

Effective Online Staff Training: Is This Possible?

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Abstract—The purpose of this paper is to consider the introduction of online courses to replace the current classroom-based staff training. The current training is practical, and must be completed before access to the financial computer system is authorized. The long term objective is to measure the efficacy, effectiveness and efficiency of the training, and to establish whether a transfer of knowledge back to the workplace has occurred. This paper begins with an overview explaining the importance of staff training in an evolving, competitive business environment and defines the problem facing this particular organization. A summary of the literature review is followed by a brief discussion of the research methodology and objective. The implementation of the alpha version of the online course is then described. This paper may be of interest to those seeking insights into, or new theory regarding, practical interventions of online learning in the real world.

Keywords—Computer-based courses, e-learning, online training, workplace training.

I. INTRODUCTION

AS global changes to products, services, technology and legislation are occurring with increasing frequency, organizations are experiencing more and more challenges to the sustainability of their businesses [1]-[3]. In order to stay competitive, organizations 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. One of the many issues facing business is therefore the training and retraining of their staff [4]-[6].

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 an imperative that all employees are computer literate [2], [7]. Even unskilled labor may need to be able to use some technology, if only to receive or input information [1]. Employees should, therefore, be regarded as assets to the organization, and valued for the knowledge and expertise they can bring to the overall performance of the business, if effectively trained. If organizations wish to increase their competitiveness and institutional knowledge, then their staff training should be a matter of consequence and not merely regarded as a “sunk” item (a cost with very little return on investment) [3], [4], [8], [9].

Frequently, the importance of staff training in relation to the many other aspects of organizational strategy is not immediately apparent. However, a knowledgeable staff body can have a major impact on an organization’s intellectual capital, as well as having a direct input into knowledge transfer and organizational learning [10], [11]. As businesses become more innovative, the changes must be embedded into the business processes. For this to occur, staff first have to be alerted to the changes, and then be trained how to use them. At the same time, the organization 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. As a contributor to a firm’s performance, the importance of the human factor should not be underestimated or disregarded [3], [12]. The far reaching consequences of a technically competent or incompetent labor force can be seen across multiple and disparate areas. For example, employees in customer service departments need to be able to deal with clients quickly and effectively. Finance needs staff to not only run reports, but also to be able to retrieve and analyze the relevant source data. Most business processes require human interfaces at some point, and these interfaces need to be skilled and knowledgeable. Organizational effectiveness can only be achieved if the workforce is enabled and skilled in their respective responsibilities [6].

II. 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. Over time, reservations and concerns have been expressed by senior managers, the actual finance trainers themselves, as well as the staff members who attend the training courses. The institution requires a knowledgeable, 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 have 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

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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 financial system. After attending the training, all trainees are expected to perform as knowledge workers in an information intensive sector of the organization.

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 and reporting requirements. Any attempt to alleviate the problematic situation has to be acknowledged as a reasonable solution by all stakeholders. Thus although the current training is acceptable, a more flexible, efficient and effective solution is 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, is not viable. Therefore the option currently being considered is 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 [44] as "learning that is delivered, enabled or mediated using electronic technology for the explicit purpose of training, learning or development in organizations".

According to previous research, it would appear that e-learning should be able to address most of the issues presented by the current problematic situation as detailed above [12]-[14]. Thus the problems faced by supervisors who are experiencing difficulties releasing staff due to the clash of organizational needs with training times would be alleviated if not resolved as the dates and times for training would be flexible rather than fixed [1], [2], [9]. From the trainees' perspective, e-learning offers convenience, flexibility and individualization. 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, if they feel it is required. Or alternatively, skip sections if they already feel competent in that area. The final assessment can be attempted only when each individual feels confident of their ability to pass [2], [15], [16].

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 the offerings 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. This involves all members of the workforce that require access to the financial system at this institution. 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 can operate 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 financial system, and the financial reporting skills of the institution's workforce, thereby increasing the competitive advantage of the organization.

Having explored some of the best practices of e-learning, and using the principles that are most appropriate for this particular organization, as distilled from the e-learning literature, an alpha version of a computer-based course for the financial overview module has been set up. After the alpha version has been tested by trainers and a few selected trainees, the beta version of the course will be implemented in the real world situation. Based on trainee, trainer and line manager feedback, the researcher will intervene to make further changes to this specific module. It is hoped that by linking practice and research, new insights into existing theory, or even new theory will emerge, based on a cycle of theory informing practice, which in turn may lead to more theory being generated, which affects practice. This cycle also appears to create better learning for both practice and theory [17]-[20].

III. LITERATURE REVIEW

The need for continuous, flexible, updated training would appear to be a challenge for many organizations in both the corporate and public sector [1], [12], [21]-[23]. It is the ability of an organization's workforce "to absorb information rapidly and learn the skills necessary to adapt to a constantly changing business environment" that is the deciding factor for the organization's survival [13, p311]. Organizations need to be able to offer specialized training to anyone, at any time, from any place that is both effective and efficient. To remain competitive, there is a need to offer staff training and retraining as new products, services, technologies and legislative regulations are implemented [5], [24], [25].

Having an organizational climate that is supportive of learning, and actively encourages training is vital to the implementation and continuation of any training initiative. It is the support provided by the organizational 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 [1], [26]-[28]. The need for senior management to recognize the value of developing or fostering an organizational learning climate is vital, and effective training should be an integral part of the business processes [2].

In a corporate environment, the training will only involve adult learners. Therefore, due attention should be paid to basic principles of adult learning if any training intervention is to be successful, irrespective of whether it is delivery in a classroom

or online [2], [29], [30]. In order to be receptive to learning, adults need to feel accepted, respected and supported [31]. 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 [13], [32]-[34]. "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" [28, p54].

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 [9], [35], [36]. 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 [2], [37]-[39]. 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 & Taiwan [1], [7], [25], [29], [40]-[42].

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 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 organizations are making use of e-learning as a method of course delivery [1], [9], [43].

The literature on e-learning that can be applied to this research is summarized below under the headings of benefits; strategies and tools; learner characteristics; learning approaches; barriers to e-learning; success factors; classroom versus computer-based training; and measurements of success.

A. Benefits

E-learning can offer flexibility and accessibility that is hard to replicate in an instructor led setting. Apart from being able to offer training anytime, anywhere, which includes crossing geographical boundaries, it allows for almost instantaneous distribution. This is important when organizations are faced with critical changes in legal and statutory regulations. E-learning can ensure that training is timeous and consistent, and that there is no possibility that organizational strategies or directives can be misinterpreted by different individual trainers [1], [2], [9], [11], [16], [36], [37], [43].

B. Strategies and Tools

These include the use of goal-setting, frequent challenges or tests, varying forms of multimedia, as well as a strong focus on appearance, content design, learning guides, and context relevant help. Learning history and progress should be tracked and clearly visible. The offering should be easy to navigate and have a clear course outline with explicit definition upfront

of the learning outcomes and assessments [5], [16], [30], [35], [36], [45]-[48].

C. Learner Characteristics

Cognitive ability: this appears to be a strong predictor of successful training outcomes and whether the learned skills will be retained. Motivation: whilst intrinsic motivation is difficult to address in a compulsory training environment, it is possible to stimulate extrinsic motivation by focusing on the value of the course to the learner. Goal orientation: it is important that course design emphasizes learning goals rather than performance goals [27], [28], [41], [49], [50].

D. Learning Approaches

Constructivist model: learners perform better when they can explore and discover things on their own. Cognitive load theory: importance of balancing intrinsic load when producing learning content. Error management training: 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 [15], [27], [40], [50]-[52].

E. Barriers to e-Learning

Attention to the attitude, motivation and expectations of trainees, as well as providing practical exercises or case studies would seem to be essential, if the training is to be successful and the learning internalized by the trainees. Poor quality equipment, delays and crashes can anger and frustrate learners [16], [40], [45], [23], [41], [34], [53], [54].

F. Success Factors

The success predictors of an e-learning implementation can be summarized under the headings of systems design, system delivery and system outcome [55]. Successful business implementations of e-learning also offer opportunities for reflection and self-direction, which in turn are reinforced or enhanced when used in conjunction with learner feedback. Some form of evaluation also needs to be incorporated into the design of the course [29], [32], [37], [49], [54], [55].

G. Classroom versus Computer-Based Training (CBT)

It would appear that the majority of trainees would elect to study online due to the convenience factor, despite indicating that they would miss the ambience of a classroom setting. The main objection to e-learning seems to be the lack of interaction with both the instructor and other classmates [2], [9]. To counteract this, these papers suggest setting up discussion boards and online chat rooms. The individualization expected from an e-learning course places a high degree of responsibility to deliver on the instructor or course designer [5], [13], [16], [33], [40]. Reference [16], a meta-study, found that e-learning did not score lower than classroom based instruction, as an effective way to assist employees to learn.

H. Measurements of Success

The prior research in this area emphasizes the importance of not only delivering the training, but also of ensuring that there is a transfer of knowledge and skills within the working environment [43], [56].

On an organizational 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 organization to not only be able to deal with compliancy issues, but also to address gaps in employee knowledge and issues arising from performance reviews [16], [34].

Reference [57, p95] states, "Corporations and other organizations increasingly rely on digital technology to conduct day-to-day functions", and further alludes to the "unavoidable forces of change" 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 a matter of concern to educationalists, as well as organizations [37], [42], [53], [54].

This study, which is informed by the e-learning literature review, is being conducted using an action design research approach, which is discussed in Section IV below. It was considered that this would be the most suitable way of solving 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 how to measure the efficacy, efficiency and effectiveness of such training [58].

IV. RESEARCH APPROACH

On examination, it may appear that the future of Information Systems (IS) research lies in the "sciences of the artificial", rather than the "sciences of the natural" [59], [60]. The over-riding knowledge requisite for an artificial 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" [59, p346]. As the objective of this research is to intervene in a real world setting, and to make changes based on a designed artifact, it was considered that the most effective research methodology would be a combination of Action Research (AR) and Design Science Research (DR). This approach has been designated Action Design Research (ADR) [61]. The need for this type of IS research is a much discussed topic [17], [62], [63].

ADR should address an actual problematic situation in an organizational setting, by building an innovative Information Technology (IT) artifact, whilst learning from the intervention, and producing academic theory [61, p40]. It should practically assist IS practitioners in solving real world challenges, whilst also building theory that is academically rigorous. ADR was specifically designed to overcome the perceived limitations of AR and DR research approaches [61]. ADR has strict, explicit principles which are sometimes

lacking in AR, whilst the iterations and simultaneous building, intervention and evaluation address the sequencing difficulties of DR when attempting to use the designed artifacts in organizational settings. ADR hopes to capture the emergent nature of the artifact, and address any unforeseen consequences with immediate effect. The interdependence between design and use in the organization is inscribed into the artifact, and highlighted by ADR [61].

AR can be regarded as "the ideal post-positivist social scientific research method for IS research" [17, p.243], based on the premise that IS, as a highly applied field, should enable the interaction of people, organizations and technology [59], [62]. Whenever technology is introduced into the workplace, people are directly affected in some way or another. Both monitoring and evaluating their reactions should perhaps be considered an important part of any IS research. In this study, the feedback or evaluations from the trainees (end-users) will be used to re-align the artifact on a continuous basis, and it is hoped, this will contribute to a successful implementation. However, some action research has been criticized for the occurrence of personal bias or over-involvement of the researcher, lack of rigor, and has sometimes been labeled as consulting rather than researching [17]. By incorporating DR into the AR methodology, it is hoped that this criticism of AR will be managed in this research.

DR is problem focused and seeks to design an innovative product, or artifact, that addresses unsolved problems within an organization [64]. There is a build and evaluate process which forms a loop which is usually iterated as the design is refined, before the final artifact is produced [62]. However, a possible limitation of design science research is that the building of the artifact is considered a separate step from the evaluation step, and the value of DR lies in its ability to solve the original problem, rather than testing it in a real life setting [61]-[63]. The intervention or introduction of the artifact into the organization is a secondary factor for much design science research [63]. Owing to the perceived limitations of AR and DR when used separately, it has been suggested that IS researchers consider combining DR and AR in order to achieve a rigorously designed artifact that is evaluated in a real life organizational context to solve or to ameliorate a perceived problem within that organization [63]. ADR has been designed to meet these challenges [61].

V. RESEARCH OBJECTIVES AND QUESTIONS

The objective of this study is to convert the current classroom based finance training courses for employees at the organization to 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 learners' need for meaningful, practical and flexible instruction. Arising from the objective, the overarching question of this research is how will the implementation of e-learning effect learning outcomes in the workplace, with further sub-questions: (1) If the implementation can be considered efficacious, i.e. it is achieving the desired outcome

of training staff to use the financial 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 artifact, why is it not working in this particular setting? (3) How can this implementation inform future training interventions? (4) 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 being directly involved in the practical implementation of an IT artifact (an e-learning course), into an organization, and considering the impact of such an intervention on the end-users, as well as the organization itself.

TABLE I
EVALUATION OF PROPOSED SOFTWARE APPLICATIONS ADAPTED FROM THE
HOLSAPPLE & LEE-POST E-LEARNING SUCCESS MODEL [55]

Factor considered	Weighting
Easy to use	20
Fast/Responsive	2
Well organised	3
Effectively presented	10
Support: prompt, knowledgeable, available	10
Training	5
System Design	50
Content tools	8
Learner contact	5
Assignments/Tests	2
Assessments	5
Appearance	10
User satisfaction (this evaluation, user = instructor)	20
System Delivery	50

VI. IMPLEMENTATION AND EVALUATION OF ALPHA VERSION OF ARTIFACT

The development of the alpha version has proved to be relatively onerous due to organizational financial constraints. As a result of this constraint, three free software applications were investigated. The goal was to find an application that would be easy to use, offer relatively immediate support, be able to upload standard documents, videos, screencasts and audio files. There should be a facility for trainees/trainer contact, but this did not have to be sophisticated. Some type of assessment at the end of the course was also required. The final course appearance should be professional, and the application should be easily navigable to encourage usage. The best fit was chosen based for the main part on the e-Learning Success Model [55], with some additions arising from the literature review described above, as well as the removal of certain factors which are not required for this application (Table I).

The weightings of the evaluation factors were decided by the finance department executive based on their business objectives, in consultation with the finance trainers. The final scores were based on the trainer's personal experience of three

packages after uploading the same PowerPoint presentation, video and sound files, and capturing an assessment. There were no installation issues with the chosen application as the only requirement was an internet connection.

Transposing the existing finance training course from classroom to online proved fairly challenging, and a great deal of thought needed to be applied to ensure that the PowerPoint slides made sense when there was no face-face interaction. The voice-over was problematic with this particular application as it did not allow the instructor to re-record one slide. Instead, the whole module needed to be re-recorded if mistakes occurred. The material had to be broken into twenty minute sessions, which also required considerable instructor input. There were also issues with the organization's firewalls and the application's underlying programs which had to be addressed as they emerged. To address these problems, it was agreed that for the alpha version of the artifact, the recording would take place off-site. A more permanent arrangement would be negotiated with the IT department for the beta version. The key learning factors extracted from the literature review were applied wherever possible, with the prior research on strategies and tools, success factors and learning approaches being particularly valuable at this juncture.

The alpha version was then tested by two of the other finance trainers, and one staff member who had not attended training previously. The feedback received at this point was very similar from all three testers, and linked in closely with previous e-learning literature. The background noise in the recording was an irritant, and needed to be resolved before releasing a beta version. Furthermore, although the learning history was available, the software application did not allow progress to be tracked, and this proved problematic. Timing, presentation and content design was well rated. The assessment questions proved useful as a review of the learning, but it was noted that the use of short text answers as provided by the software application was frustrating as the correct answer is case and punctuation sensitive, so any slight variation resulted in the answer being marked as incorrect.

Based on this feedback, the instructor has altered the assessment questions to exclude short text. Management is being approached to consider the purchase of a software application which will allow greater flexibility with regards to changing screens and voice-overs, as well as being able to monitor the trainee's progress online. A hand-held microphone for recording will be used in order to overcome the background noise problem, although using a sound proof recording laboratory would be the best solution.

The second alpha version is to be trialed with three new staff members who need immediate access to the finance system and cannot wait for the scheduled classroom training. Based on the response to the second iteration of the alpha version of the online module, and the final assessment thereof, the beta version of the online course will be launched under controlled conditions. It is envisaged that the first group of trainees will complete the course during working hours in the current computer laboratory, with an instructor present, in

case of problems with either the technical aspect, or with the content. As this is an intervention in a real life situation, it is essential to mitigate any adverse or unforeseen consequences. Staff members will be able to book a computer at a time that is suitable to themselves and their line managers, so the e-learning benefit of “anytime, anywhere”, will apply in a limited fashion. Therefore, time taken to complete the e-learning module and readiness to commence the final assessment will be up to the user.

VII. 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 [12], [41], [43]. E-learning may be the future of both education and training, however, it has not always been successfully implemented, and its use, particularly in the workforce, has not reached the envisaged levels of adoption [1], [22], [23]. 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 [29], [65], [66].

By studying the implementation of computer-based training courses in the work environment, and using an action design research approach, it is hoped that this research will address the area of concern practically by creating hands-on, adaptable training courses that meet the needs of adult learners, and at the same time, enable a transfer of the learning to the workplace. It is anticipated that this research will assist in improving training interventions by making the courses both flexible and effective, and which result in a skilled body of staff that can support the strategic goals of the organization. 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.

This study is set within the workforce of a single cosmopolitan South African institution that employs a sophisticated, integrated financial system. It would, therefore, not be possible to make statistical generalizations from the findings. However, as this a qualitative study, the objective is to generalize from the individual findings to a theory within a particular setting, rather than to generalize from the sample to the population [67], [68]. It is hoped, though, that the descriptive and practical nature of the research may enable other researchers facing a similar problematic situation within other organizations to use the theory and findings as a base to develop additional theories, or to compare and contrast interpretations.

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