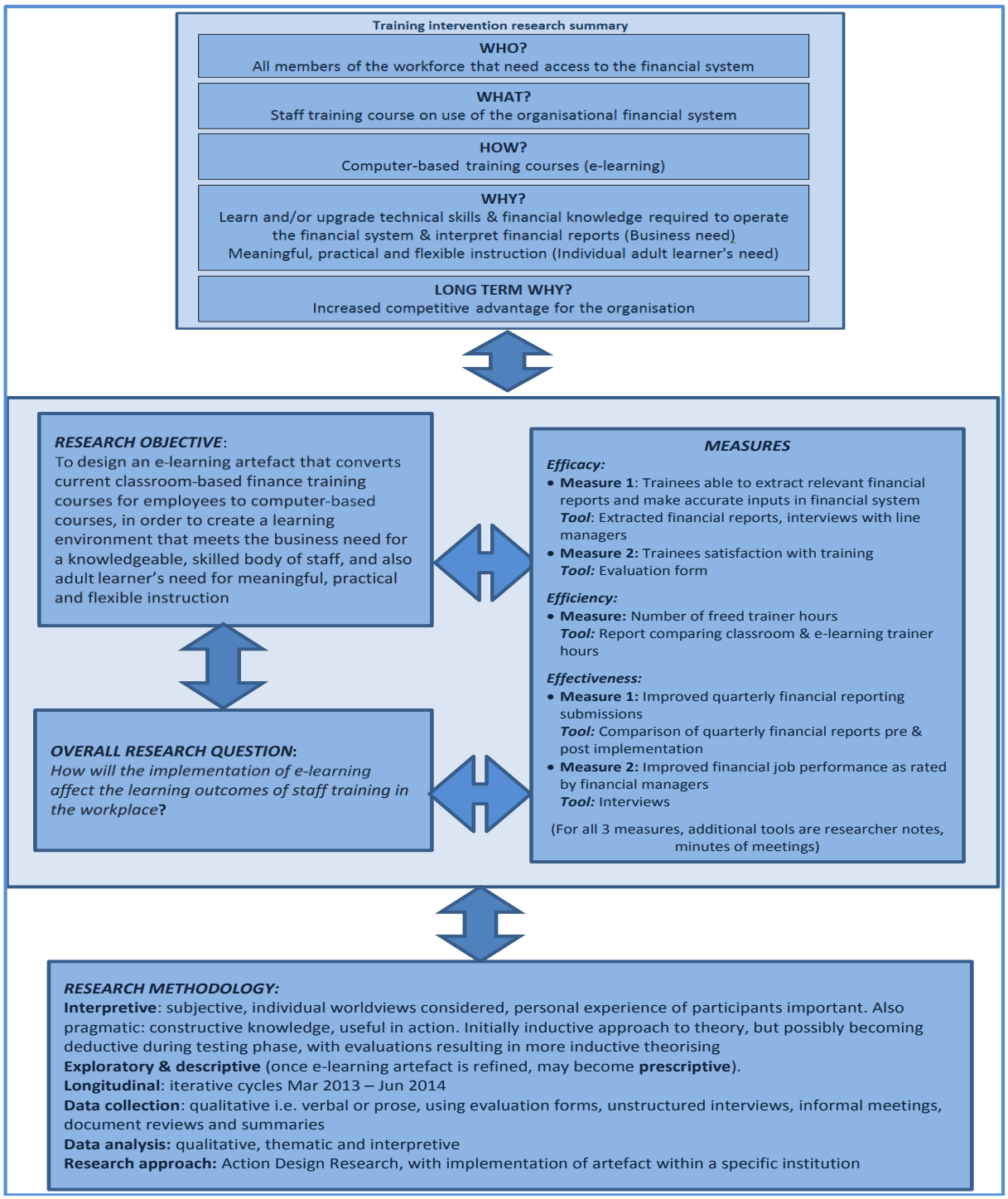


Figure 10: Research to investigate the change from classroom-based to computer-based training for compulsory finance training: research overview; research objective, overall research question, measures and research methodology

3.8. Ethics

There were no minors involved in this study and the participants do not have a dependent relationship with the researcher. Whilst completion of the course evaluation and participation in a research study was optional, UCT staff members are required to complete finance training before being given access to the finance system. It was expected that the majority of trainees would be amenable to participating in the research, but they were given a choice on the evaluation form. Evaluations were anonymous if desired. Each participant was informed that their identity would not be revealed in the analysis; and responses would be noted but kept anonymous. The participant completed their evaluation before receiving their marked final assessment. This was handed back during a face-to-face meeting with the researcher/trainer, to discuss the results. The evaluation was only given to the trainer at the end of this meeting, thereby ensuring there was no bias in either direction.

Permission was given by the UCT Executive Director: Finance for the implementation of computer-based training for the various finance modules, and the UCT HR194 form, *Access to UCT staff for research purposes*, (Appendix 2), was completed and approved by the Human Resource department. The Faculty of Commerce Ethics Committee's letter of approval to proceed with the research is attached (Appendix 3).

As this is ADR, the implementation of the e-learning artefact affects UCT as a whole, either directly or indirectly, and changing the current finance training has direct consequences for trainees. To mitigate any adverse or unforeseen consequences, the initial implementation of the beta version of the e-learning module was carried out during working hours. Three workstations were set up within the Finance department for training purposes. A trainer was present whenever a participant was engaging with the online module and any problems regarding use of the technology were dealt with straightaway. Exercises were marked as soon as they were handed in, and the results were discussed face-to-face. This meant that where required, clarification could be given. The participant was also able to repeat the section if they wanted to. At all times, the aim was to ensure that trainees were not disadvantaged by the initiative, and this necessitated keeping a tighter control over the environment than is usual in online training. It is believed that this research was undertaken with the principle that there would not be any "victims of a new technology" (Myers & Venable, 2014, p. 3) and that the ethical issues raised by these researchers have been met in as far as this study could be considered low risk and uncontroversial.

3.9. Summary of research approach

The use of both AR and DR is well established in IS research where the ultimate goal is to improve practice in a real world environment (Gregor & Hevner, 2013; Mathiassen et al., 2012; Papas et al., 2012). Despite the debates regarding the similarities and differences between the two approaches, as well as other comparable methodologies or paradigms, it was decided that the principles and goals of ADR, as proposed by Sein et al. (2011) would be well suited to meet the objectives of this research. It is hoped that the clear definitions given in this approach, together with vigilant management thereof, will support the claims of rigor and validity. Simultaneously, it is an investigation as to whether this approach can satisfy both the learning and the generation of knowledge required by IS research, whilst improving practice, and producing actionable recommendations for practitioners. According to Sein et al. (2011), “ADR reaches into the very core of IS: designing IT artifacts while allowing for their emergence in an organisational context, and seeking utility in the ensemble they represent” (p. 53).

4. Alpha version development and results

The first stage of ADR was completed with the formulation of the problem. The result of this formulation was the decision to change the finance training courses from classroom-based to computer-based. It was envisaged that e-learning would enable a flexible schedule of course offerings, making them more accessible, controllable, dynamic and examinable. Whilst this may not have been the ultimate solution, it was accepted by all stakeholders consulted as both desirable and feasible (Checkland & Poulter, 2006). The second stage of the ADR approach relates to the building of the artefact, its placement into the organisational environment and its continuous evaluation, whilst ensuring that the principles of "reciprocal shaping", "mutually influential roles" and "authentic and concurrent evaluation" are being addressed. The results from this BIE stage are illustrated in Figure 11.

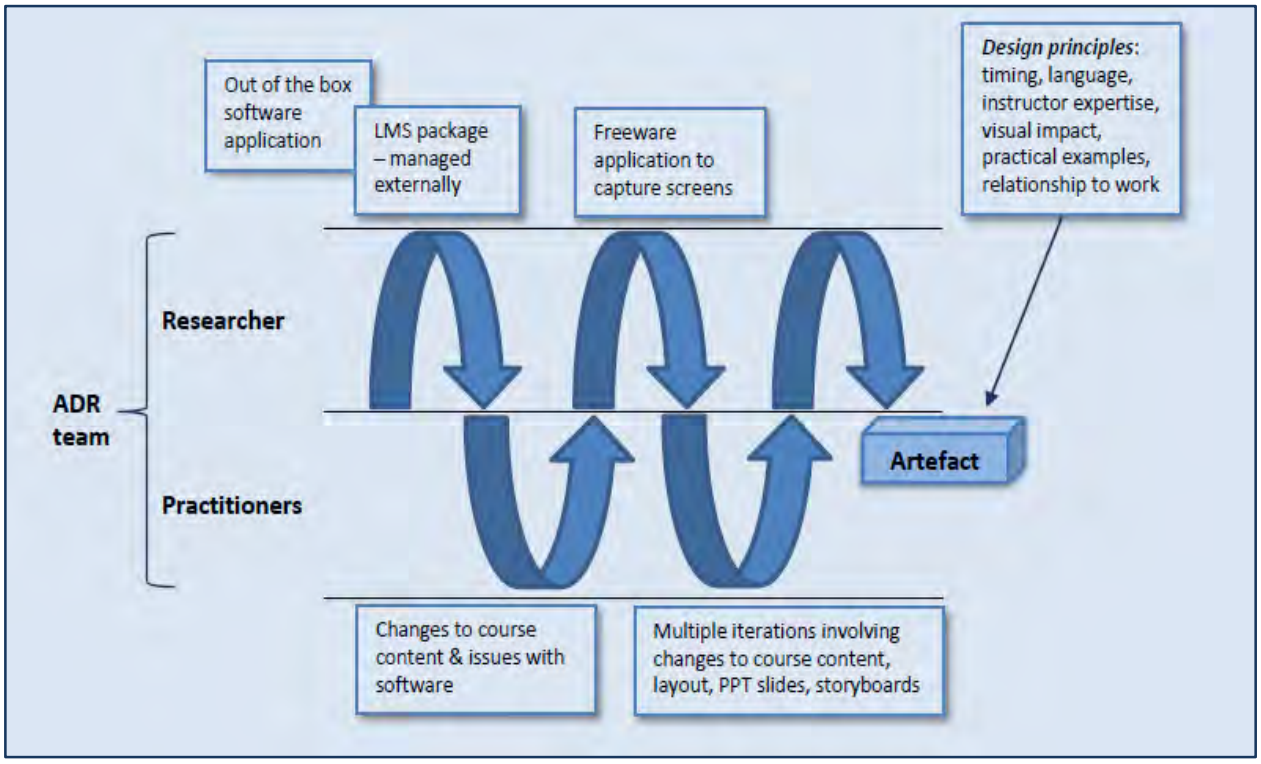


Figure 11: ADR Building, Intervention & Evaluation Stage for this research
(Own construct: informed by Sein et al., 2011)

First iteration of alpha version:

The foundation of the development of the artefact was to find a suitable software application. This proved to be onerous due to organisational financial and IT constraints. After an abortive attempt to purchase an out of the box Learning Management System (LMS), three free software applications were investigated. The best fit was chosen based on the e-learning success model (Holsapple & Lee-Post, 2006). An online course was built for one of the training modules using the chosen application. This first instance of the alpha version of the artefact

was tested by other practitioners. With the first test, all worked as anticipated, although some suggestions for changes to the course content were made and reservations regarding the layout offered by the application expressed. However, when the second tester was invited to sign up for the module, it was discovered that owing to the organisation's upgraded IT security/firewalls, this off-campus software application would not work. Amongst other problems, e-mails from and to the instructor, the "learners" and the software owners were blocked. At this point, after consultation with the training team and management, it was decided that if the implementation was to go forward, using a LMS would have to be abandoned. Instead, a freeware application would be used to capture the course content, and the rest would be assembled using whatever tools were to hand. At a very simple level, paper-based hand-outs could be used for the exercises and assessment, and records kept manually using a spreadsheet. Following a meeting which included practitioners and management, it was decided that the target course to be converted would be the one that involved the last of the finance system components, although the first building of the artefact involved the first course of the training material. The decision to convert the last in the series of training courses was based on its creating the most issues in terms of resources and due to its more specialised nature, there were considerable delays before some staff members received training. The delay was a result of the course requiring a quorum of four participants to make it a viable session for the finance training team. It therefore appeared to be an ideal fit for online training, which would be available any time. Additionally, the majority of the trainees would not be completely new to the organisation and the finance system, as most would have completed the three prior courses, a prerequisite for this course, in the classroom. Consequently, they would be able to compare the two modes of instruction when completing the evaluation.

Lesson learned from first iteration: Even with commitment and a budget from management, unexpected events can result in the desired software application not being purchased. In this case, the LMS software application company was taken over by a larger concern, and the new licencing cost was prohibitive. Changes to the organisation's financial cash flow also meant straightened financial circumstances and a reluctance by the organisation to invest in something new and untried, despite the initial approval of the training team's business plan. Additionally, with the approved budget, there was no suitable alternative LMS software application which met both the organisation's IT architecture landscape and the researcher's e-learning software requirements. Another learning experience was that it is not advisable to

attempt to use an application that is managed out of the organisation's own IT system or department. Working within organisational silos is also problematic. Although there was commitment from the Finance executive, the IT executive had not been involved in any decision making, and were reluctant to assign resources to this development as they had other priorities. The artefact was not able to be introduced into the organisation in its current format. Notwithstanding these initial challenges, some feedback regarding the artefact had already been obtained, and there was continuous reflection undertaken to redesign the artefact, both in the system design (technology and course design) and the system delivery (content/use).

Second and subsequent iterations of alpha version:

The second alpha version involved using a very simple tool that was free and easily available for download. However, it took some time to learn how to use it. In addition, when it was tested with different applications (MS Office PowerPoint [PPT] and the actual finance system), there was a problem with the synchronisation of the voice and with the screen changes in the finance system demonstrations. Expert technical assistance was required to resolve this. In all, 14 tests were carried out before all parties were satisfied with the result. The transposing of the existing finance training course from classroom to online was challenging. A great deal of deliberation and time was required to ensure that the PPT slides made sense to the practitioners who were acting as testers, and ultimately to the users, in the absence of face-to-face interaction. In order to adhere to the advice suggested by CLT, the material had to be constructed so that the recommended 20 minute time limit per online session was not exceeded. This required considerable instructor input, discussion with other trainers, and re-ordering of the course material. It was important that the voice-over/audio component that accompanied the screencasts was scripted, as the information on PPT slides and the demonstrations of the finance system needed to be explained. Thus, a story board was devised for each training session and was checked by an alternative trainer. Figure 12 is an example of a storyboard. The application of EMT was brought into the design of the artefact by ensuring that the emphasis was on learning, and that the exercises were there to be used as practice, not a test. Additionally, it was reiterated throughout the online modules that mistakes would happen but that it was more important that the trainee knew how to recognise and manage the errors as they occurred. Each check led to a meeting to discuss intention and objectives between the researcher/instructor and the practitioners/trainers. These informal discussions resulted in increased learning about the use of the finance system

and the different practitioners' understanding of the business processes. The exercises were also developed and tested by the practitioners. The objective was to ensure the exercises reflected real life scenarios that would be encountered in the workplace, in order to apply the practices suggested by the Constructivist Theory. As with the examples given in the screencasts/audio, there was a close relationship between the instruction and real life routines. A flow between theory and practice was constantly in effect. As a result of these consultations, there were several iterations of the alpha version during this stage.

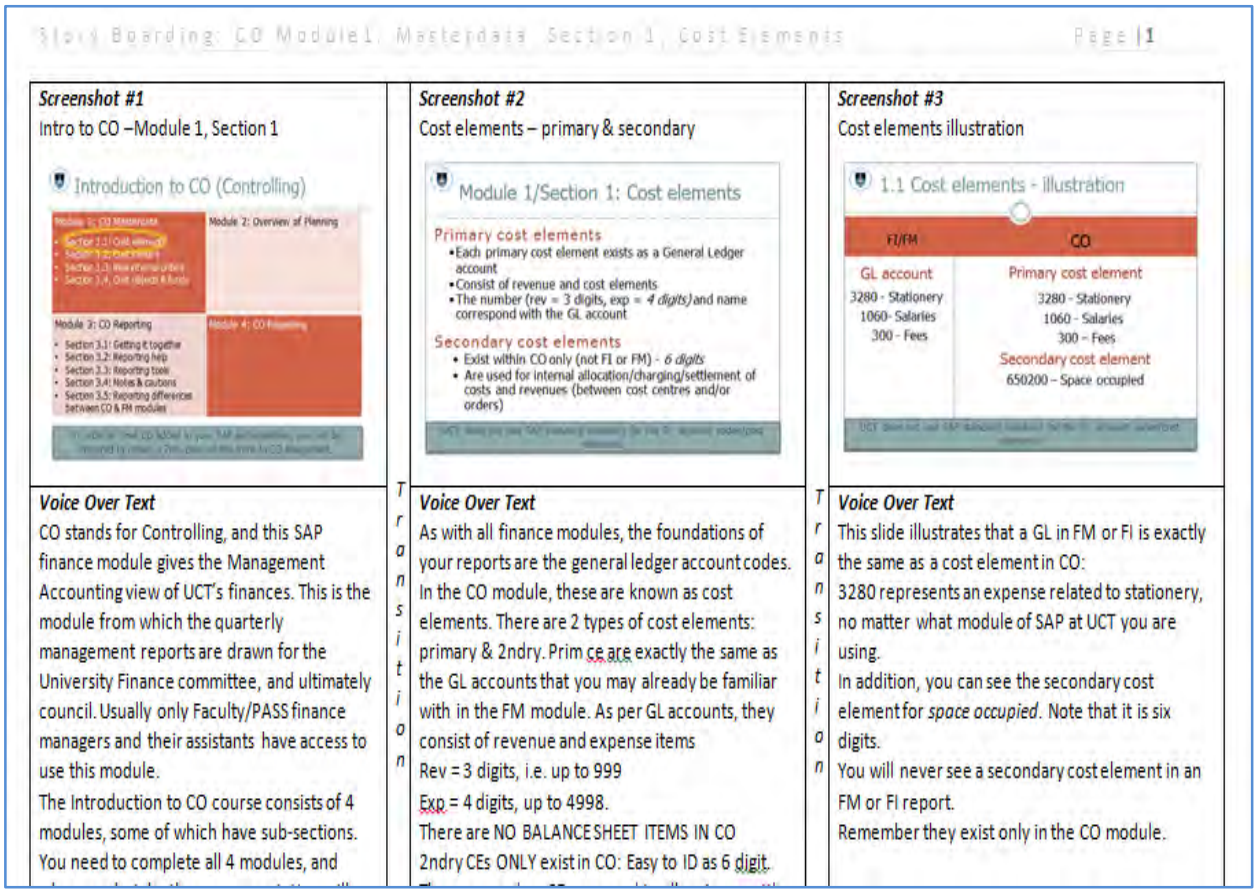


Figure 12: Example of a storyboard

Lessons learnt from subsequent iterations of the alpha version: From a practical perspective, the background noise in the recording was an irritant, and needed to be resolved before releasing a beta version. This was accomplished by purchasing a good quality headset and microphone, and scheduling the recording sessions out of office hours. Landlines and cell phones were shut off or disconnected. Furthermore, as the application was not an LMS, there was no learning history available or an indication of the duration of each training session, and this was proving problematic. To address this issue, a PPT slide was inserted at the start of each session, with a clear indication of where the particular session fitted into the module, and what was still outstanding (Figure 13).

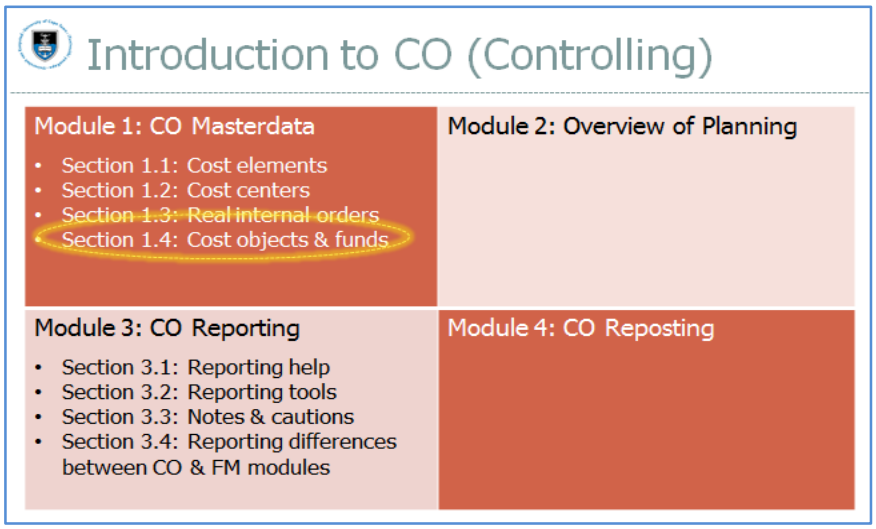


Figure 13: Example of slide serving as learning history guide

Additionally, a hand-out was produced for the users/trainees with timings of each session (Figure 14).

Introduction to CO Online Training Course

Module	*Section*	*Content*	*Timing (mins)*
Module 1			
	1.1	*Cost elements*	18
Exercise A			
Practice			
	1.2	*Cost centers*	25
Exercise B			
Practice			
	1.3	*Real internal orders*	13
Exercise C			
Practice			
	1.4	*Cost objects & funds*	21
Exercise D			
Practice			
Module 2		*Overview of Planning*	6
Exercise E			
Practice			
Module 3			
	3.1	*Reporting help*	7
	3.2	*Reporting tools*	51
	3.3	*Notes & cautions*	8
	3.4	*Reporting differences CO/FM*	4
Exercise F			
Practice			
Module 4		*Reposting*	13
Exercise G			
Practice			
		Total time of viewing	166
			2hr 46 mins
Assignment: Case study - Weeping Willow Nursery			

Figure 14: Timing sheet for online course modules

Timing, presentation and content design were signed off by the practitioner tester. It was noted that one session exceeded the 20 minute timing goal, but after further discussion, it was decided to proceed with the implementation of the beta version despite this. The final assessment exercise, a case study, was felt to be too difficult in an e-learning environment for new users. Based on this feedback, after some consideration and further research, an answer

sheet was designed, which included scaffolding (Appendix 4). This led the trainee through the assessment, each block building on the previous one. The time taken for these alpha version iterations was over 60 hours. This was to produce one online course, which in viewing time totals 166 minutes (2 hours 46 minutes) for all sessions. The researcher was deeply involved with the whole process and maintaining an objective stance was at times difficult. The building of the artefact required constant application, vigilance and reflection to ensure that the research objectives and standards were met and best practice was being followed.

5. Beta version development and results

After all alpha version changes to the e-learning finance system training course artefact had been made, it was decided that the beta version was ready to be introduced to the organisation (Figure 15). A VLC Media Player (freeware) was installed on all three workstations, together with the ten video clips, which comprised the course. The finance system was also installed on each desktop.

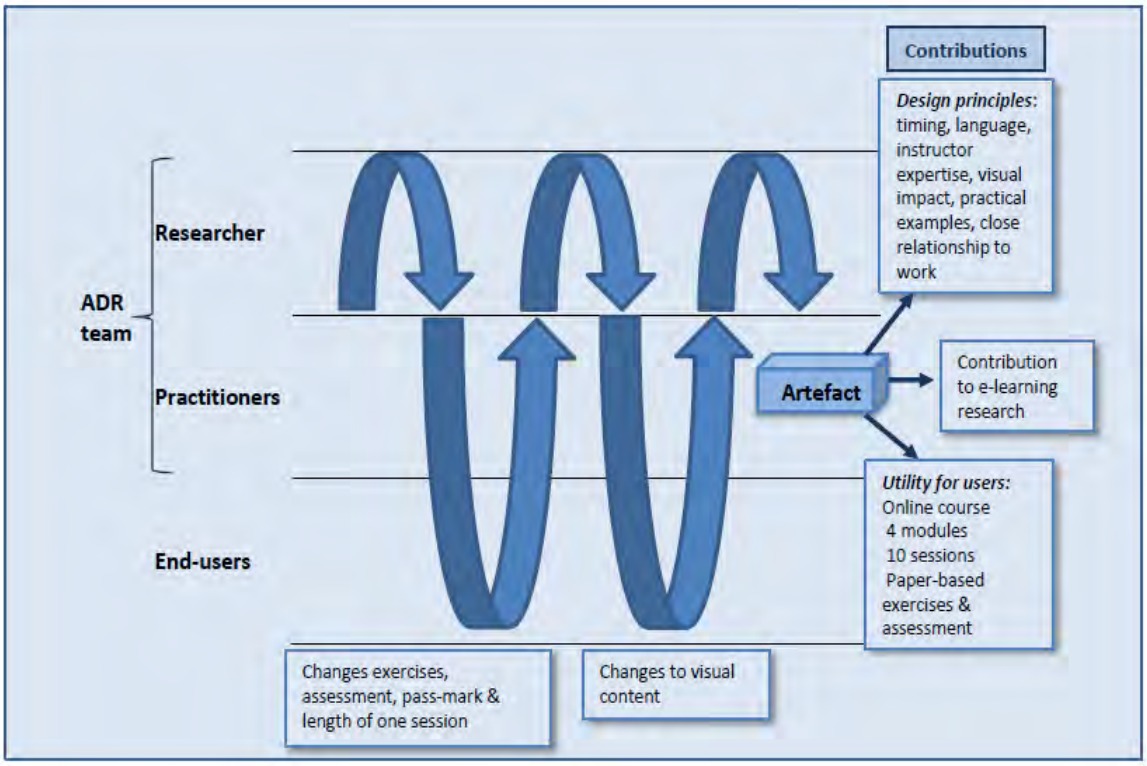


Figure 15: Beta version of artefact in ADR Building, Intervention & Evaluation Stage
(Own construct: informed by Sein et al., 2011)

First iteration of beta version:

The use of the first beta version of the artefact was initiated by two staff members simultaneously. The beta version of the artefact consisted of four modules, which comprised ten sessions, seven exercises (using the finance system's training client), and a final assessment in the form of a case study. At the end of each exercise, trainees were encouraged to take time to practice their new skills on the finance system's live client, using their real life authorisations. Trainees were requested to book a workstation at a time that suited themselves and their line managers, so the e-learning benefit of "anytime", though limited to working hours, still applied. The scheduling of the sections, the time taken to complete the module, and readiness to commence the final assessment were up to the participant. Exercises were marked directly, and, based on verbal feedback from the participants/trainees, as well as the exercise outcome, modifications to the e-learning

artefact were made the same day. These changes were more related to the users' interpretation of the exercises than with the content of the online presentation, so it was possible to make the necessary revisions on an ongoing basis.

As subsequent staff members completed the beta version of the online course, it appeared that the problems encountered by previous trainees were resolved for the most part, although other issues emerged in some cases. These changes involved further consultation with other practitioners, and in the case of the assessment, management needed to authorise a lowering of the pass mark from 75% to 70%, which was found to be too high. It should also be noted that the course that was converted to online, concerns a specific component of the finance system, and is usually only given to finance managers and assistant finance managers. However, it transpired that not all the trainees were finance managers, or even assistant finance managers, and would not necessarily need the same level of expertise in their day-to-day work experience. The decision regarding which staff members require training is left to the finance managers of each reporting area of the organisation. In certain cases, the finance manager required staff members with different responsibilities to have access to this component of the finance system.

The assessment marks ranged from 88% to 26%. Those trainees who failed the assessment were required to repeat either the whole course or particular module(s) where it was apparent the concept had not been grasped. The researcher also requested another practitioner to re-mark the assessments to ensure that the final result was fair. The beta version course evaluations for the 12 users are summarised in Table 3 with the mark for the final assessment included at the bottom of the table. A "P" is indicative of a repeated attempt, where 70% or more was attained. All trainees passed at the second attempt. The written responses to evaluation questions of all twelve trainees are attached in Appendix 5.

Table 3: Beta version online course evaluations and assessment mark

		Trainees														
		A	B	C	D	E	F	G	H	I	J	K	L			
	Instructional Design (5= Excellent, 1= Poor)													Tot	Max	%
Q1	I was able to navigate through the course easily	5	5	4	3	5	5	4	4	4	3	5	4	51	60	85
Q2	The audio portions were easy to hear	5	4	4	4	5	5	5	3	5	5	5	4	54	60	90
Q3	The video portions were easy to see	5	5	4	4	5	4	5	4	5	5	5	5	56	60	93
Q4	The exercises were properly explained	4	5	5	3	5	5	3	2	3	4	5	4	48	60	80
Q5	The course design facilitated the learning process	5	5	5	4	5	5	3	4	4	4	5	4	53	60	88
Q6	Moving through the module was logical & intuitive	5	5	4	4	5	4	3	4	4	4	5	3	50	60	83
	The following tools helped my learning experience. (Please rank from 1 [least useful] - 5 [most useful].)													288	360	**80**
Q7	*Audio*	5	5	5	4	5	5	5	3	4	5	5	3	54	60	90
Q8	*Video*	5	5	5	4	5	5	5	5	4	5	5	4	57	60	95
Q9	*Exercises*	3	5	4	4	5	5	4	3	5	5	5	5	53	60	88
Q10	*Practice session*	2	5	4	4	5	4	5	NC	5	5	5	2	46	55	84
Q11	*Handouts*	5	5	5	4	5	5	4	3	N/A	N/A	5	5	46	50	92
Q12	*Case study*	1	5	3	4	5	5	3	4	N/A	N/A	*	4	34	45	76
Q13	Please provide comments on how the instructional design of the course could be improved:	See Sheet 2 for written responses												*Took me a while to complete		
Q14	Did the technology distract from the course content?	See Sheet 2 for written responses														
	Training Content: (5= Excellent, 1= Poor)															
Q15	The content was arranged to make effective use of time	3	5	5	4	5	4	3	3	5	4	5	5	51	60	85
Q16	The course allowed me to learn at my own speed	5	5	5	4	5	5	4	4	5	5	5	5	57	60	95
Q17	The length of the module was appropriate	3	4	3	4	5	NC	2	4	5	5	5	5	45	55	82
Q18	The amount of information was appropriate	5	4	4	4	5	5	3	4	5	5	5	4	53	60	88
Q19	The course contained relevant examples	5	5	4	4	5	4	5	4	5	5	5	5	56	60	93
Q20	The course contained best practice concepts	4	5	3	4	5	5	5	4	NC	5	5	5	50	55	91
Q21	The learning objectives were clearly identified	4	5	4	4	5	5	4	4	5	5	5	4	54	60	90
Q22	Was the content coherent and well developed? Please provide examples where it is NOT.	See Sheet 2 for written responses												366	410	**89**
Q23	How confident are you that you will be able to apply the concepts learned in this session when you are back in the workplace?	See Sheet 2 for written responses														
Q24	Please provide comments on how the presentation of the course could be improved?	See Sheet 2 for written responses														
Q25	How does this SAP CO online course compare with the SAP FM classroom based course? Please give positives and negatives.	See Sheet 2 for written responses														
Q26	How did you experience scheduling your own training to accommodate your work commitments?	See Sheet 2 for written responses												***Total overall***		
Q27	General comments and suggestions for improvement?	See Sheet 2 for written responses												654	770	**85**
	Mark for final assessment where "P" indicates repeated attempt	*74*	*88*	*72*	*78*	*P*	*P*	*P*	87	*N/A*	*N/A*	*P*	*P*			
	Repeated attempt result (Refer Table 5 for original mark)					*77*	*77*	*79*				*79*	*77*			

Lessons learnt from first iteration of beta version:

Overall, the results of the user evaluations were encouraging. Only one trainee was totally in favour of classroom-based training. However, even this user remarked on enjoying the flexibility of online training.

For an online course, there was considerable contact, or face-to-face interaction. As a consequence, the instructor was able to discern where there was insufficient explanation or instruction, and remedy the omission. This has meant that there were fewer issues as subsequent trainees completed the course. The one session that exceeded the recommended 20 minute time frame was commented on, and the consequence of ignoring this time limit was highlighted. It became apparent that what is obvious to an expert user is not the same for a new user, and there is a definite need to ensure that clarity is maintained and the foundational principles of accounting and the financial business processes are referenced repeatedly. In this organisation, the medium of instruction is English. However, the trainees' first language is often not English. This has led to some confusion regarding instructions. The instructor must ensure that written directions in the exercises are explicit, in order that no one is disadvantaged. This clarity should also be included in the online audio recordings,

where it may be necessary to repeat important concepts using different words to ensure that misunderstandings do not occur due to vocabulary issues. Another lesson arising from the implementation of the beta version of the artefact was that there must be some time limit imposed. Two trainees failed the assessment where there was a break of almost a month. Additionally, it was discovered that one trainee had informed their line-manager that they were at the online training workstation, when in fact they were not. It has been resolved, in future, to keep an individual sign-in sheet for all trainees, and to email this sheet to the trainee's line manager after the course is completed, together with the assessment result.

At the time of write up, twelve staff members had completed the online financial training course. A profile of the trainees/users is summarised in Table 4, with the "@UCT" column reflecting length of service, "Ms" = months, "Ys" = years. Ten of these trainees were new users for this component of the finance system. Trainees I and J have been using this finance system component for a while, but were struggling with the concepts of a particular section. They have been requesting this specific training for some time but the training team was unable to accommodate them due to lack of resources. They signed up to complete the specific session online in the same week that they were informed of the new medium of instruction. The assessment was not completed by Trainees I and J as they had only booked for the single relevant session and its exercise. For this reason, they were not given a slide hand-out which included all sessions. However, in order to capture and include their practical and applied inputs on the new medium of instruction, and gain valuable feedback from an experienced user perspective, they were requested to evaluate the training. It is envisaged that the artefact will continue to evolve as more staff complete and evaluate the online course.

Table 4: Summary of the characteristics of the users

Trainees	(N)ew or (R)efresher	Gender	Age	1st lang	Highest qualification	Job title	@ UCT
A	N	F	35	English	CIMA	Finance Administrator	12 Ms
B	N	F	40	English	BCompt	Asst Finance Manager	11 Ms
C	N	F	32	English	BTech Tax	Senior Finance Officer	4 Ms
D	N	M	31	isiXhosa	BTech: Cost&Mngt Acc Certificate in Taxation	Asst Finance Manager	5 Ms
E	N	M	33	Afrikaans	ND: Accounting BCompt. in 3rd year	Asst Finance Manager	5 Ms
F	N	F	48	English	Grade 10	Admin Assistant	8 Ys
G	N	M	26	isiXhosa	Degree	Finance Officer	11 Ms
H	N	F	30	English	MDI Internal Audit	Senior Finance Officer	11 Ms
I	R - Sec 1.3	F	35	English	BCom	Asst Finance Manager	5 Ys
J	R - Sec 1.3	F	48	English	CA & MBA	Finance Manager	21 Ys
K	N	F	47	English	Tertiary	Admin Officer	15 Ys
L	N	M	45	English	Diploma	Finance Officer	8 Ys

6. Discussion

As outlined in Section 3, this research has been conducted using an ADR approach. The seven principles of ADR, as defined by Sein et al. (2011), were applied with specific reference to this current research on the implementation of e-learning, in place of the current classroom-based training (Table 2). The results and outcomes of the intervention in the organisation and work situation are discussed in this chapter, and evaluated in terms of each principle, as well as their relationships to the background literature review and research questions.

6.1. Practice-inspired research

	Principle	*Description (Sein et al., 2011)*
1	Practice-Inspired Research	Problem drawn from real-world, used to create knowledge regarding a class of problems, typified by this particular problem.

(ADR Principle 1, extracted from Table 2)

This research was initiated by the continuous need to train staff in the financial sector of the organisation in order to meet the challenges of the changing business environment. The existing staff training, whilst relatively effective, was resource intensive. The training can only be repeated on a monthly basis and this delays staff becoming productive as they can only access the finance system after training is completed. Scheduling was difficult and the source of many issues for trainers, trainees and line-managers across the entire organisation. A proposed solution was to convert the existing classroom-based training to online training, and this e-learning initiative was accepted by Finance Department management. The objective was that the online training would continue to meet the business need for a knowledgeable, skilled workforce, whilst accommodating the adult learner/trainee's need for practical and flexible instruction. The class of problem to be addressed by the practice-inspired research was the effective and efficient use of e-learning as a tool that is accepted by both the business and the trainees. With reference to the roles and responsibilities of the parties involved in this research, the researcher is providing input, extracted from the literature on e-learning, into the construction of the artefact, and observing and recording the results of the artefact being implemented into the organisation in real time, the authentic situation. At the same time, the researcher is also the super-user of this component of the organisation's finance system, and the principal instructor. As is common in AR, the same individual is both researcher and practitioner. In addition, to the researcher, the other members of the finance training team perform the role of the practitioners. The training team member who is responsible for the training register and venue booking takes on the role of supervisor for this

study. The users are the staff members who require access to this component of the organisation's finance system, also referred to as trainees.

From the results of the evaluations of the e-learning intervention, together with the assessment, it appears that the initiative has been successfully implemented. A real-world problem was addressed and knowledge created for other e-learning implementations. All twelve trainees expressed, in some form, their support for online training, for example, "I think it is better" (Trainee E) and "I prefer online to classroom" (Trainee B). Even Trainee D, who preferred classroom training, commented "I love the flexibility (of the online course)".

Although the sample size of the current research is small, the trainees were fairly diverse in respect of characteristics such as gender, age, first-language, educational background, job title and length of service (Table 4). The total number of trainees for this component of the finance system for the last three years was 37. This total is made up of eleven trainees in 2011, 22 trainees in 2012, and four trainees in 2013. Therefore, having ten new trainees in the first six months of the year is a relatively high number in this context, i.e. the target group of users in the organisation.

In terms of the assessment marks, five trainees achieved the pass mark of 70%, with two achieving more than 80%. Of the five who had to repeat, one (59%) was probably due to rushing the completion of the assessment as well as a lapse of over a month between finishing the course and completing the assessment. During that time, this particularly finance system component was not used as the break was due to an operational emergency rather than personal choice. The trainee went over the course notes before meeting with the instructor, and appeared to have a good grasp of the content when questioned during this interview. He obtained 77% after repeating the assessment with no further intervention. One trainee (26%) appeared to lack motivation to complete the course. This conclusion is drawn from comments and observations made by the supervisor before the assessment, and the assessment being left largely blank, with no attempt made to answer the questions. The trainee was repeatedly a "no show" despite booking the workstation personally, did not respond to e–mails, and took over four weeks to finish the course. After an intervention by the line-manager, the trainee repeated the entire course and obtained 70%. The other three trainees' failure (56%, 62% and 66%) was due to a lack of understanding of one of the concepts, which was the same concept for all three trainees. This has resulted in a review of this session of the online course by the training team. It was felt that the failure to absorb this concept was possibly the result of trainees not utilising the practice time to engage with this

concept in their own financial areas as not all areas use it. How to address this is still under discussion as it is an important part of the financial component being taught and therefore cannot be omitted. As an interim measure, it was suggested inserting a “hint” in the relevant case study question that references this concept. It should be noted that the two “refresher” trainees who only registered for the single session were attempting to deal with this same concept as they now needed to use it in their business processes. With reference to the three trainees that failed, (56%, 62% and 66%), following a face-to-face meeting with the instructor, and repeating the session that dealt with the concept in question, they obtained passes of 77%, 79% and 77% respectively. Unfortunately a comparison cannot be drawn between the classroom-based training and the online training of this course in terms of the assessment, as previously the case study was completed as a group exercise in the classroom. Individual understanding was, therefore, not apparent.

If the user satisfaction dimension of Holsapple and Lee-Post’s (2006) model is considered, the criteria of “overall satisfaction”, “enjoyable experience” and “overall success” has been attained in the light of the research evaluation results and comments. The last criterion of “recommend to others” was not addressed in the evaluation as this training is not elective, and is linked to job requirements. However, when this question was asked in the post training follow-up email sent to the nine “new” users (the tenth having left the organisation), the six who responded were very positive, “Absolutely” (Trainee F), “Definitely (Trainees E and B), “anyone who needs a refresher course in order to efficiently submit annual budget plans should consider going on this course” (Trainee C). The follow-up emails are attached in Appendix 6.

With regards to the net benefits of the system outcome dimension (Holsapple & Lee-Post, 2006), the positive aspect of “empowered” was achieved, as nine out of twelve trainees rated the control factor (Q16: *The course allowed me to learn at my own speed*) a five (excellent), and the overall percentage for this question was 95%, the highest satisfaction rating achieved in the evaluation results. There appeared to be some division regarding “time savings”. The trainees rated the effectiveness of the timing (Q15*: The content was arranged to make effective use of time*) between 5-excellent (six trainees), 4-very good (three trainees) and 3-average (three trainee). At this stage it would be difficult to assess whether the time-saving criterion has been achieved. For the instructor, the time investment was considerable. Even if the time taken to build the artefact and the subsequent changes required during the iterations is set aside, the marking of the exercises and the assessment, the face-to-face

meetings and ensuing discussions have accounted for an average of an hour per trainee. However, in the instructor's view, this time investment is very effective and worthwhile for achieving the long term goal of up skilling of staff involved in financial reporting, and increasing the organisation's competitive advantage. When addressing the time-saving aspect from the users' side, it is extremely variable and would appear to be entirely dependent on the individual, which possibly accounts for variation in the evaluation ratings. Two of the ten new trainees finished the entire course in a day, whilst three took three mornings, two, five mornings, and one, five full days. Two took over a month, but not consecutively. The classroom-based training took nine hours, spread over two days. However, feedback from the classroom-based course usually indicated that most trainees did not feel they had enough time to practice. There have been comments, verbal and written, on the underestimation of the length of time that should be allowed for the online course, "Time for course needs to be better communicated" (Trainee H). However, the training team has not been able to address this issue owing to the individual dependencies. The supervisor repeatedly informed trainees not to base their time allocation on the timing sheet (Figure 14) which only gives the viewing time of each session, and does not allow for the time each trainee spends on the exercises and practice sessions, which is entirely dependent on the individual. This fixation on timing may be a consequence of incorrect goal-setting, referred to by Chatzoglou et al. (2009) and Chillargege et al. (2003). With performance goals replacing learning goals, the negative effect predicted by e-learning literature, was apparent as trainees were very unhappy when told that other trainees finished in a day, or three mornings. However, despite the possible non-achievement of the "time-saving" criterion for either the instructor or the users, there appears to be more confidence on both sides when these trainees finish the course, which is the ultimate objective of the training intervention. "[The financial system component offered online] is more beneficial than [the finance system component offered] in the classroom. After you've done [this component] you know exactly how to work on your own" (Trainee G).

The overall results of the assessment were positive, despite the five failures discussed above. The pass mark of 70% was debated with financial management, as well as the training team, and it was decided that it was important to set a high standard, particularly as this was the management accounting component of the finance system. It is a specialised component, and usually only undertaken by finance managers, or assistant finance managers. After further discussion, the pass mark remained 70%, and the trainees are required to meet that benchmark, even if they end up repeating the course. Moreover, with regards to "enhanced

learning" and "academic success" (Holsapple & Lee-Post, 2006), the responses to Evaluation Q23*, (How confident are you that you will be able to apply the concepts learned in this session when you are back in the workplace?*), would seem to be an indication of the achievement of these goals, with comments such as "Very confident" (Trainee D), "80%" (Trainee H) and "I have high confidence on the stuff I learn" (Trainee G), and an indication of high to moderate confidence from the other trainees. Apart from meeting the criterion of "academic success", there are also the gains to business efficiencies and effectiveness. With better learning results and improved usage of the finance system, there will be a time saving in the long term, as well as increased productivity.

The negative aspects of the Holsapple and Lee-Post (2006) model regarding lack of contact and isolation were ameliorated in this implementation by having the trainees come to the finance training workstations. This, as well as having a supervisor present in the room throughout, seems to have addressed some of the isolation issues mentioned by several studies (Garavan et al., 2010, Krunić, 2010; Otter et al., 2013; Schmeeckle, 2003). Bringing the trainees to the workstations, meant that although the e-learning "any place" factor did not apply, the trainees were instead part of the office, and the real-world practice of the organisation (Sein et al., 2011). They could take breaks as required, and were given access to the common-room in order to make use of the refreshment facilities. Having the work stations set up with a supervisor present also negated trainees' feelings of anxiety and confusion (Ali & Magalhaes, 2008, Zhang et al., 2004). This was commented on by Trainee *B*, as part of the positive aspect of the online training, "[The trainer] was with us still to ask questions if we weren't sure of anything", although Trainee H found being part of the office distracting, "It should have been presented in a dedicated lab (or) e-learning room, not a personal office". Although this was the only negative comment regarding the workstations, the researcher felt it was possibly a significant issue, and discussed this comment with the trainee during an interview. The trainee explained that whilst they did not want to be set up in a "lab" as this would be too isolated, they would have preferred a more formal, and quiet, learning area. As a result of this discussion, the researcher raised the concern with the training team (practitioners). The supervisor suggested she move to another office nearby when there are trainees present at the workstations, and that a "Quiet: training in progress" sign be placed on the door, which would be closed. It is anticipated that this will resolve this issue, whilst still maintaining the positive effect of contact and approachability.

In an attempt to overcome the negative aspect of lack of interaction, the instructor went over each exercise face-to-face, and the final assessment was discussed in detail, after it was marked, also face-to-face. The feedback, whilst not immediate, as suggested by Zhang et al., (2004), was usually within the hour. In a few instances, feedback was delayed overnight due to the trainee leaving immediately after handing in the exercise. The "lack of contact" and "isolation" aspects did not feature in eight out of twelve trainees' evaluations when commenting on the online experience. It must be noted, however, that Trainee F mentioned that a "downside" of online learning was "Interaction with other individuals and facilitator a bit lacking", and Trainee H stated "(As the) course instructor (is) not present in actual office to answer questions, you don't know what questions other candidates have and therefore learning limited to yourself". Similarly, trainees I and J observed that answers to questions were not immediate in online learning. This could be addressed by informing trainees that they are welcome to email the instructor with any questions during the course. It should be noted that the supervisor was not present whilst these two "refresher" trainees completed the session they had registered for, which was not the case for the other trainees who mostly addressed their questions to the supervisor. In cases where the supervisor was unable to answer, the instructor was called in. The questions raised have related to the exercises or assessment, the timing of the course and logistical issues such as forgotten passwords and user IDs, and not to the course content.

The other two negative aspects of the system outcome in the e-learning success model (Holsapple & Lee-Post, 2006), are "quality concerns" and "technology dependence". The system quality rating scored 87% on the evaluation and as such can be considered as a positive rather than a negative benefit. As the software used was very simple (play, pause, fast forward and re-wind), the only real concern regarding technology dependence was having a power supply, and being able to connect to the organisation's servers.

It is possible therefore to conclude that when implemented in a supportive environment, with frequent face-to-face interactions between instructor and learners, as well as meticulous design, e-learning can be an efficient and effective tool in the organisational context for both the business and the workforce. The design of the online course is reviewed in line with the second principle of ADR, the production of a "theory-ingrained" artefact.

6.2. Theory-ingrained artefact

	Principle	*Description (Sein et al., 2011)*
2	Theory-ingrained artefact	Artefact is based on existing theories and technologies (Design subject to change on evaluation).

(ADR Principle 2, extracted from Table 2)

An extensive literature review of the current e-learning body of knowledge that covered system design, delivery and outcome, e-learning strategies, tools and pedagogical principals, resulted in the development of an artefact (the online training module) that encompassed most of the factors identified. System design, as depicted by Holsapple and Lee-Post (2006), encompasses system quality, information quality and service quality. Figure 3, the simplified view of success factors identified by Holsapple and Lee-Post (2006), replicated below for ease of reference, summarised system quality as technology, information quality as course design, and service quality as instructors. System delivery which covered "use", was designated course content, and the last dimension, system outcome, covered transfer of training as a result of the net benefits being positive rather than negative. User satisfaction, together with the positive and negative aspects of the e-learning implementation, has been discussed under the first ADR Principle.

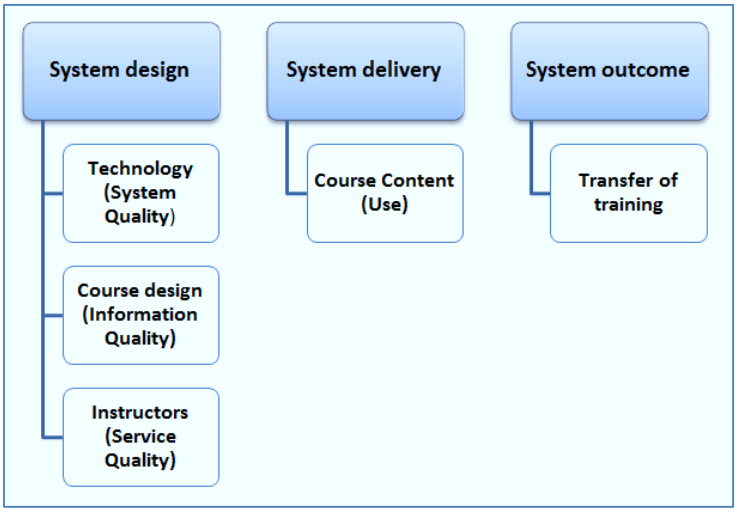


Figure 3 (replicated): Simplified view of success factors identified in e-learning literature (own construct, informed by Holsapple & Lee-Post, 2006)

The instructional design section of the evaluation (Q1 – Q6) which addressed concerns regarding quality was rated relatively highly by the trainees, receiving an overall rating of 312 out of a possible 360 (87%).

In addition, the technology appears to have met the system quality criteria of "ease of use, simple, stable, secure, fast and responsive" (Holsapple & Lee-Post, 2006, E-learning success model, Figure 2). C. Lin et al. (2011) and Mueller and Strohmeier (2010) emphasised that the

technology should be user-friendly and easy to use. The VLC Media Player is extremely simple to operate, and the supervisor explained the controls on an individual basis at the beginning the course. The trainees were used to accessing the live finance system so only needed to be shown how to access the training client. The supervisor was also available to address any technological issues during the course. The simplicity of the technology resonates with both Yunus and Salim (2008) and Lai (2011) who concluded in their respective studies that pedagogical principles were more significant than technology for successful e-learning implementations. The converse side of the simple technology is that there is no easy way for users to find the exact place in the video clip if they wanted to go back except by trial and error, "It would be helpful when trying to find information on the video to know more or less where to go, i.e. a marker" (Trainee J). Although this could be addressed by adding timings to slide hand-outs, for most trainees, the hand-out consisting of all the slides appeared to be a sufficient guide. The one trainee who mentioned this issue was only completing one session, so was not given the slide hand-out. As a result of the trainee's experience, it was noted that slide hand-outs should be given to every trainee, with some hand-outs broken up into sections to accommodate those doing sub-sections of the course.

The next dimension of system design in Figure 2, information quality, was summarised as course design in Figure 3. This dimension requires that the final product is well-organised, effectively presented, right sized, clear, useful and up-to-date. One of the factors that hinder e-learning course completion was cited as lack of clear objectives and final assessments (Bedwell & Salas, 2010; Welsh et al., 2003). This barrier was surmounted in the online course by providing a slide (Figure 13) at the beginning of each module and section, and both the slide and the audio stated the objective. This was reiterated at the end of each section, before discussing the exercise. There was an assessment at the end of the course, and this requirement was highlighted at the beginning of the course, as well as at the end, in the video clips, and by the supervisor when giving instructions to each trainee at the start. Mueller and Strohmeier (2010) state that, in the e-learning environment, bad design not only creates negativity but is harmful as well. Multiple hours were spent planning and reconstructing the artefact's PPT slides, and the accompanying audio, in the form of the storyboards (Figure 12), and this finding concurs with Chu and Robey (2008) who warned of the underestimation of time in respect of adapting content to the online setting. It appears that the information content and design of the presentation were good as the evaluation question "The course design facilitated the learning process" (Q5) elicited a rating of 88% (53 marks out of a

possible 60), and the question asking how the presentation could be improved (Q24) was either not commented on or evaluated as good or satisfactory by eight out of the twelve trainees. The comments received from Trainees I and L concerned the physical presentation, and suggested adding more visual aids and making the cursor/pointer bigger. As such, these related more to the system delivery dimension. Trainees G and K were concerned about the exercise or case study instructions, although Trainee K was satisfied with the rest, "I think the exercises were great, the audio and videos were good". Trainee F requested more practical exercises, but when interviewed, it was apparent that this individual had not made use of the practice sessions. The suggestion from Trainees I and L regarding using the cursor to highlight text on the PPT slide, whilst discussing that point in the audio, will be incorporated in the next iteration of the artefact.

Having the right-size of content for an online course is crucial (Garavan et al., 2010). One of the first checks when designing the course was to break up the information to be delivered into short sections. For this study, the researcher/instructor endeavoured to keep the sections to sessions of 20 minutes or less. One section exceeded this time limit, and despite a number of iterations to reduce it, was left at 51 minutes as there did not appear to be an appropriate place to break. However, it was noted and commented on by Trainee A "The online course was a little long for one session", Trainee G, "3.2 Tools is too long" and Trainee K, "…but when I came to [the reporting section] it felt like forever". In the light of these comments, the instructor, after much reflection and discussion with the other practitioners, needs to re-record the entire section in order to make the change. The difficulty with this section arose from trying to keep the content coherent and to preserve the flow, but it was decided that keeping to the 20 minute time limit was obviously more important for the users. The solution is to add one of the "tools" in Section 3.2 (Reporting tools) to Section 3.3 (Notes and cautions), which will now deal with all matters related to the printing of reports from this component of the finance system, and will include the printing tool. This change will be made when the current trainees have completed the course. This example highlights that the duration of online presentations is crucial to user acceptance and closely relates to other e-learning studies (Andreu & Jáuregui, 2005; Garavan et al., 2010, Hamid, 2002), as well as CLT (Bannert, 2002; Kirschner, 2002; Van Merriënboer et al., 2006).

Course designers should be aware of cognitive overload, and even more so in the online environment. Learners, or in this case, trainees are already involved in decision making simply by starting the course. By placing control of the pace of proceeding through the sections and

exercises, as well as the duration of study each day on the individual user, trainees may already feel pressured. In this research, this was found to be the case, where four trainees stayed all day, even going without proper breaks. A loss of concentration was apparent to the instructor when marking the exercises or assessments that were completed at the end of the day. When discussing the results of the assessment with the training team, the supervisor indicated that the trainee had been at the station all day, and in a few instances, had not eaten either. This example of apparent cognitive overload supports the theory of CLT discussed by Kirschner (2002) and Van Merriënboer et al. (2006). It was also noted that leaving the decision of when to come for the online training session caused some anxiety with a few trainees, and this is before they had started to engage with the learning itself, “At first it needed to be explained to me outside UCT before I could actually understand what was asked of me” (Trainee K). In order to reduce cognitive overload, Becker et al., (2011) and Bedwell and Salas (2010) suggest varying instructional content with practical exercises. This recommendation was embedded in the online artefact, with short sessions (with one exception), followed by an exercise in the organisation’s finance system training client environment and then a practice period on the live system. Another suggestion to reduce cognitive load which was used in the artefact design, was ensuring consistency across screens, and the use of an uncluttered design (Garavan et al., 2010). All forms of visual data were used on the slides, such as words, pictures, tables and other graphics. The addition of audio track should assist when the visual data becomes excessive. Using both visual and auditory information assists learners to integrate more information (DeRouin et al., 2005). It is suggested that the cognitive load balancing recommended by Van Merriënboer et al. (2006), and used in the online training artefact, contributed towards the successful outcome of the initiative.

The last dimension of system design highlighted by Holsapple and Lee-Post (2006) is service quality, which was summarised as “Instructors”. For the purposes of this artefact, it was essential that the instructors were part of, and drawn from, the organisation. For meaningful, relevant training courses and practical exercises, instructors need to be cognisant of the business processes and how the organisation uses the finance system. The more the instructor is involved with the system, the greater the expertise and understanding of a range of aspects, including course outcomes and application. This is required if the course sessions are to be broken down in order that new users can understand the concepts. If the instructor has already made mistakes themselves in the course of their system usage, they can use the

scenarios as learning experiences for the trainees and warn of pitfalls. The importance of instructors' expert knowledge and involvement in the business is discussed by Andreu and Jáuregui (2005), K. Lin et al., (2011) and more recently Otter et al., (2013). The input of instructor time was considerable and in depth during the building of the artefact, and this has a direct commonality with several prior studies (Andreu & Jáuregui, 2005; Blass & Davis, 2003; Chu & Robey, 2008; Hadjerrouit, 2010; Schmeeckle, 2003). In addition, once the course is active, instructors need to be available to answer queries, whether in person or via e-mail, mark exercises and correct any misconceptions. Face-to-face meetings are important to clarify conceptual principles. Apart from connecting with the learner, it may also remove some of the negativity associated with online environment. Use of an alternative instructor to moderate assessments that were borderline passes ensured that the results were benchmarked and unbiased.

This artefact did not make use of chat rooms or discussion boards recommended by Otter et al. (2013) and Van den Bossche et al. (2010). Although these may be added to the artefact in the future, their absence did not appear to be a constraint in this study. This may be due to the direct and focused involvement of the instructor, and the provision of almost immediate feedback to the trainees, as well as the siting of the artefact within the business environment close to the training team and the trainees' workplaces. Trainees (staff) in an organisational setting possibly have different needs and expectations to students in an educational environment. The researcher observed that the trainees were usually anxious to get back to work and it may be that they do not have the time or desire to engage with the learning experience on a social level. The system design component of the online course, as evaluated by the trainees, and interpreted by the researcher, is summarised in Figure 16.

System design		
System Quality (Technology) *[Results extracted from qualitative data analysis]*		
easy-to-use	☺	"Can stop, pause and rewind when and where you want to (E)
user friendly	☺	"The online training was way more user friendly that I imagined (F)
stable	😐	Not a particular issue as software is loaded on individual workstations
secure	☺	Each workstation is password protected and managed by supervisor
fast	😐	Not reliant on internet connectivity.
responsive	😐	Finance system itself has own servers/processors
Information Quality (Course design): 87% *[Refer Table 3, Trainees' evaluations]*		
well-organised	☺	"The course is well structured" (G)
effectively presented	☺	"The presentation was well prepared and well presented" (H)
of the right length	☺	"Very clear, concise and direct" (F)
clearly written	☺	"Hand-outs were well-presented and easily read and understood" (C)
useful	☺	"Content was satisfactory and relevant" (F)
up-to-date	☺	The live system was used for all demonstrations so data was real time
Service Quality (Instructors) *[Results extracted from qualitative data analysis]*		
prompt	☺	"Responses were excellent. Tailored approach was appreciated" (E)
responsive	☺	Supervisor or instructor present at all times
fair	☺	Final assessment moderated by another instructor
knowledgeable	☺	Instructor is super user in organisation for this component of finance system. "Excellent and had a good sense of humour which I think is essential in the teaching/transfer of skills business" (E)
available	☺	"The team was accommodating and extremely helpful to assist with follow up training when needed" (C)

☺	Overall positive feedback	😐	May need some attention	☹	Not working, needs more discussion by team

Key

Figure 16: Overview of Online Training Course System Design Results
(Own construct: informed by Holsapple & Lee-Post, 2006)

The system delivery factor of Holsapple and Lee-Post's (2006) model is "Use" and this was simplified as "Course content" in Figure 3. The course content of the artefact consisted of video clips and audio recordings, a script in the form of storyboards, practical exercises in the finance system training client environment, and allowed for practice on the live system with real-life system authorisations. An instructional guide was also provided. This guide summarised the main learning concepts, shortcuts and other reminders for use by trainees back in the workplace, and is referred to as the "yellow pages" for this online course. According to Bedwell and Salas (2010), learning guides are an essential part of e-learning practices. In addition, trainees were provided with a hand-out of the presentation slides, with space to make notes next to each slide. In response to a post training follow-up email to assess how some of the first trainees were progressing back in the workplace, Trainee B

commented “The print screens and yellow SAP CO guide have been useful. (I) was able to make notes thereon specific to my working environment”. The exercises were carried out on the finance system’s training client, and after completing the exercises, the trainees were able to log on to the live system, with their own user IDs, and practice using their own live data, in real time. In order to maintain learner involvement, Garavan et al. (2010) suggest interspersing simple questions at frequent intervals. It is felt in this research study that the frequency of the exercises provided a similar response,

> The different exercises that we answered and were allowed to bring back to office were most useful, as practical examples used on how to create and link RIOs to funds etc. and (I) was able to fall back on exercises and notes when needed (Trainee B).

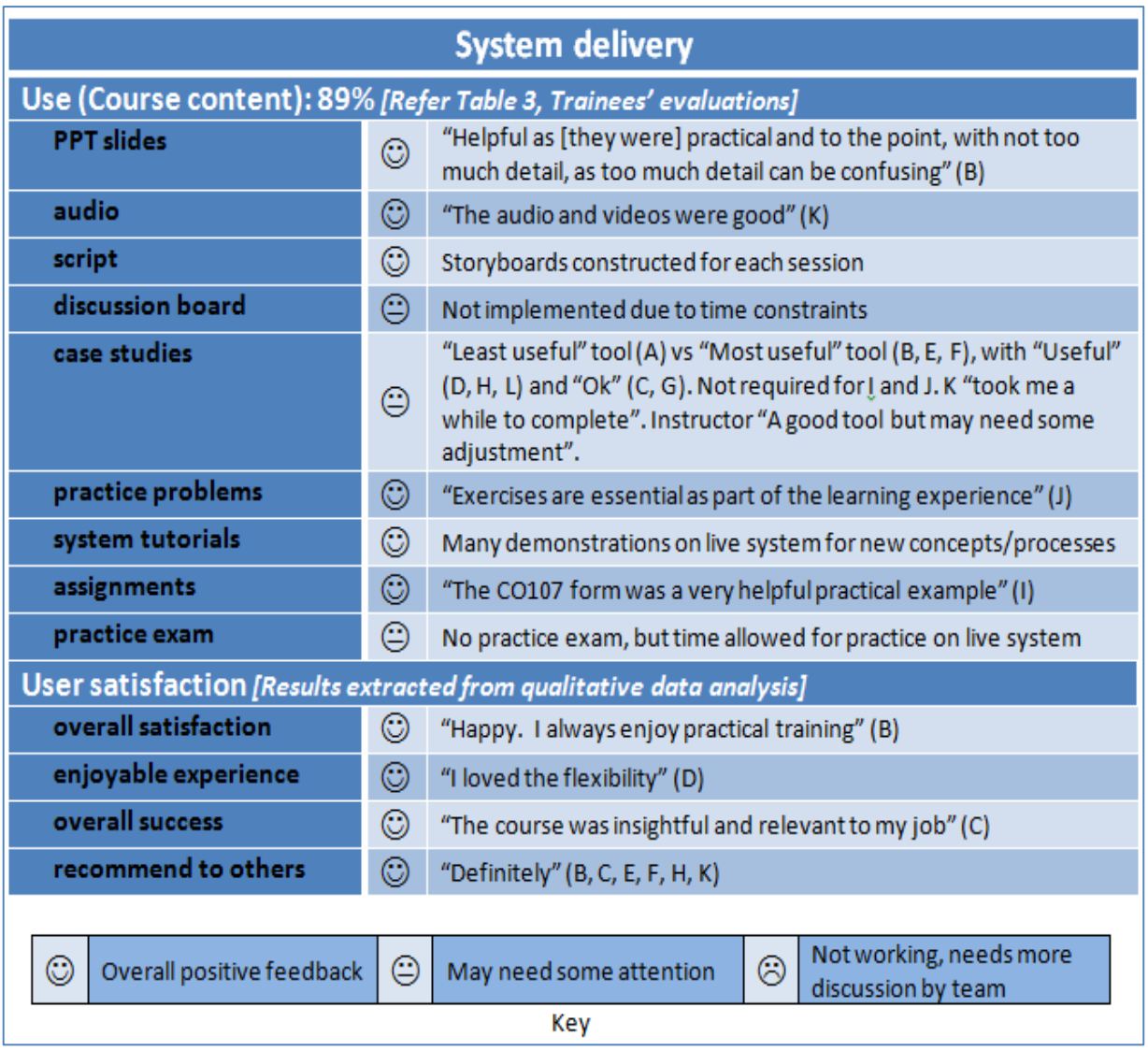
Enabling practice sessions relates to Constructivist theory which states that learners need to explore and discover on their own. The usefulness of these sessions is supported in the e-learning literature by Granger and Levine (2010) and Grossman and Salas (2011) who observe that successful e-learning initiatives require allowing learners many opportunities to practice. A learning history, as mentioned by Mueller and Strohmeier (2010), was included at the beginning of every module (Figure 13, refer Chapter 4) and the timing of the video clip component of the sessions was given as an additional hand-out (Figure 14, refer Chapter 4). It was observed that most of the trainees referred to the timing sheet when deciding whether to carry on, take a break or end off for the day. Hay et al. (2004) believe a final assessment is important for stimulating reflection. In this study, the assessment, which took the form of a case study, had the lowest overall rating for usefulness (76%), and the ratings for Evaluation Q12, the usefulness of the case study, were very mixed. Three trainees rated the case study a 5-very useful, three trainees gave it a rating of 4-useful, two trainees, a 3 (neutral) rating, one trainee rated it a 1-least useful, and Trainee K did not give it a rating, rather commenting, “Took me a while to complete”. A possible explanation for this was the state of mind of the trainee when they attempted the assessment. The lowest ratings (1 and 3), were given by trainees who had either worked through the day from 08h00 until after 17h00, or had a meeting back at the office, but insisted on completing the assessment, despite the supervisor suggesting they came back the next day. Trainee K also tried to complete the assessment at the end of the day. The aim of the case study was to encourage problem solving, and an integration of the concepts, rather than a memorisation of the material or rote learning. The case study component of the artefact is very comprehensive and requires focus and attention to detail. A breakdown of the assessment marks are displayed in Table 5. Fatigue may be the

reason why some trainees rated the case study poorly, whilst the other trainees, who completed it on a subsequent day, usually 09h00, found it useful. The researcher suggested that in future the case study not be handed out after the last session of the online course is completed. Instead, the trainee will be required to return and undertake the final assessment, i.e. the case study, on the following day. This practice will be trialled with the next trainees to register for the online course.

Table 5: Online Training Course – Assessment Mark Breakdown

Objective: To understand masterdata concepts of CO component														
Assessment: *Case study Weeping Willow Nursery*			*Trainees*										*Overall per Question*	
Q#	*Question*	*Tot mark*	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*K*	*L*	*Average*	*% Mark*
1	Identify cost elements	20	16	21	18	20	20	15	16	20	18	19	18	92
2	Identify highest level reporting group	1	0	1	1	1	1	1	1	1	1	1	1	90
3	Under this group, identify four main activities for this organisation	4	4	2	4	3	4	4	4	4	4	4	4	93
4	Using these four main activities as reporting nodes, identify those activities (cost centers) that are significant for this organisation, i.e. would require separate management & reporting	10	6	10	0	9	10	6	9	10	8	8	8	76
5	Explain your reasoning for above choice	5	3	5	0	5	5	3	4	5	3	4	4	74
6	Explain how to set up structure to report on workshops (RIOs)	6	5	6	3	4	3	4	4	3	1	3	4	60
7	Explain how to set up structure to report on research projects (RIOs)	4	3	3	4	1	2	2	4	2	1	3	3	63
8	Based on Q2-5, draw a CC hierarchy for this organisation	25	17	20	20	20	20	20	22	22	24	20	21	82
9	Based on Q6&7, draw a **RIO** hierarchy for this organisation, and show links to CC hierarchy	25	20	20	22	15	12	22	15	20	19	15	18	72
		100	74	88	72	78	77	77	79	87	79	77	79	79%
	Original (Fail) mark						55	56	26		64	64	66	66%
	Original Mark for Q9						5	2	0		4	2		
	Q6, Q7 & Q9 relate to the RIO concept													

As related by Moolman and Blignaut (2008) and Ali and Magalhaes (2008), there were some language issues in this study as well. Not all the trainees were English first language speakers. However, in cases where more than one trainee had a problem with understanding the question, the instructor worked with another practitioner, who is not an English first language speaker, to change the wording so that its meaning was unambiguous. In spite of this, Trainee G, who is not an English first language speaker commented, “Please try to make questions more clear”. A summary of the system delivery component of the online course, based on the evaluations of the trainees, as interpreted by the researcher, is given in Figure 17.



System delivery		
Use (Course content): 89% *[Refer Table 3, Trainees' evaluations]*		
PPT slides	☺	"Helpful as [they were] practical and to the point, with not too much detail, as too much detail can be confusing" (B)
audio	☺	"The audio and videos were good" (K)
script	☺	Storyboards constructed for each session
discussion board	😐	Not implemented due to time constraints
case studies	😐	"Least useful" tool (A) vs "Most useful" tool (B, E, F), with "Useful" (D, H, L) and "Ok" (C, G). Not required for I and J. K "took me a while to complete". Instructor "A good tool but may need some adjustment".
practice problems	☺	"Exercises are essential as part of the learning experience" (J)
system tutorials	☺	Many demonstrations on live system for new concepts/processes
assignments	☺	"The CO107 form was a very helpful practical example" (I)
practice exam	😐	No practice exam, but time allowed for practice on live system
User satisfaction *[Results extracted from qualitative data analysis]*		
overall satisfaction	☺	"Happy. I always enjoy practical training" (B)
enjoyable experience	☺	"I loved the flexibility" (D)
overall success	☺	"The course was insightful and relevant to my job" (C)
recommend to others	☺	"Definitely" (B, C, E, F, H, K)

Figure 17: Overview of Online Training Course System Delivery Results
(Own construct: informed by Holsapple & Lee-Post, 2006)

Most of the strategies and tools highlighted in Figure 5 (refer Chapter 2.5) have already been mentioned in the course of the above discussion, however, some require further debate. Extrinsic motivation stipulates that it is the need for knowledge that drives the application to study and how quickly the course is completed. Wang et al. (2010) believe study application and completion can be invoked by linking training to the individual's KPIs, and Schmeeckle (2003) to the job requirements. In the two instances where more than three weeks elapsed between starting the online module and completing it, the trainees failed the final assessment. In the case of Trainee E, the delay was due to internal departmental issues. The trainee was requested to re-sit the final assessment, after reading through the course notes. With no further input, the trainee achieved 77% on the second attempt. In the second instance, Trainee G was clearly unmotivated, and dragged out the completion of the course. It was decided to involve the line manager whereupon it was discovered that the staff member did not actually require knowledge of this module of the finance system in their day to day

work. However, the line manager's objective was to have all staff in the reporting area cross-trained which was why the training had been requested. It was suggested that it be made clear to the staff member by the line manager, that their performance appraisal was dependant on successfully completing the training. Welsh et al. (2003) state that there is a lower completion rate if the course is perceived to have little impact on learner. With the line manager's approval, the staff member was informed that they must repeat the course. The trainee achieved 70% on the second attempt.

Zhang et al. (2004) suggests immediate feedback, and Schmeeckle (2003) that the course finishes with an instructor led session to address any questions or problems. In this study, feedback was given after every exercise, and the final assessment was discussed in detail, together with the trainees' opinion of the online course. The evaluations had already been completed by the final meeting, but discussing the positive and negative aspects face-to-face appeared to contribute to overall user satisfaction, as mentioned by both Bedwell and Salas (2010) and Schumaker (2004). Making comments and asking questions, according to Aczel et al. (2008) encourages reflection. Trainee D, who consulted the instructor on a number of occasions, has observed in response to the post training follow-up email,

> The course was very helpful in giving insight about the [finance system] as a whole and how it fits in, in [this] organisation. It also assists in using the different applications and understanding the structure of the system and how the transactions flow. It is very useful in the better execution of my tasks (Trainee D, via email dated 26.06.14).

Learner control, and the ability to work at one's own pace, is one of e-learning's greatest advantages (Zhang et al., 2004). This proved to be the case in this study where all twelve trainees commented on the benefit of working at their own pace, either in the evaluation, or during the last meeting. "(You) can stop, pause and rewind when and where you want to" (Trainee E), "I enjoyed it because I could rewind and forward to understand" (Trainee K), and most relevantly, "I couldn't rewind you (during classroom training)" (Trainee B). Online training is learner-centred, and this appeals to most trainees, "Classroom-based courses do not facilitate accommodating people who learn at different speeds" (Trainee A). The mistake of giving too much control referred to by Fisher et al. (2010) was avoided in this study by keeping the controls very simple. In fact, most of the control was given to the viewing of video, and when to fit in the sessions. According to Granger and Levine (2010), learners will explore course material if given freedom of choice. The artefact allowed for practice sessions

in the live system, but it was left up to the trainee to make use of this. Most of the trainees did log into the live system, and this was made apparent to the instructor and the supervisor by the questions asked. Interestingly, the two trainees who struggled with a single concept in the case study assessment had not logged onto the live system for practice purposes. In the case of Trainee K, this was due to missing system authorisations which the organisation's IT systems access team were unable to resolve in time. Trainee F reflected, "[I] would personally have benefitted from a bit more time on the practical SAP training". The researcher has suggested that trainees be informed that a log of the time they spent on practising in the live system will be added to their assessment mark when reporting back to their line-managers.

Merriam (2001), states that some adult learners are heavily reliant on the instructor. There appeared to be a few issues with the booking of workstations when the course was first announced. This may have been due to the newness of e-learning at this organisation. The freedom to book a station whenever it suited the workplace was a novel experience, but trainees rapidly grew accustomed to the flexibility. The application of the knowledge gained, the relevance to the real life work environment, the flexibility and self-pacing appeared to suit these adult learners, as was the case in the research carried out by Aczel et al. (2008), Moon et al. (2014) and Sung and Choi (2014). The overall rating for the training content was 366 out of a possible 410 (89%), which can be considered a good result. The relevance of EMT was apparent when Trainee B stated "I think it's a good idea to have the exercises to test our knowledge, because when you do make mistakes on the exercises, you learn from them and can take it back to the workplace", and Trainee J commented "The exercises are essential as part of the learning experience". Based on instructor experience of commonly made errors, the exercises challenged the trainee not to make these mistakes, but if they did, it provided a useful opportunity to illustrate what could go wrong and what to do when that happened. Similar findings of the effectiveness of allowing, or even actively encouraging, errors, were reported by Granger and Levine (2010) and Grossman and Salas (2011). Learning from mistakes appeared to engage the trainees, who far from being discouraged by the marking of the exercises, were positive about not making the same mistake twice and Trainee F joked about the "greening" of her paper. (The instructor used green pen to mark.)

Goal setting and maintaining deadlines, an issue suggested by Blass & Davis (2003) and also by Wang et al. (2010), proved more difficult in the organisation's online environment. It was suggested by the supervisor who observed non-attendance or multiple cancellations, that a record of attendance be kept in future, and e-mailed to line-mangers on completion of the

course. Based on the assessment results, it was established that completing the course very quickly or very slowly usually resulted in a struggle with the final assessment. Trainee E stated that the length of time that elapsed between starting the course and finishing the course, definitely affected his learning. He directly attributed his initial failure of the assessment to this delay. From observation, it appears that those who have performed best completed the course in three morning sessions, with not more than a day apart. The supervisor will suggest that at least three mornings are factored in when new trainees book their workstation. The system outcome dimension of the online course, as evaluated by the trainees, and interpreted by the researcher, is illustrated in Figure 18.

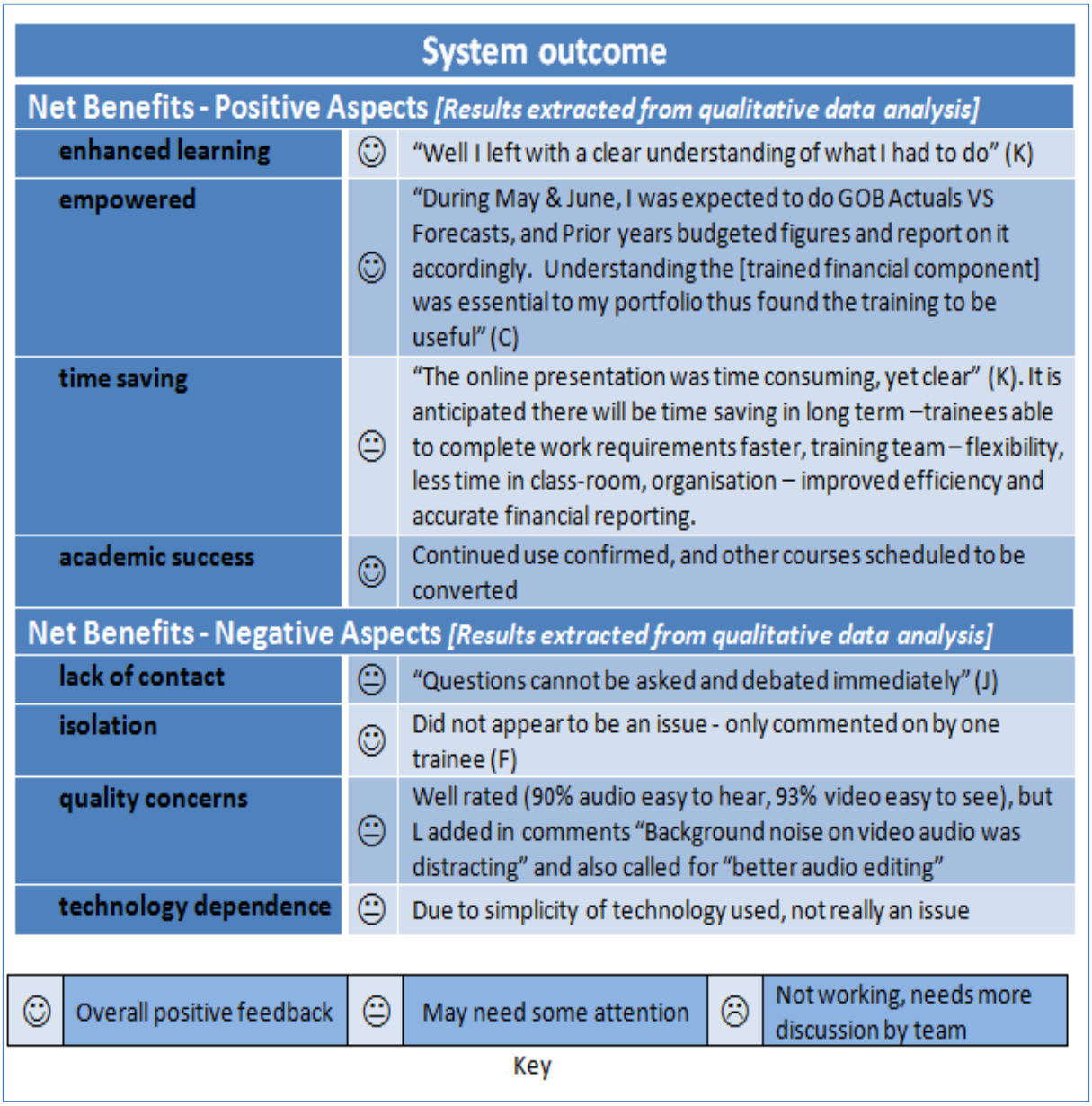


Figure 18: Overview of Online Training Course System Outcome Results
(Own construct: informed by Holsapple & Lee-Post, 2006)

The artefact went through many detailed iterations and the close fit, application and outcomes of a number of e-learning theories in the current beta version are apparent.

6.3. Reciprocal shaping

	Principle	*Description (Sein et al., 2011)*
3	Reciprocal Shaping	Artefact and organisation influence each other, iterative cycle set in motion.

(ADR Principle 3, extracted from Table 2)

The third principle of ADR addresses reciprocal shaping, where the artefact and the organisation influence each other. This principle, together with principles four and five, are realised during the BIE stage, and the three principles are closely connected. The alpha version of artefact was tested by the other practitioners, and changes to the online course were made based on their feedback. At this early stage of the building of the artefact, the organisation, in the form of the practitioners, was directly shaping the artefact. At the same time the artefact was influencing the practitioners by challenging their practices, and forcing each practitioner to examine what should be presented and how. This emerged during the discussions of the training team post-testing of the artefact. After the beta version was launched, further changes were made to the module based on both trainee and trainer feedback. If the online course achieves its objective, it should result in an appropriately trained, motivated and enabled workforce. This in turn should have a positive effect on organisation's financial reporting, which could result in more staff registering for the online course. The successful implementation of this artefact could lead to more courses, with targeted objectives, being offered online. The researcher has already been approached by another training team within the organisation who heard of the implementation of the online module, and is interested in setting up their own courses. In this way, the artefact is influencing the future of training within the organisation, and the organisational setting is affecting and changing the artefact as it continues to be implemented. In time, when the impacts of training can be assessed in terms of enhanced productivity and efficiency of preparing and using financial reports, there will be further opportunities for reciprocal shaping. Potentially this shaping is a very powerful outcome of the research as it has the benefit of introducing online training, and its associated benefits and efficiencies, into the wider organisational community. The artefact was enhanced and changed as issues were encountered, some due to physical constraints of the organisation, and others to do with course design and content. Feedback from the workstation supervisor, trainees and the instructor was instrumental in shaping the current version of the artefact. At this stage of implementation, it is difficult to state with certainty that the organisation has been changed by the use of the artefact, however, the instructor feels more confident in the trainees' ability

to use the module appropriately, and with the depth and application of the trainees' understanding of the finance system component. Whether this is a correct perception can only be measured in time. The researcher has sent out follow up emails to trainees, and will shortly be engaging with some of them in classroom-based course, which is an add on to this finance system component. Line managers are still to be approached for comment. Trainees B, C, D and E have reported that they are using the module on a daily basis, apparently with increasing assurance, "(I) assure you that I have been actively working on the CO Reporting and am functional" (Trainee C). Trainee A has left the organisation, so cannot be reached for comment. The assessment case study tested the trainees' learning as it was a practical exercise where learners had to apply their recently gained knowledge, and not merely answer questions. It is expected that this will lead to better use of the financial reporting tool. Additionally, the other trainers reported that, in their opinion, the rollout of this artefact will definitely lead to more efficient and effective training. This is due to trainees not having to wait for the monthly training cycle to start becoming productive in terms of the finance system and being able to catch up on missed courses, instead of having to wait another month. The online benefit of working at their own pace should ensure a deeper understanding of the finance system and business processes, and having exercises marked at individual level will assist the instructor to know when extra intervention is required. The shaping of the organisation by the artefact, and the artefact by the organisation, will therefore continue as long as the online course is offered.

6.4. Mutually influential roles

	Principle	*Description (Sein et al., 2011)*
4	Mutually Influential Roles	Multiple participants in project share specialised knowledge and learn from each other - researchers bring theory and practitioners, work practices.

(ADR Principle 4, extracted from Table 2)

The fourth principle of ADR addresses the mutually influential roles of the multiple participants involved in the research. As mentioned previously, this principle is closely linked to the principle of reciprocal shaping. Throughout the BIE stage, there was continuous interaction between all the role players. Much of this interaction has been mentioned in the chapters dealing with the alpha and beta artefact development, as well as the discussions of ADR principles one and two. However, to summarise, the researcher designed the course module using best practices gained from an extensive and in-depth review of the literature on e-learning. The practitioners provided input regarding course content, and issues specific to

the working environment of the organisation. With reiterative cycles, the workforce has also provided input into the shaping of current artefact, and the online module can only benefit from the experiences and knowledge of all parties. There were frequent meetings with the training team and the researcher/instructor. Apart from the changes to the storyboards, the assessment was re-designed after consultation with the other practitioners. Once the beta version had been introduced into the organisation, the researcher discussed issues with the training team as they were identified. Exercises were re-written, and the final assessment mark was altered. There was much interaction between the researcher/instructor and the supervisor. The supervisor indicated concerns regarding workstation booking, attendance, lack of trainee involvement or concentration. These matters were discussed with the training team, and action was taken by the researcher or instructor, depending on which role was required. The instructor used past experience and business practice to review exercises and attend to conceptual questions, whilst the researcher used theoretical knowledge and the review of e-learning literature to suggest solutions to logistical or situational problems. The instructor and the practitioner who moderated the assessments also learned from each other, and from the trainees, as different scenarios were presented as solutions to the case study, which were not wrong. Feedback from the supervisor, the training team and the trainees was used by the researcher/instructor to refine the course design, and ultimately the artefact. Knowledge from different perspectives was shared to enhance the value of the training. Theoretical best practices were blended with organisational best practices, by the addition of actual work experience and real life problems encountered by both practitioners and the trainees who came from diverse areas of the organisation. Although the objective of the online course is to impart an understanding of a specific component of the financial system, there is a change of emphasis on what is important depending on how the different areas are using it. The line managers also have an influence on the outcomes of the online course. They may need to motivate their staff, as well as facilitate time out of the office. With successful completion of the online training, newly acquired skills will then be used in the workplace, which should increase financial reporting output and decrease errors. Lastly, there has been an exchange of learning between the researcher and the Centre of Electronic Technology (CET) team that suggested the tool that was finally chosen for the screen capturing. The researcher attended a training session run by this team on use of the tool, and then required assistance with the synching of demonstrations from one of the technicians. Subsequently, the technician has requested that the researcher give feedback to the CET team regarding the

lessons learnt from using this tool in an actual implementation. The technician also advised that other organisational users of the tool who are experiencing problems will be referred to the researcher. As the artefact is rolled out, it is expected that many more stakeholders will contribute to the end product, which will be used by the organisation, for the advancement of the organisation's financial reporting, in terms of accuracy and interpretation.

6.5. Authentic and concurrent evaluation

	Principle	*Description (Sein et al., 2011)*
5	Authentic and Concurrent Evaluation	Evaluation process never separated from building and intervention - must be allowed to occur spontaneously in the organisational context.

(ADR Principle 5, extracted from Table 2)

ADR's fifth principle of authentic and concurrent evaluation means that the evaluation process was never separated from the building of the artefact, and its intervention, or implementation into the organisation. Much of this building, intervention and evaluation has been discussed in Chapter 4 (alpha version development of the artefact) and Chapter 5 (beta version development of the artefact). The initial artefact was built and offered to practitioners, in the working environment. Subsequent feedback and issues were discussed by the researcher and the practitioners during working hours, as part of the business of the training team. Changes were made to the artefact as a direct consequence of these discussions. It was an important concern of the training team that the implementation of the artefact would be taking place in real time, affecting those members of the organisation's workforce that required finance training. Once the practitioners approved the alpha version of the artefact, it was introduced into the live environment with immediate effect, and replaced the classroom-based training of this component of the finance system. It was presented to those staff members who had been booked on the course as the current practice for the training of this component of the finance system. The online course was experienced as a valid method of learning, in the work situation. Unexpected consequences were immediately visible, and were acted upon promptly. The issues with interpretation, either due to lack of clarity in the instructions, or language usage, were debated between at least two members of the training team, and the instructor made the required changes to the artefact, which mostly concerned the exercise component, before the next trainee started. The artefact was continuously being evaluated and implemented in on-going cycles in a dynamic, real-time environment. At times, the comments were noted but changes were only made when the same issue arose from other trainees' questions and evaluations. The

building, or rather the evolving of the artefact continued based on the trainees' evaluations, and each time, the artefact was implemented back into the workplace. There was no separation of the building of the artefact, its implementation and the evaluations. At times, all of these stages were in operation simultaneously, with the researcher making changes to the artefact, whilst some trainees were working on the course and others evaluating it. The issues occurred spontaneously as the artefact was exposed in the real world organisational setting. Concurrent and authentic evaluations of the artefact will therefore continue as long as the artefact is being used by the organisation.

6.6. Guided emergence

	Principle	*Description (Sein et al., 2011)*
6	Guided Emergence	Highlights interaction between initial design and how implementation in organisational setting causes continuous evolvement and re-working of emerging artefact.

(ADR Principle 6, extracted from Table 2)

The sixth principle of ADR is guided emergence. This principle describes how the interaction of the first instance of the artefact and its introduction into the organisation causes a continuous evolution of the developing artefact (Sein et al., 2011). The alpha version of this study's artefact was rolled out into the organisation, in real time, and feedback from the trainees and the involved practitioners was immediately acted on by course designer/researcher, with the re-designed artefact being re-implemented back into the organisational setting almost immediately. The extent of the effect of the implementation into the organisation setting is highlighted by the fact that the decision of which course was to be converted to online completely changed with the first iteration. The organisational environment directly affected the course design in terms of equipment, setting, timing and control. This was part of the learning experienced by the researcher who was required to find solutions to these issues. Every solution caused a change in the artefact as each BIE cycle resulted in a re-working of the course module. The researcher was deeply involved in discovering what was possible and what needed to be re-assessed in order to make the solution workable. This problem solving involved practical constraints such as software, equipment and venue, and also dealt with theoretical issues regarding best practices of e-learning. Not least, the expertise of the instructor and the experience of the practitioners needed to be built into the course content in order to deliver full value to the users.

The introduction of the audio component resulted in the production of the storyboards, which had not been part of the original design, and were not used in the first alpha iteration.

In turn, the use of storyboards resulted in many iterations of the artefact as the storyboards were reviewed by the rest of the training team. Due to these reviews, the researcher/instructor found that adherence to the principles of information quality when constructing the course was critical. The information needed to be well organised, clear and useful. Right sizing and presentation were also crucial.

Recognition of CLT led to the slides being kept as simple as possible, and this appears to have been appreciated by the trainees, "[The overall presentation of the slides was] helpful as it was practical and to the point, with not too much detail, as too much detail can be confusing" (Trainee B). It is believed that the high rating of the training content (89%) is a direct result of the guided emergence of the artefact. In order to ensure that the online course remains up-to-date, the artefact will need to be assessed on a regular basis. In addition, the finance system training client is updated annually and this will ensure a review of the artefact's exercise component each time as the exercises are based on authentic financial data extracted from this client as the objective was to make the training as realistic as possible. As a result of a changing business environment, the artefact cannot remain static but will continue to evolve as a result of its implementation in the organisation, and the concurrent evaluations which will also continue. It is anticipated that this continuous evolution of the artefact is sustainable as the changes are unlikely to be as frequent as they have been in the initial implementation. In future, the re-working of the artefact will probably be undertaken due to changes in the finance system itself, the financial business processes and the organisational environment, rather than to issues experienced by the users. Whilst the trainee evaluations will still be considered and implemented, it is believed that as the online course matures, and the training team applies the learnings abstracted from the implementation, there will be fewer issues encountered.

6.7. Generalised outcomes

	Principle	*Description (Sein et al., 2011)*
7	Generalized Outcomes	Learning that has occurred during the iterations is developed so solution of specific problem is generalised to class of problems.

(ADR Principle 7, extracted from Table 2)

Much of the learning that transpired during the implementation of the online course has been discussed in previous chapters. The artefact was re-designed during the numerous iterations of both the alpha and beta versions, based on user feedback and practitioner evaluation. Many of the best practices of e-learning, as described in the e-learning literature, were used

in the design and the building of the artefact. To summarise the learnings gained during this conversion of a classroom-based course to an online course, and implementing it in the organisation, it is evident that when designing an online course, the course designer needs to be very clear about the course objective and the audience that will be addressed (Becker et al., 2012). With any online initiative undertaken in the work environment, the training requirements must be aligned to business objectives (Dublin, 2004). It follows that the online course should be perceived as useful and job relevant by the trainees. If completing the online course is part of the trainee's KPIs, they are more likely to be motivated to successfully complete the training, and experience personal satisfaction on their achievement, "[the training was] relatively essential to my job therefore [I am] extremely satisfied" (Trainee C).

Expensive software and advanced technology is not necessary when implementing an online training course. The focus should be on good quality audio and video capture. Simple enhancements can be made such as using the cursor as a pointer to underscore important concept, whilst recording the video clip. User satisfaction can be elicited by ensuring that the training content is organised and clear, the presentation is simple but attractive, and the sessions are short. Storyboards, or a script, are crucial. Not only does their use ensure that all points are covered, but they also serve to refine and define the content, so that the end result is patent and succinct, which is critical for trainees whose home language is not English. Objectives should be evident and the online course should incorporate practical exercises, such as completing a form that is part of the business process, and will be the trainee's function in the workplace. Even though the course is online, handouts would appear to be a necessary part of the course content and design. Having the slides printed out, not only acts as a guide, but also allows for note-taking. Some form of easy guide also appears to be well received and assists in allaying anxiety regarding ability to perform the new acquired skills back at the office. Trainee B stated "My notes, yellow pages and marked exercises should help me at the office". Feedback needs to be immediate, or as close to immediate as can reasonable be achieved. It is helpful for both instructor and trainee to know that each session's concepts have been absorbed before starting work on the next session. Any e-learning initiative must offer the learner the ability to control the pace of their learning. Even simply being able to book the session when it suits work requirements appears to enhance user satisfaction, "Best yet. I could attend to everyone's needs or delegate (work in the office before attending online session)" (Trainee L). The importance of the instructors should be emphasised in an e-learning environment. Apart from their expertise, being part of the

business ensures the relevancy and practicality of the training. They also need to be committed to being part of the e-learning initiative as the investment of time in the startup of the online course is considerable, and being available to answer questions and give feedback, also requires time sacrifice. Finally, it is suggested that having a dedicated online learning space close to the training team relieves feelings of anxiety and isolation. This is a trade-off as it means the e-learning benefit of “any time, any place” is fairly restricted, the place particularly so. However, attempting training in the trainee’s own workspace would not be ideal and insisting on staff working after hours would not have the desired positive result nor be sustainable.

In terms of e-learning generally, it would seem that the most successful outcomes occur where there is a combination of online courses with access to the instructor or trainer for learning support when required. The role of the instructor is an applied one, and requires much engagement with both the trainees and with the rest of the training team, or practitioners. There needs to be a two way interaction. The relevance of the training to the trainee is crucial and the role of the line manager in the training process is an important one. This may be even more of an issue with online training due on the one hand to the flexibility of booking the sessions by the individual, and also from the organisational perspective of capacity. The line manager needs to ensure that the trainee is aware of the importance of the training to their job performance, what the consequences of failing the online course are, and that they complete the online course within a reasonable time frame. If necessary, the line manager should re-arrange the workload to facilitate this. The online course appears to have introduced e-learning, and a higher standard of learning into the organisation, as evidenced by the interest shown by other departments since the implementation.

Finally, a summary of the research, the formalisation of the problem, the research objective, and the research questions, the measures and research outcomes and the research methodology are summarised in Figure 19 (a) and (b), which was split for ease of use.

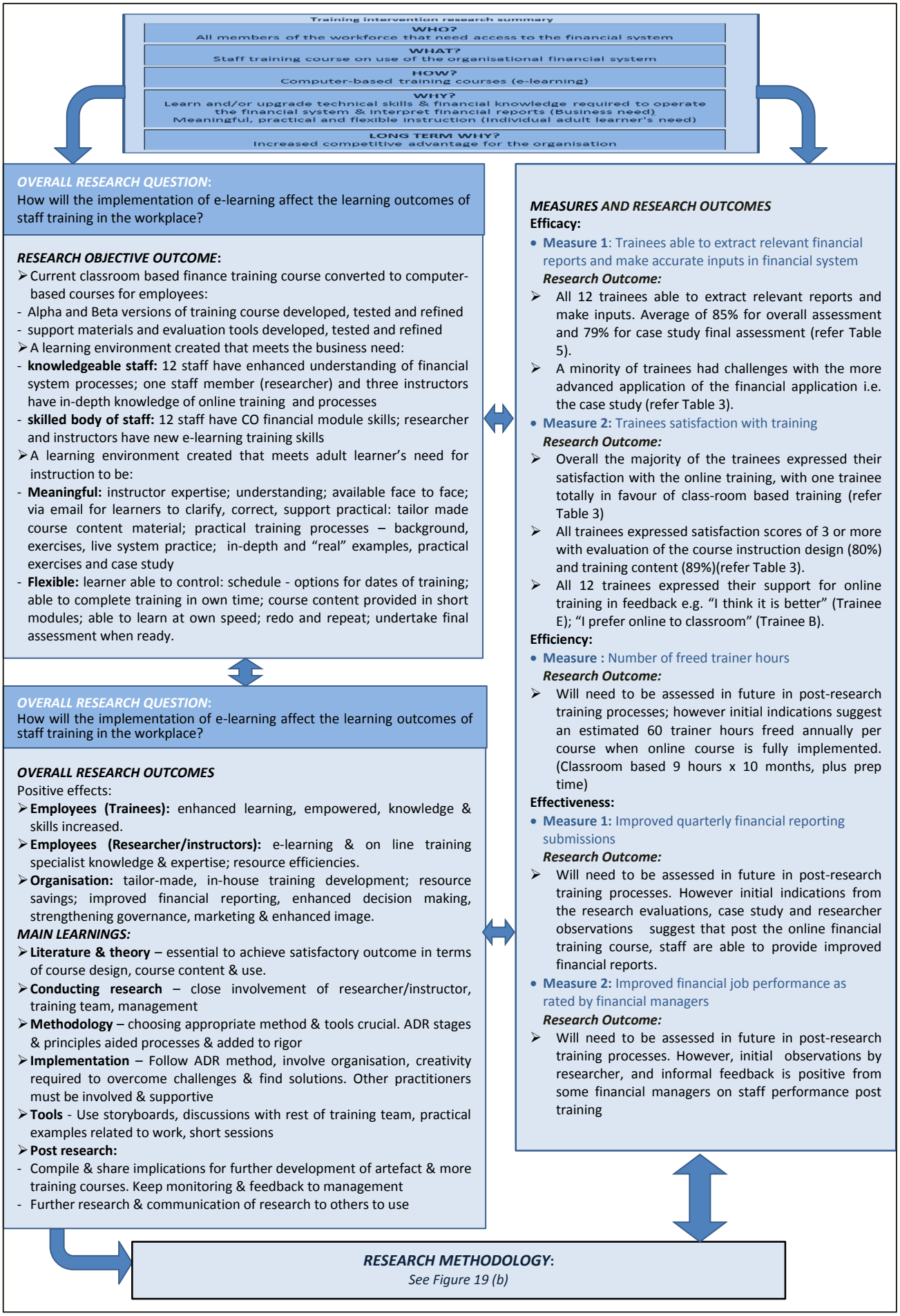


Figure 19 (a): Summary of research outcomes - part 1

RESEARCH METHODOLOGY:

Interpretive: *subjective, individual worldviews considered, and personal experience of participants important. Also pragmatic: constructive knowledge, useful in action. Initially inductive approach to theory, but possibly becoming deductive during testing phase, with evaluations resulting in more inductive theorising*

Post Research Reflection:
Approach was successful as researcher was engaged in making changes to the online artefact and generated constructive knowledge around "real" online training in an organisation, as well as producing relevant data through trainee assessment and interventions. The trainees' meanings and beliefs were interpreted to create knowledge and understanding of and from the research. Through self-awareness, high-standard research practice and critical reflection the researcher's own interpretations were scrutinised and refined and created refined theory and application of e-learning.

Exploratory & descriptive (once e-learning artefact is refined, may become prescriptive).

Post Research Reflection:
The researcher explored the area of concern from different stakeholder perspectives, namely the trainees, the trainers and the finance managers, and the relevant literature, but also to provide an accurate depiction of this experience (Saunders et al., 2007). Once the e-learning artefact is evaluated and refined in its beta version, the research becomes prescriptive, as the research objective is to achieve an effective and efficient implementation of computer-based courses in the workplace. The researcher explored e-learning and online training and artefact from the trainees, the trainers and the finance managers' perspectives, and thoroughly explored the relevant literature, as well as provided an accurate depiction of the experience of new online financial system training in an organisation (Saunders et al., 2007). The research became prescriptive post the evaluation of the artefact, with reflection on learnings and possible improvements in order to achieve as effective and efficient an implementation of the computer-based financial system training course as possible.

Longitudinal: *iterative cycles March 2013 – June 2014*

Post Research Reflection
The research encompassed the building of an innovative information technology (IT) artefact in an alpha and beta version, through short turn around, focused and concentrated iterative processes and cycles; taking feedback from the users and instructors into account to directly influence in the construction. This allowed for learning from real application and at the same time producing academic theory – both closely aligned to the organisation objectives.

Data collection: *qualitative i.e. verbal or prose, using evaluation forms, unstructured interviews, informal meetings, document reviews and summaries*

Post Research Reflection:
The research data was collected in detail in verbal and written from, using evaluation forms, interviews, completed exercises, assessments, document reviews and summaries. The researcher captured self-reflections and learnings throughout the research process. As the experience was unique to each participant, there were no standard responses (Saunders et al., 2007)

Data analysis: *qualitative, thematic and interpretive*

Post Research Reflection:
To structure and frame the results online course evaluations and assessment marks were summarised, qualitative summary sheets collated and summarised. The researcher searched for patterns, developed themes and interpreted the findings. Although a pragmatic approach was used (Baskerville & Myers, 2004; Goldkuhl, 2012), interpretive research was also included as the researcher's and practitioners' interpretations of the evaluations also affected the construction of the IT artefact. An effort was made to use data triangulation by using captured evaluations, together with the researcher's reflections and detailed description of the results, moderated through discussion with other trainers, to ensure the credibility and reliability of the results.

Research approach: *Action Design Research, with implementation of artefact within a specific institution*

Post Research Reflection:
Action Design Research was at the core. The interdependence between design and use in the organisation was evident. The four stages of the ADR method were useful in particular the second stage of "build, intervene, evaluate" which assisted with the learning and guided emergence development of an artefact which addressed the organisation's challenges, as well as met the research objectives and supported the development of academic theory. The seven principles of ADR were a valuable tool in all stages of the research and as an analytical tool. The result is an innovative, rigorous and pragmatic e-learning artefact and positive research and organisational outcomes.

Figure 19 (b): Summary of research outcomes - part 2

7. Conclusion

As businesses continue to face rapid changes in both technology and the environment, a highly skilled and knowledgeable workforce can provide a competitive advantage (Bondarouk & Ruël, 2010; Chatzoglou et al., 2009; Kisielnicki & Sobolewska, 2010). E-learning may be the future of both education and training, but it has not always been successfully implemented. Its use, particularly in the workforce context, has not reached the envisaged levels of adoption (Ali & Magalhaes, 2008; Harden, 2008; Luor et al., 2009).

The literature indicates gaps in actual case studies of e-learning implementations in South Africa, and a lack of academic research regarding the adoption and subsequent usage of e-learning in the business environment (Cheng, 2011; Lai, 2011; K. Lin et al., 2011). By studying the implementation of computer-based training courses in the work environment, and using an ADR approach, it was anticipated that this research would address the area of concern practically by creating a hands-on, adaptable training course that met the needs of adult learners, and at the same time, enabled a transfer of the learning to the workplace.

7.1. Claim for rigour and relevance

A comprehensive review of the best practices of e-learning has been undertaken, including pertinent academic theories. Computer-based finance training courses have been developed using principles from literature and theory, in particular ADR (Sein et al., 2011), and has been successfully implemented in an organisation in Cape Town, South Africa. The overall rating from the trainees' evaluations, including the two "refresher" trainees, was 85%. In response to a post-training follow-up email sent a month after the completion of the course, feedback from the trainees indicates that the transfer of training to the workplace is occurring. Five out of the twelve trainees specifically mentioned the usefulness of the training in meeting their job requirements. It is expected that this research will assist in improving training interventions through system design, content and outcomes by making the courses both flexible and effective. This, in turn, results in a skilled workforce that can support the strategic goals of the organisation. The flexibility of the online course in terms of controlling the learning speed appears to have created the greatest user satisfaction, scoring 95%.

As the results of this research have indicated, it is possible to design and implement an online training course that is both acceptable to the end-users, and relatively effective in terms of the immediate training outcome, with limited resources. All ten of the "new" trainees advised that they would recommend the course to others. The final assessment had a pass rate of

50%, with an average overall mark of 66%, which increased to 79% after the trainees that failed repeated the assessment. Apart from Trainees E and G, the other three all had difficulty with one particular concept, and the online course will be adjusted in future to address this. The reasons for the poor results of Trainees E and G have been debated in the discussion chapter, however, it should be highlighted that Trainee G managed to increase their mark from 26% to 79%, simply by repeating the whole online course. There was no need for any extra interventions from the instructor, a time saving benefit for both parties.

7.2. Contribution

The importance of designing online courses with close reference to the e-learning literature is emphasised in this study. Apart from the concepts used in the actual course design, discussed under ADR's seventh principle, employing learning approaches or tools such as extrinsic motivation, as illustrated above, CLT, appropriate goal-setting and adult learning are crucial if the online course is to be successfully implemented, and sustainable in terms of end user acceptance. As the two main issues encountered in this study related to the trainee's misunderstanding of the exercise questions (Trainees D, G and K), it should be noted that the audio component needs to be as lucid and simple as possible, the exercise instructions unambiguous and visual examples provided that illustrate clearly what is required. Lack of social interaction will always be a concern within the e-learning environment. However this can be managed, as it has been in this research implementation. In the organisational environment, social engagement is not necessarily desirable due to different priorities.

As part of the ADR process, the development of the artefact, a new and innovative product, and its implementation into the organisation has meant close interaction between the researcher and the practitioners. The training team has been directly involved and contributed throughout the iterations of the artefact, and the outcomes and the results of the assessments have been shared with these practitioners. There has been much anticipation expressed regarding the conversion of the rest of the finance training courses to the same medium. It is also hoped that the research will contribute to new insights into existing knowledge regarding the efficacy and sustainability of computer-based learning in the workplace for any practitioners or organisations contemplating implementing online training courses. The ADR approach has resulted in a high quality solution to a real business need being brought into existence. The explicit principles, reflection and generalised outcomes should be of practical use for these and other practitioners, as well as other organisations.

Whilst the current phase of the research is complete, there are opportunities for future research. One aspect that may bear investigation is whether more interaction in the organisational environment would be useful, bearing in mind workload and deadlines, and how to encourage such interaction if it is deemed advantageous. The absence of a discussion board did not invite any specific comments from the trainees, but it may be of interest to explore the establishment of "Q&A drop-box" and whether such a tool would result in user take up, and increase user satisfaction regarding e-learning. The "Q&A" type of contact may be more appropriate in the workplace and would possibly serve to address Trainee H's reservation regarding not knowing what questions other trainees are asking, and thus limiting one's learning to one's own experience. It may also be useful to discover whether the more responsibility a trainee has, the more motivation they have to successfully complete the training, with the job directly linked to the mastering of the training material, as illustrated by Trainee G. Lastly, the effects of the online training on the long term objectives need to be ascertained. The efficiency of the conversion to e-learning has not been measured in specific detail owing to time constraints. At this stage of the research and online implementation, the e-learning solution appears to be benefitting the trainees. However, the instructor's hours are still the same when measured over the month. It is anticipated that there will be a reduction once the implementation matures. There are intense upfront costs during the design and development of online courses, but these should reduce to a certain extent once the course is implemented. There is a definite efficiency in keeping up-to-date with new developments, as well as setting standards with clear training outcome levels. The current advantage of the online course is evident when trainees need to repeat sections or, indeed, the whole training course. Increased productivity and professionalism of the workforce should also increase and, provided this occurs, and remains high, the organisation will be both sustainable and profitable.

7.3. Limitations

This study is limited to a single organisation and to a small number of participants. However, the construction of the online course has been described in detail, together with the effects of its implementation into the organisational setting. For ethical reasons, a tighter control of the environment was adopted than is usual in online learning, and this probably influenced the findings. However, this proved to be beneficial for the implementation, and is discussed as one of the generalised outcomes of the research. The design concepts are able to be re-used for any skills based training course for organisational development. The number of

participants for the first six months of the year has been fairly large in comparison to the number of staff trained over the last three years in the organisation's classroom-based course. The increase in staff wishing to book may be directly attributable to the course being offered online. It appears more line managers have been encouraging their staff to register whenever they have a space in their work commitments. In the past, they would need to wait for the instructor to be available, for the quorum to be met and for their own availability to all coincide. The marking of the exercises and the completion of an assessment has enhanced the transfer of training and although it is not possible to measure the long term effect at this point, the short term outcomes appear to be positive. It is a limitation of this study that efficiency and effectiveness have not been measured as fully as intended owing to time constraints. However, anecdotal feedback to date indicates an improvement in both measures. The trainees indicated on their course evaluation that they were confident that they would be able to apply the concepts learned in the online course when they returned to the workplace. Furthermore, the comments received by return of the post-training email indicate that the trainees have found the training has enabled and empowered them in the work situation, and some have already reported an improvement in their reporting functionality, which is indicative of effectiveness. The efficiency of the implementation is proving itself in the ease with which trainees are able to book their training. There are no backlogs of bookings, and it has no impact on the trainer, other than marking the exercises. The impact on the scarce resources of trainer time and space, i.e. venue, are either reduced or eliminated.

7.4. Summation

The goal of this research study was to convert the current classroom-based finance training courses for employees to computer-based courses. This was a direct outcome of the organisational concern that the current training on offer was not efficient and not always effective either. The research sought to address the core of the IS discipline by bringing an artefact into existence that would solve a need in the real world, and at the same time respond to calls from practitioners to provide practical solutions. The resulting artefact is practice inspired, developed and tested, dependent on both design and use, and the concurrent evaluations by end users (Sein et al., 2011).

The main research question asked how the implementation of e-learning would affect the learning outcomes of staff training in the workplace. From the trainee evaluations, it appears

that the trainees felt empowered, and that their knowledge and skills increased. Simultaneously, the instructor and the training team felt that the training was effective (trainees reported sense of comfort when using this financial module in the workplace and ability to respond faster to queries), efficient (less usage of space and trainers' time, trainee's able to integrate training with workplace requirements) and efficacious (trainees were able to access appropriate module, identify requirements, check masterdata, and run targeted reports). As a result of the many iterations of the artefact and the eventual successful implementation of the online course, there was no need to investigate why it was unsuccessful (Research sub-question 2). The organisation has benefitted from a tailor-made, in-house training course which saves resources and improves financial reporting. This in turn should lead to enhanced decision making and strengthened governance for the organisation overall.

The use of ADR has attempted to illustrate that IS research can be both rigorous and design or system orientated, whilst also making the organisational intervention demanded by AR, and providing guidance and information to practitioners in the field. The explicit principles of ADR have been followed rigorously, and discussed in detail so that the building of another online course could be replicated by other researchers or practitioners. The iterations of the various stages during the construction of the alpha and beta versions of the artefact have elicited profound reflection in action and on action, as well as a formalisation of learning.

In addition, the research has illustrated that as theory informs practice, and practice informs theory, more theory is generated, which in turn affects practice. This cycle of emerging theory combined with practical intervention in the workplace, has given rise to new insights into the whole training experience as practiced at this organisation for trainers, trainees and management. It is hoped that this deeply embodied and enriching research experience positively contributes to the body of knowledge and practice on e-learning, and will assist other researchers, practitioners and organisations in a range of ways, including more sustainable businesses and empowered, productive staff.

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Evaluation form

Instructional Design: (5= Excellent, 1= Poor)					
1. I was able to navigate through the course easily	5	4	3	2	1
2. The audio portions were easy to hear	5	4	3	2	1
3. The video portions were easy to see	5	4	3	2	1
4. The exercises were properly explained	5	4	3	2	1
5. The course design facilitated the learning process	5	4	3	2	1
6. Moving through the module was logical & intuitive	5	4	3	2	1
The following tools helped my learning experience. Please rank from 1 [least useful] - 5 [most useful].					
7. Audio	Y	N	Rank		
8. Video	Y	N	Rank		
9. Exercises	Y	N	Rank		
10. Practice session	Y	N	Rank		
11. Handouts	Y	N	Rank		
12. Case study	Y	N	Rank		
13. Please provide comments on how the instructional design of the course could be improved:					
14. Did the technology distract from the course content?					
Training Content: (5= Excellent, 1= Poor)					
15. The content was arranged to make effective use of time	5	4	3	2	1
16. The course allowed me to learn at my own speed	5	4	3	2	1
17. The length of the module was appropriate	5	4	3	2	1
18. The amount of information was appropriate	5	4	3	2	1
19. The course contained relevant examples	5	4	3	2	1
20. The course contained best practice concepts	5	4	3	2	1
21. The learning objectives were clearly identified	5	4	3	2	1

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Evaluation form

22. Was the content coherent and well developed? Please provide examples where it is NOT.
23. How confident are you that you will be able to apply the concepts learned in this session when you are back in the workplace?
24. Please provide comments on how the presentation of the course could be improved?
25. How does this SAP CO online course compare with the SAP FM classroom based course? Please give positives and negatives.
26. How did you experience scheduling your own training to accommodate your work commitments?
27. General comments and suggestions for improvement?

This evaluation may be used for research purposes regarding this e-learning course.
Please indicate below if you are prepared for your evaluation to be included:

Yes ☐ No ☐

Please indicate if you are prepared to be interviewed at a later stage regarding your experience of the course and how you have used this learning in the workplace. (Please provide your contact details in this case.)

Yes ☐ No ☐

Name: ..... Dept: ..... Ext: .....

HR194	ACCESS TO UCT STAFF FOR RESEARCH PURPOSES	UNIVERSITY OF CAPE TOWN IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

NOTES

- Forms must be downloaded from the UCT website: http://www.uct.ac.za/depts/sapweb/forms/forms.htm
- This form must be completed by applicants who are requesting to access UCT staff for the purpose of research.
- A copy of the research proposal as well as the Ethics Committee approval must be attached.
- **It is the responsibility of the researcher/s to apply for ethical clearance** from the relevant Faculty's Research in Ethics Committee (RiEC).
- If you are requesting staff information, you are required to complete the HR Information Request Form (HR190) and submit it together with all the required documentation.
- The turnaround time for a reply is **approximately 10 working days unless specified as urgent.**
- Return the completed application form and all the above documentation to Joy Henry via email: joy.henry@uct.ac.za; or deliver to: For the Attention: Executive Director, Human Resources Department, Bremner Building, Room 214, Lower Campus, UCT.

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University or institution at which employed or a registered student	University of Cape Town		
Faculty or department in which you are registered or work	Work in Finance department, registered in Commerce Faculty		
Address (if not UCT)	N/A		

SECTION B: SUPERVISOR DETAILS

	Title and name	Telephone number	Email address
Supervisor	Elsje Scott	4258	Elsje.Scott@uct.ac.za
Co-Supervisor	N/A		

SECTION C: APPLICANT'S FIELD OF STUDY (if applicable) / TITLE OF RESEARCH PROJECT / STUDY

Degree	Master of Commerce		
Research project or title	To e-learn or not to e-learn: an investigation into the effectiveness of converting compulsory staff training from classroom to computer		
Research proposal attached	☒ Yes	☐ No	
Target population (number of UCT staff)	All staff requiring access to UCT financial system, line managers and finance managers		
Amount of time required for an interview and/or questionnaire	Evaluation part of training already. Interviews only required where further information resulting from evaluation required. 30 to 45 mins. Further interviews with line managers & finance managers may be sought to ascertain effectiveness of new training method.		
Lead Researcher details	Christine Rogerson		
Proof of ethical clearance status attached	☒ Yes	☐ No	

SECTION D: FOR OFFICE USE (Approval status to be completed by the Executive Director, Human Resources or Nominee)

Support or approval			Role	Signature	Date
Supported?	☑ Yes	☐ No	Joy Henry (Office Co-Ordinator)		30/04/13
Approved?	☑ Yes	☐ No	Miriam Hoosain (Executive Director: HR)		30/4/13

UNIVERSITY OF CAPE TOWN

Faculty of Commerce
Ethics in Research Committee
Courier: Room 2.26 Leslie Commerce Building Upper Campus University of Cape Town
Post: University of Cape Town • Private Bag • Rondebosch 7701
Email: Harold.Kincaid@uct.ac.za
Telephone: +27 21 650 5041
Fax No.: +27 21 650 4396

UCT/COM/165/2013 19th June 2013

Christine Rogerson
University of Cape Town
christine.rogerson@uct.ac.za

Dear Researcher,

Project title: To e-learn or not to e-learn

This letter serves to confirm that the project entitled, **"To e-learn or not to e-learn"** as described in your final submitted protocol 2013, has been approved. You may proceed with the research.

If you do decide to do interviews, you should use either a consent form or cover letter that informs subjects about what is done to protect confidentiality, the right to withdraw at any time or to not answer specific questions, the purpose of the research and the amount of time that will be involved.

Please note that if you make any substantial change in your research procedure that could affect the experiences of the participants, you must submit a revised protocol to the Committee for approval.

Best wishes for great success with your research.

Regards,
Harold Kincaid

Professor Harold Kincaid
Commerce Faculty Ethics in Research Committee

INTRODUCTION TO CO ASSESSMENT: Mark out of 100 — 70% required to pass

Answer sheet

1. Identify what cost elements need to be set up for Weeping Willow Nursery *(NB No numbers required)* → [20]

Expense cost elements	***Revenue cost elements***

2. What would be the highest level group that you need to report on for **this** organisation? (**NOT** UCT) → [1]

3. Based on the case study, what are the 4 main activities of Weeping Willow Nursery? *(High level groups)* → [4]

4. Assuming each activity identified in (3) above is a node in the organisation's hierarchy (group), what cost centers should be set up: (*Hint — start small – new CCs can be added, if required, as business grows and more activities require separate reporting*). → [10]

Group *(main activities as identified [3] above)*	***Cost center(s)*** *to be attached to each group — each detailed activity requiring management/reporting (no numbers required, just description)*
1	
2	
3	
4	

5. Explain why you have identified these activities as separate ***cost centers***, i.e. how does this accommodate the organisation's management and reporting requirements?) → [5]

Page 1 of 2

INTRODUCTION TO CO ASSESSMENT: Mark out of 100 — 70% required to pass

6. How would you set up your CO structure to accommodate the general manager's requirements to see the total cost of all the workshops, as well as the break down per actual workshop, and workshop category *(i.e. Groovy Gardens/Seasonal Snippets)*? → [6]

7. How would you set up your CO structure to accommodate the 2 research projects? → [4]

8. Based on your reasoning (2 – 7) above, draw a suggested CO Cost center hierarchy, with cost centers included. *(Make up numbering — this is NOT UCT)* → [25]

9. Based on your reasoning above, draw a suggested CO Real internal order hierarchy, with RIOs included. Please ***indicate the settlement CC*** for each RIO. *(Make up numbering — this is NOT UCT)* → [25]

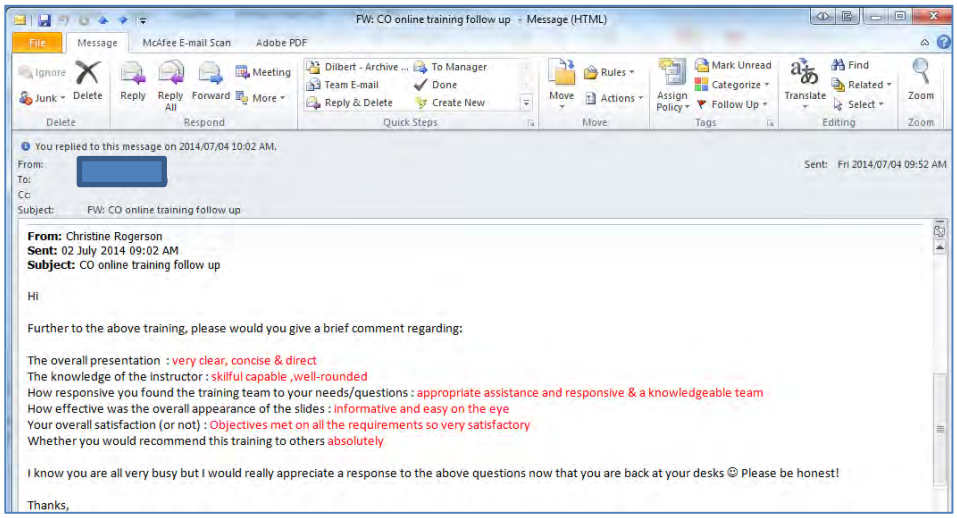
Name: ..... Dept: ..... Ext: .....

Page 2 of 2

Q	Description	Trainees											
		A	B	C	D	E	F	G	H	I	J	K	L
Q13	Please provide comments on how the instructional design of the course could be improved:	No comment	No comment	No comment	Nothing substantial, generally good.	No comment	More SAP exercises may be incorporated	Please try to make questions more clear	It was good	More pictures/diagrams Movie pointer bigger Text portion highlighted to match mentioned by audio in video SAP screen small	It would be helpful when trying to find information on the video to know more or less where to go, ie. a marker	I think the exercises were great, the audio and videos were good but I think the case study needs to be explained more clearly.	More guided practice
Q14	Did the technology distract from the course content?	No comment	No	No, it was useful to have it	No comment	No comment	I found the technology easier to grasp than the theory, being a hands on learner	Not at all	NC	No	No	No I enjoyed it because I could rewind and forward to understand	No
Q22	Was the content coherent and well developed? Please provide examples where it is NOT.	No comment	Yes	Yes	Yes	Yes	Content was satisfactory and relevant	Yes	Yes it was. I feel the exercises could have been more specific. The handouts could also have had a bit more keypoints other than just the slides.	Yes, I found it to be an easy to follow intro to RIOs	Yes	Yes	Yes
Q23	How confident are you that you will be able to apply the concepts learned in this session when you are back in the workplace?	No comment	Reasonably confident. My notes, yellow pages and marked exercises should help me at office	In practice, with trial and error, I am certain I will be able to do this as I grasp the understanding thereof.	Very confident	Yes	Quite confident following the feedback session with myself & Christine on key areas of concern for me.	I have high confidence on the stuff I learn that I will in possession to execute them	80% confident	As with any course, if you don't work with RIOs often, some things may be forgotten but we have the handouts & SAP help to refer back to.	The exercises are essential as part of the learning experience	Rank from 1 to 5, between 3 & 4	Very confident
Q24	Please provide comments on how the presentation of the course could be improved?	No comment	I was satisfied	No comment	No comment	No comment	I'm fairly contented with the layout and would personally have benefitted from a bit more time on the practical SAP training	3.2 Tools is too long which is causes by the speaker saying same thing over and over	It should have been presented in a dedicated "lab" e-learning room, not a pesonal office.	As mentioned before if more visual aids could be used when displaying text it might make it easier to recall later.	See comment under Q13	I think it went well but when I came to Section F it felt like forever. I don't think I am the person to say how to improve it.	Better audio editing
Q25	How does this SAP CO online course compare with the SAP FM classroom based course? Please give positives and negatives.	Classroom based courses do not facilitate accommodating people who learn at different speeds. The online course was a little long for one session.	Classroom: was a bit overwhelming. A lot of information given in short time. Probably overwhelming because I was new to SAP. It did give a nice basis to work on through in SAP. Online: was nice especially the audio/video sessions. I could go back to it if I didn't understand. Difficult to do this in the	Postives being hand on training the classroom based environment	Contact classes are better than online. One understands a person better when having contact classes than online Inflexibility	I think it is better. Can stop, pause and rewind when and where you want to. Very interactive for digital media.	Self assessment can be applied throughout the training and your own time management is a huge positive. Interaction with other individuals and facilitator a bit lacking and on the downside.	SAP CO (online) is more beneficiary than SAP FM classroom. After you done CO you know exactly how to work on your own	Positives: you can work at your own pace, you can go back if you need to. Negatives: course instructor not present in actual office to answer questions. You don't know what questions other candidates have and therefore learning limited to yourself, too many distractions in personal office vs dedicated office/classroom	Online - has advantage of being able to go at own pace and refer back when required Croom - has advantage of being able to pose questions and get answers from the course instructor	You can learn at your own pace (+) Questions cannot be asked and debated immediately (-)	No comment	CO online: I could go at my own pace andmake sure I understand a topic before moving on. Classroom based: you still have an intention to recap afterwards but never do so.
Q26	How did you experience scheduling your own training to accommodate your work commitments?	Fairly easily	Was a bit difficult as certain days of week are busier than others regarding deadlines, but was able to schedule training around it.	Perfect	I loved the flexibility	No comment	Super appropriate	That I think is the good thing because you can always come and do your exercises and still catch up with your everyday work	50/50	Time scheduled in diary to accommodate training	No comment	At first it needed to be explained to me outside UCT before I could actually understand what was asked of me.	Best yet. I could attend to everyone's needs or delgate (back at the office).
Q27	General comments and suggestions for improvement?	I found the case study was a little too general as the course content was very UCT focused	I prefer the online course to classroom because even though it was online, Lynn was with us still to ask questions if we weren't sure of anything.	No comment	Generally good	No comment	Overall I'm very positive. The online training was way more user friendly that I imagined. Thanks to the very clear & concise instruction and it was definitely informative and beneficial.	No comment - the course is well structured.	Time for course needs to be better communicated.	None, other than above. The CO107 form was a very helpful practical example.	No comment	No comment	Background noise on video audio was distracting. Highlight text as the narrator moves through a slide. Edit out unnecessary long pauses.

(Attached in date order, most recent first)

Trainee F



FW: CO online training follow up - Message (HTML)

You replied to this message on 2014/07/04 10:02 AM.

From: [redacted]
To:
Cc:
Subject: FW: CO online training follow up

Sent: Fri 2014/07/04 09:52 AM

From: Christine Rogerson
Sent: 02 July 2014 09:02 AM
Subject: CO online training follow up

Hi

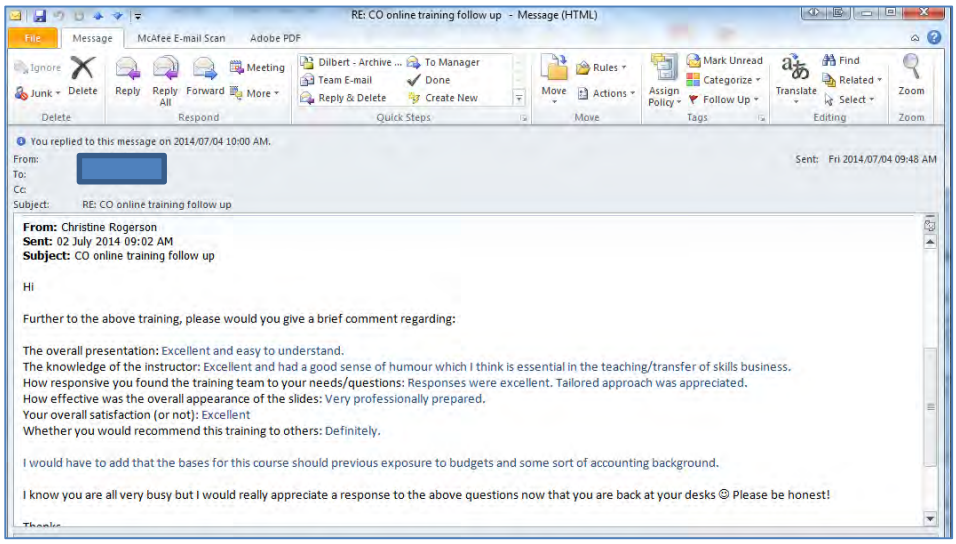
Further to the above training, please would you give a brief comment regarding:

The overall presentation : very clear, concise & direct
The knowledge of the instructor : skilful capable ,well-rounded
How responsive you found the training team to your needs/questions : appropriate assistance and responsive & a knowledgeable team
How effective was the overall appearance of the slides : informative and easy on the eye
Your overall satisfaction (or not) : Objectives met on all the requirements so very satisfactory
Whether you would recommend this training to others absolutely

I know you are all very busy but I would really appreciate a response to the above questions now that you are back at your desks ☺ Please be honest!

Thanks,

Trainee E



RE: CO online training follow up - Message (HTML)

You replied to this message on 2014/07/04 10:00 AM.

From: [redacted]
To:
Cc:
Subject: RE: CO online training follow up

Sent: Fri 2014/07/04 09:48 AM

From: Christine Rogerson
Sent: 02 July 2014 09:02 AM
Subject: CO online training follow up

Hi

Further to the above training, please would you give a brief comment regarding:

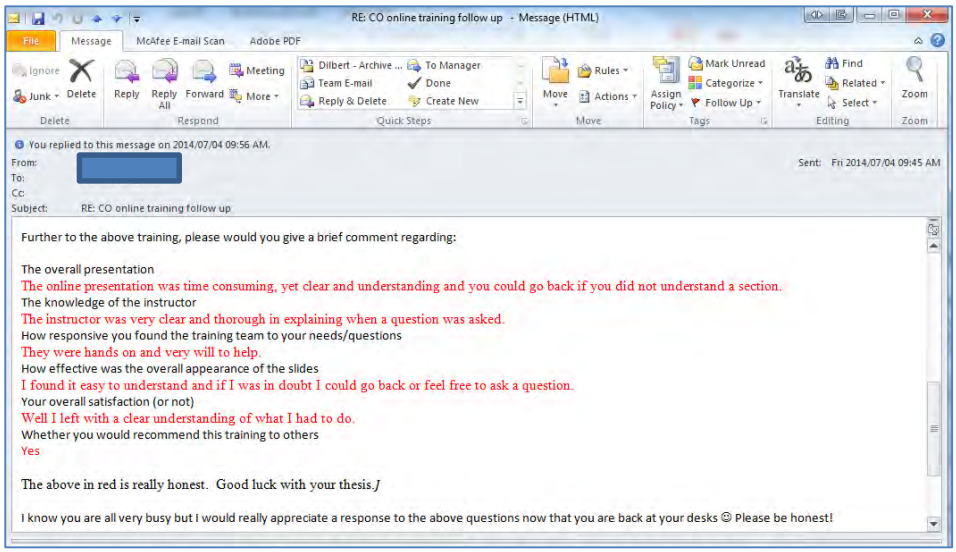
The overall presentation: Excellent and easy to understand.
The knowledge of the instructor: Excellent and had a good sense of humour which I think is essential in the teaching/transfer of skills business.
How responsive you found the training team to your needs/questions: Responses were excellent. Tailored approach was appreciated.
How effective was the overall appearance of the slides: Very professionally prepared.
Your overall satisfaction (or not): Excellent
Whether you would recommend this training to others: Definitely.

I would have to add that the bases for this course should previous exposure to budgets and some sort of accounting background.

I know you are all very busy but I would really appreciate a response to the above questions now that you are back at your desks ☺ Please be honest!

Thanks

Trainee K



RE: CO online training follow up - Message (HTML)

You replied to this message on 2014/07/04 09:56 AM.

From: [redacted]
To:
Cc:
Subject: RE: CO online training follow up

Sent: Fri 2014/07/04 09:45 AM

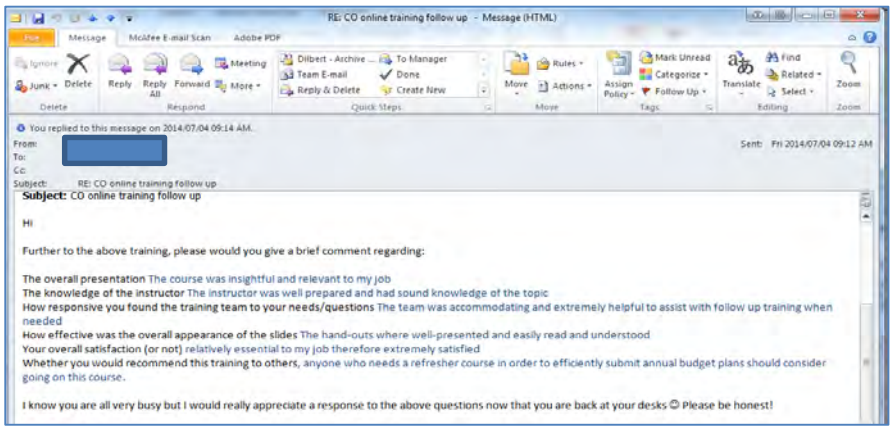
Further to the above training, please would you give a brief comment regarding:

The overall presentation
The online presentation was time consuming, yet clear and understanding and you could go back if you did not understand a section.
The knowledge of the instructor
The instructor was very clear and thorough in explaining when a question was asked.
How responsive you found the training team to your needs/questions
They were hands on and very will to help.
How effective was the overall appearance of the slides
I found it easy to understand and if I was in doubt I could go back or feel free to ask a question.
Your overall satisfaction (or not)
Well I left with a clear understanding of what I had to do.
Whether you would recommend this training to others
Yes

The above in red is really honest. Good luck with your thesis.J

I know you are all very busy but I would really appreciate a response to the above questions now that you are back at your desks ☺ Please be honest!

Trainee C



RE: CO online training follow up - Message (HTML)

You replied to this message on 2014/07/04 09:14 AM.

From: [redacted]
To:
Cc:
Subject: RE: CO online training follow up
Sent: Fri 2014/07/04 09:12 AM

Subject: CO online training follow up

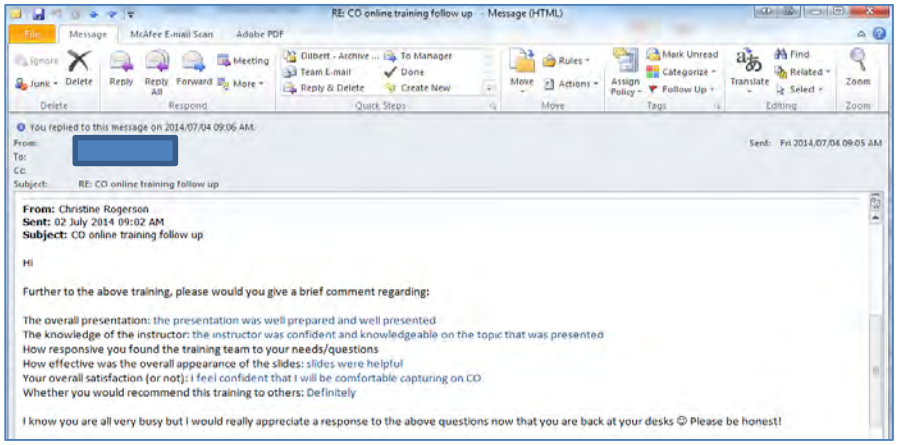
Hi

Further to the above training, please would you give a brief comment regarding:

The overall presentation The course was insightful and relevant to my job
The knowledge of the instructor The instructor was well prepared and had sound knowledge of the topic
How responsive you found the training team to your needs/questions The team was accommodating and extremely helpful to assist with follow up training when needed
How effective was the overall appearance of the slides The hand-outs where well-presented and easily read and understood
Your overall satisfaction (or not) relatively essential to my job therefore extremely satisfied
Whether you would recommend this training to others, anyone who needs a refresher course in order to efficiently submit annual budget plans should consider going on this course.

I know you are all very busy but I would really appreciate a response to the above questions now that you are back at your desks ☺ Please be honest!

Trainee H



RE: CO online training follow up - Message (HTML)

You replied to this message on 2014/07/04 09:06 AM.

From: [redacted]
To:
Cc:
Subject: RE: CO online training follow up
Sent: Fri 2014/07/04 09:05 AM

From: Christine Rogerson
Sent: 02 July 2014 09:02 AM
Subject: CO online training follow up

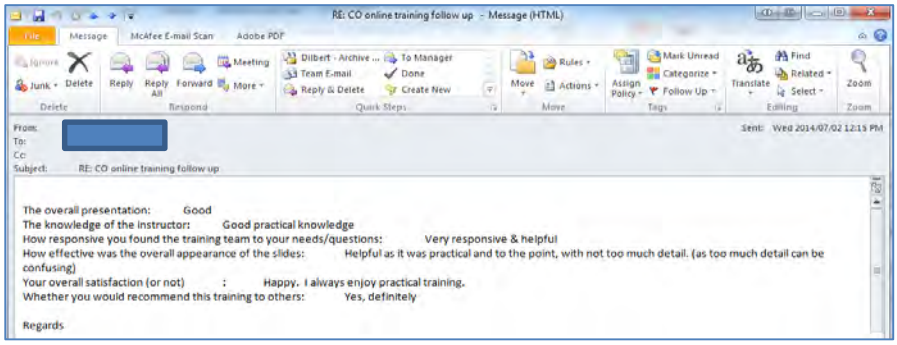
Hi

Further to the above training, please would you give a brief comment regarding:

The overall presentation: the presentation was well prepared and well presented
The knowledge of the instructor: the instructor was confident and knowledgeable on the topic that was presented
How responsive you found the training team to your needs/questions
How effective was the overall appearance of the slides: slides were helpful
Your overall satisfaction (or not): I feel confident that I will be comfortable capturing on CO
Whether you would recommend this training to others: Definitely

I know you are all very busy but I would really appreciate a response to the above questions now that you are back at your desks ☺ Please be honest!

Trainee B



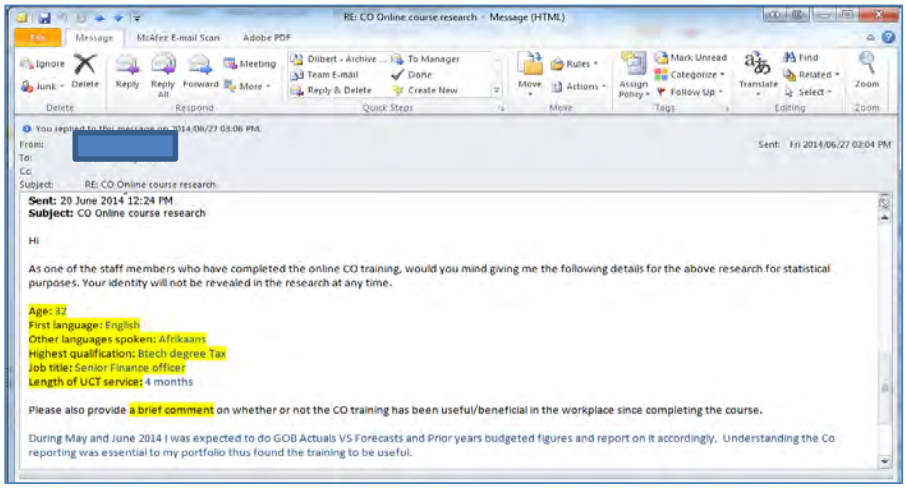
RE: CO online training follow up - Message (HTML)

From: [redacted]
To:
Cc:
Subject: RE: CO online training follow up
Sent: Wed 2014/07/02 12:13 PM

The overall presentation: Good
The knowledge of the instructor: Good practical knowledge
How responsive you found the training team to your needs/questions: Very responsive & helpful
How effective was the overall appearance of the slides: Helpful as it was practical and to the point, with not too much detail. (as too much detail can be confusing)
Your overall satisfaction (or not) : Happy. I always enjoy practical training.
Whether you would recommend this training to others: Yes, definitely

Regards

Trainee C



RE: CO Online course research - Message (HTML)

From: [redacted]
To:
Cc:
Subject: RE: CO Online course research
Sent: Fri 2014/06/27 03:04 PM

Sent: 20 June 2014 12:24 PM
Subject: CO Online course research

Hi

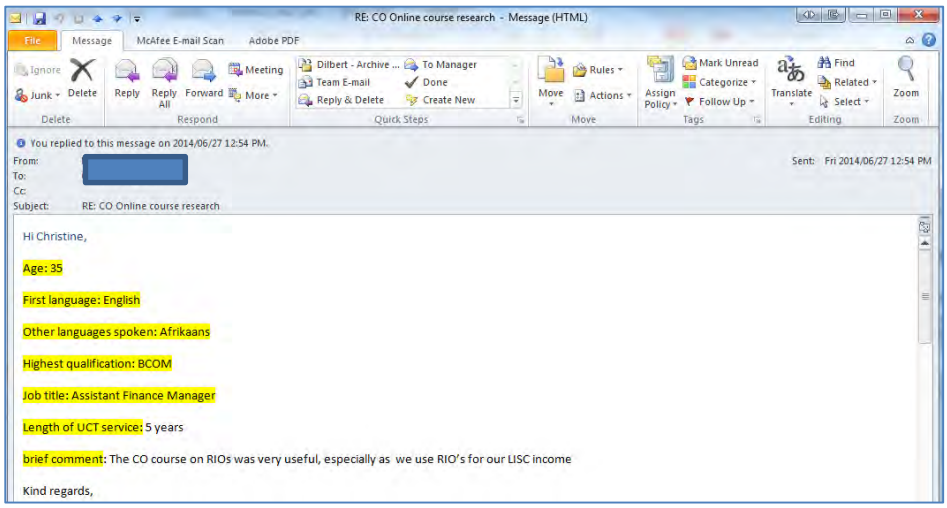
As one of the staff members who have completed the online CO training, would you mind giving me the following details for the above research for statistical purposes. Your identity will not be revealed in the research at any time.

Age: 32
First language: English
Other languages spoken: Afrikaans
Highest qualification: Btech degree Tax
Job title: Senior Finance officer
Length of UCT service: 4 months

Please also provide a brief comment on whether or not the CO training has been useful/beneficial in the workplace since completing the course.

During May and June 2014 I was expected to do GOB Actuals VS Forecasts and Prior years budgeted figures and report on it accordingly. Understanding the Co reporting was essential to my portfolio thus found the training to be useful.

Trainee I



RE: CO Online course research - Message (HTML)

You replied to this message on 2014/06/27 12:54 PM.

From: [redacted]
To:
Cc:
Subject: RE: CO Online course research

Sent: Fri 2014/06/27 12:54 PM

Hi Christine,

Age: 35

First language: English

Other languages spoken: Afrikaans

Highest qualification: BCOM

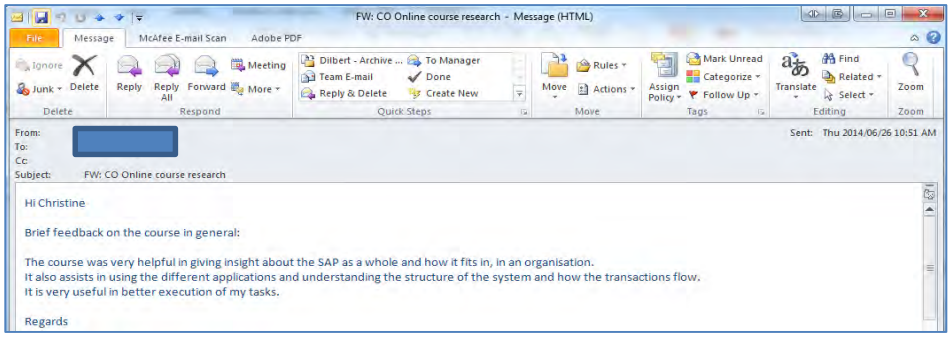
Job title: Assistant Finance Manager

Length of UCT service: 5 years

brief comment: The CO course on RIOs was very useful, especially as we use RIO's for our LISC income

Kind regards,

Trainee D



FW: CO Online course research - Message (HTML)

From: [redacted]
To:
Cc:
Subject: FW: CO Online course research

Sent: Thu 2014/06/26 10:51 AM

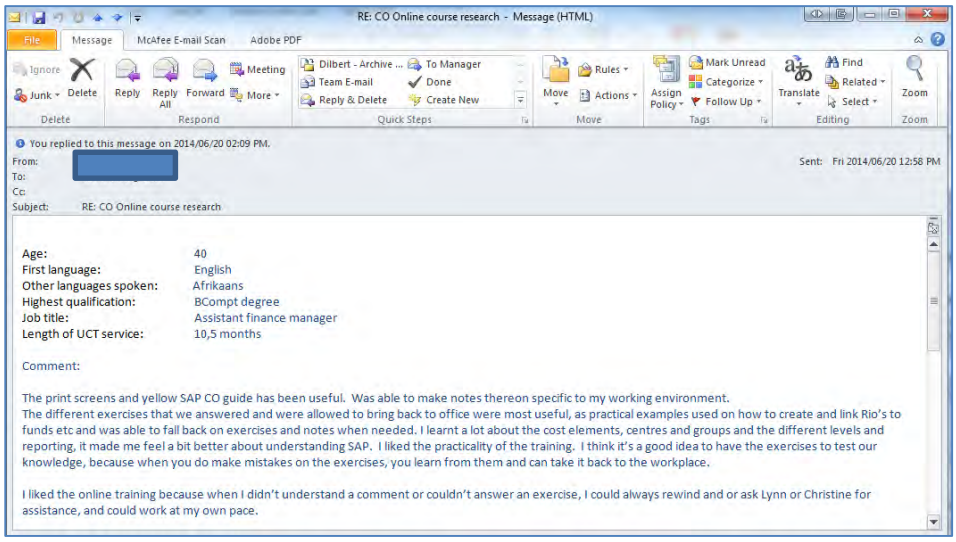
Hi Christine

Brief feedback on the course in general:

The course was very helpful in giving insight about the SAP as a whole and how it fits in, in an organisation.
It also assists in using the different applications and understanding the structure of the system and how the transactions flow.
It is very useful in better execution of my tasks.

Regards

Trainee B



RE: CO Online course research - Message (HTML)

You replied to this message on 2014/06/20 02:09 PM.

From: [redacted]
To:
Cc:
Subject: RE: CO Online course research

Sent: Fri 2014/06/20 12:58 PM

Age:	40
First language:	English
Other languages spoken:	Afrikaans
Highest qualification:	BCompt degree
Job title:	Assistant finance manager
Length of UCT service:	10,5 months

Comment:

The print screens and yellow SAP CO guide has been useful. Was able to make notes thereon specific to my working environment.
The different exercises that we answered and were allowed to bring back to office were most useful, as practical examples used on how to create and link Rio's to funds etc and was able to fall back on exercises and notes when needed. I learnt a lot about the cost elements, centres and groups and the different levels and reporting, it made me feel a bit better about understanding SAP. I liked the practicality of the training. I think it's a good idea to have the exercises to test our knowledge, because when you do make mistakes on the exercises, you learn from them and can take it back to the workplace.

I liked the online training because when I didn't understand a comment or couldn't answer an exercise, I could always rewind and or ask Lynn or Christine for assistance, and could work at my own pace.