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A SAMPLE SURVEY OF COMPUTER-BASED TRAINING WITH REFERENCE TO SUCCESS CRITERIA AND REMEDIAL PROCEDURES

D. MCELLIGOTT
R. DU PREEZ

Department of Industrial Psychology
University of Stellenbosch

ABSTRACT

The aim of the study is to conduct an investigation into the status-quo of computer-based training (CBT) at one of the leading Life Assurance companies in South Africa. The investigation comprises the development of a generic theoretical taxonomy of successful CBT which identifies the theoretical macro and micro criteria for successful CBT and its implementation. Core differences between the ideal and actual CBT in practice are identified. Results indicate that the CBT at the company satisfies the majority of the micro and macro success criteria. A few inadequacies are identified. Recommendations are made with regards to various remedial procedures. The incorporation of the theoretical taxonomy and the remedial procedures would serve to increase the success of companies CBT and could result in a highly efficient and effective CBT programme.

OPSOMMING

Die doel van die studie is die ondersoek na die huidige status van rekenaar-gesteunde-opleiding aan een van die vooraanstaande Lewensversekeringsinstansies in Suid-Afrika. Die studie sluit die ontwikkeling van 'n generiese teoretiese taksonomie vir suksesvolle rekenaar-gesteunde-opleiding in, ten einde teoretiese makro en mikro sukseskriteria van rekenaar-gesteunde-opleiding daar te stel. Kernverskille tussen dié ideaal en rekenaar-gesteunde opleiding in die praktyk word geïdentifiseer. Resultate toon dat rekenaar-gesteunde-opleiding by die betrokke instansie grootliks aan die meeste mikro en makro sukseskriteria voldoen. 'n Aantal tekortkominge word geïdentifiseer. Verskeie aanbevelings ten opsigte van regstellende prosedures word gemaak. Die implementering van die teoretiese taksonomie en regstellende prosedures in organisasies wat tans van rekenaar-gesteunde-opleiding opleiding gebruik maak, kan lei tot 'n meer effektiewe en doeltreffende rekenaar-gesteunde-opleidings program.

One of the major responsibilities of the Industrial Psychology discipline is that of quality control regarding the specific Human Resources activities that are performed within the organisation. The auditing function of Industrial Psychology is highly applicable in the field of Training and Development and serves to assess the extent to which industry applies the principles of sound Training and Development in their organisations. This is of extreme importance as South Africa is currently operating in a very competitive international arena of business where the path to future productivity and growth for this country lies *inter alia* in the education, training and development of its human resources (Van Dyk, Nel & Loedolff, 1992).

In the past, the philosophy on which education and training in South Africa was built, was of European origin which assumed a homogenous population. The trainee population, in the "new" South Africa, is now extraordinarily diverse in terms of educational, ethnic and language backgrounds and consequently requires an innovative approach to training (Trollip, 1993). While the traditional lecture form of instruction has its merits, it cannot be the only method of training to cater for a heterogenous trainee population. A novel form of individualised self paced instruction is needed to cater for the differing backgrounds of trainees and the vast numbers of individuals that need to be trained. Technologybased training in the form of Computerbased Training (CBT) should be viewed as an essential and urgent training tool to address these needs.

In CBT systems, there is a direct interaction between the trainee and the computer, which has within its systems the necessary information and instructional materials for the programme. The computer's role in such a training system typically involves administering the trainee programme to the trainees and testing their performance after learning. By virtue of its storage and memory capabilities, the computer continuously assesses the trainees' progress and is able to adapt the method and/or material presented to suit the trainees' particular needs (Goldstein, 1993; Wexley & Latham, 1981). Thus, CBT refers to "an interactive learning experience between a learner and a computer in which the computer provides the majority of the stimulus, the learner must respond, and the computer analyses the response and provides feedback to the learner" (Dickelman, 1994, p. 127).

Companies desire a training system that results in superior job performance among all their employees, and ultimately an increase in profit. To accomplish this certain industries are opting for the CBT method of instruction for it is a widely accepted fact that CBT has the capability of contributing substantially to the efficiency and effectiveness of training programmes (Kearsley, 1983). The viability of CBT, as an option for training, is clearly illustrated by the benefits that CBT provides: CBT reduces training costs as travel and living costs decrease; CBT reduces the length of training by approximately 30% when compared with classroom training; CBT provides an increased student to instructor ratio; CBT facilitators are able to provide individualised instruction; the computer in CBT delivers standardised instruction every time; CBT is interactive in nature resulting in an increase in motivation on the part of the trainees; CBT provides reinforcement during the learning process through constant feedback to the trainees and learning results obtained through CBT are seldom clearly better, but almost never worse than those obtained by more traditional ways of learning (Baird, Schneier & Laird, 1983; Gastkemper, 1984; Goldstein, 1993; Hart, 1987; Kearsley, 1983; Russ Eft, 1994; Trollip, 1993).

Certain disadvantages of CBT may serve as potential barriers to the successful implementation of CBT and although the advantages of CBT certainly outnumber the disadvantages, it does not diminish the importance of understanding the potential drawbacks of CBT. Some disadvantages include cost, development time, availability of software and the lack of the human factor (Gerber, 1990; Goldstein, 1993; Heathman & Kleiner, 1991; Kearsley, 1983; Russ Eft, 1994; Schlechter, 1991, Trollip, 1993).

From the above it would seem that CBT still has the potential to address the training needs of business in South Africa today. Although many organisations have recognised these benefits

Requests for reprints should be addressed to: D. McElligott, Department of Industrial Psychology, University of Stellenbosch, Private Bag X1, Matieland, 7602.

and have implemented CBT, the traditional lecture method of training still occupies a major percentage of training. CBT has, as a result, not been utilised to full capacity in this country (McElligott, 1997; Van Dyk, Nel, Loedolff & Haasbroek, 1997). This phenomenon requires a diagnostic intervention in order to determine those specific factors that are hindering the success of CBT in this country. In order to obtain clarity on this issue, the initial goal of the survey is to identify and con stitute the theoretical prerequisites/criteria for successful CBT and its implementation.

In identifying the success criteria of CBT, one can distinguish between certain micro and macro criteria that need to be satis fied if successful CBT is to be attained. Micro success criteria refer to certain intrinsic factors pertaining to the development and implementation of CBT. These criteria range from the creation of effective screen designs to storyboarding and flow charting. Macro success criteria, on the other hand, relate to certain extraneous issues of CBT having a major bearing on the success of the design, development, implementation and the final result of a CBT project. These criteria can be divided into two categories (1) general training principles, ranging from the need analysis to evaluation, that need to be adhered to regardless of the medium of instruction and (2) organisa tional factors such as managerial commitment, end user sup port, trainer dedication, etc. (McElligott, 1997).

Macro Factors: Training Principles

Regardless of the medium of instruction that is to be con sidered for a training programme, there are general principles that have to be followed before one is able to embark upon the development of a specific training programme. First and fore most it is imperative for the training department of an organi sation to conduct a thorough training needs assessment (Cline & Siebert, 1993; Costanzo, 1996). The focus of the needs assess ment is placed on the identification of educational gaps and various normative , demand , comparable and anticipated needs (Caffarella, 1994; Erasmus & Van Dyk, 1999). Various models for determining training needs exist for example the Graham and Mihal model and the Michalak and Yager model (in Erasmus & Van Dyk, 1999). Cognisance must be taken of the fact that one model might not be suitable for all situations. Information regarding training needs is usually gained by such methods as surveys, job analyses, critical incidents, perfor mance appraisals, interviews, focus groups, observation etc. (Erasmus & Van Dyk, 1999; Oppenheimer, 1983; Van Dyk, Nel, Loedolff & Haasbroek, 1997). Once the needs have been assessed and prioritised, task analysis is instigated whereby the knowledge, skills and abilities (KSA's) required for job perfor mance are analysed (Alessi & Trollip, 1991; Holton & Bailey, 1995).

The task analysis serves as the framework for mapping nar rower and more specific instructional objectives which are de veloped to specify what will be accomplished by a training programme. The objectives must provide a specification of the actions, which the trainee should be able to perform, the conditions under which these actions are to be performed and the standards of performance which must be met. The sound development of objectives is absolutely essential to the success of the training course and is an unconditional pre requisite for the rest of the training design. Focus has however shifted toward learning outcomes. Outcomes place more emphasis on what the student will be able to do, the results of learning, applying learning in new areas and flexible allocation of time (Costanzo, 1996; Erasmus & Van Dyk, 1999; Holton & Bailey, 1995).

The next component in the theoretical taxonomy of successful CBT involves the selection and sequencing of content. Con tent selection involves the classification of the instructional objectives and the placement of specific events in an appro priate sequence for the attainment of the objectives. These spe cific events are then written as the lesson content (Gagné, Briggs & Wager, 1992). The issue of content selection forms a part of both the macro and micro factors influencing the suc cess of CBT. With regard to the macro factors, it is clear that regardless of the medium of instruction to be utilised in the training, content has to be constructed to specifically address each of the performance objectives. Added to this, however, is the ability of CBT to offer a considerable amount of software options for varying the structure, features and nature of the lesson content. These options include the tools of branching, flowcharting and storyboarding that are extremely important in the development phase of CBT programmes.

The success of any training programme relies extensively on astute decision making at critical points in the development and implementation. Major decisions need to be made regar ding the appropriateness of the media that the organisation plans to use. An investigation into the feasibility of CBT as a training medium is not an option, but a necessity. Various methods are available in the literature which present guidelines for conducting a feasibility study (Adams, 1993; Johnson & Brigando, 1993; Kearsley, 1983; Van Dyk, et al., 1997; Wynn, 1994). Hart (1987) asserts that the many examples of failures as sociated with CBT are, to a large extent, due to the inappro priate choice and application of the CBT approach to training. Thus, the success of a CBT programme is clearly con tingent upon the careful and deliberate study of its feasibility.

Having determined the appropriateness of CBT, an analysis of the trainee population becomes necessary to examine the speci fic needs of the trainees themselves (Costanzo, 1996; Rushby, 1988). The trainee analysis serves to investigate the trainee's cur rent skill level, their current knowledge level, their origins, their language and demographical information (Baroff, 1987). A fur ther consideration, which is critical to the successful implemen tation of a CBT programme, is the compatibility of the programme with the principles of adult learning, which should also take cognisance of the various ways in which learning takes place (learning theories). These principles should be foremost in the minds of the instructional team when CBT is embarked upon (Gagné et al., 1992; Sheal, 1989; Van Dyk et al., 1999)

The continual rise in training costs is creating an urgent need for training departments to demonstrate improved perfor mance, return on investment (ROI) and financial results to top management. Thus, it is increasingly critical for the train ing team to investigate whether the skills and knowledge taught in the training programme are in fact transferred and utilised in the working environment in order to justify the capital and other investments in training. Goldstein (1993, p. 147) defines evaluation as " . . . the systematic collection of descriptive and judgmental information necessary to make effective training decisions related to the selection, adoption, value and modification of various instructional activities". A differentiation can be made between two types of evaluation, that of formative evaluation and summative evaluation. For mative evaluation is utilised to determine if the training pro gramme is operating as originally planned and if im provements are necessary before the programme is imple mented (Goldstein, 1993). Summative evaluation determines the degree to which the training programme has been suc cessful in affecting various criteria related to trainee beha viour and other organisational variables that are affected by the trainee behaviour (Gordon, 1994). Various evaluation mo dels and methods, some more accepted than others, exist that can be applied (Alliger & Janak, 1994; Bernthal, 1995; Cascio, 1991; Gagné et al., 1992; Goldstein, 1993; Kirckpatrick, 1987) but ultimately the choice of a particular model/method of evaluation lies with the individual organisation as each enter prise has its own needs regarding the evaluation of CBT pro grammes.

Macro Factors: Organisational

Organisational factors frequently represent the underlying reasons for the failure of CBT applications (Adams, 1993). In referring to the "organisational factors" influencing the effec tiveness of a CBT programme, the focus lies on the align ment/integration of CBT with other Human Resources systems within an organisation. CBT should form an align

ment with other training methods in the total training function and should by no means be regarded as a "stand alone", isolated training intervention. The results of the CBT testing facility should be integrated with the HR function as the results could assist in career and succession planning, performance appraisals and bonus structures.

The successful application of CBT is dependent on the cooperation and support of the following main groups within the organisation namely management, the training staff/CBT facilitators, the computer operations staff, the subject matter experts and the end users (Dahmer, 1995; Kattackal, 1994; Robbins, 1988). Without the participation of each of these key groups of players in the development of CBT, the probability of attaining successful CBT is minimal. Various other organisational variables could also be influential factors, but due to the nature of this study only the main groups are highlighted (McElligott, 1997).

It is clear that the impact of general training principles and organisational variables on the successful implementation of CBT is of crucial importance. Each of these macro factors need to be carefully considered and incorporated into the CBT effort if training results are to be achieved.

Micro Factors

The micro success criteria of CBT refer to various factors intrinsic to the production of a CBT programme. The process of CBT is necessarily sequential and repetitive. The design of CBT, therefore, cannot begin before the general training principles have been adhered to and the organisational issues have been clarified.

The computer offers a considerable amount of options for varying the structure, features and nature of CBT lessons. The design of a CBT lesson can become a rather complex process. However, Hannafin and Peck (1988, p. 115) assert that " . . . no single aspect of computer assisted instruction planning does more to communicate design decisions that concretise the abstract process of lesson execution than flow charting". A flow chart, in essence, is a series of diagrams depicting the progression or flow of a CBT lesson (Kearsley, 1985).

The most important assets of CBT include its ability to provide both interactive and individualised instruction through branching. This ability is demonstrated by the way the programme evaluates responses, determines whether the trainee should repeat segments of a lesson and accommodates different learning rates within a CBT lesson (Alessi & Trollip, 1991; Wynn, 1994). The use of branching is essential to the learning process. In order for the CBT programme to be successful, branching must support overall learning in terms of accuracy and efficiency (i.e. be relevant to the course content) and variety and depth (i.e. cater to the differing progression or regression needs of the learners) (Price, 1991; Robbins, 1988).

The following stage in the authoring process is the production of the storyboard. While the flowcharts illustrate the sequence of a lesson, the storyboards depict its content and presentations through the provision of a screen by screen, detailed description of the lesson (Alessi & Trollip, 1991). Due to the fact that the storyboard represents the culmination of the entire design process of CBT, the effective creation thereof is critical to the success of the CBT project.

The effectiveness of the CBT lesson also depends greatly on how the lesson material is visualised, that is, what colour scheme, screen composition and graphics make up the visual presentation. Text displays are the most predominant communication channels in most CBT programmes, over and above graphics and sound. There are many factors to consider in the design of text displays, including readability, balance, pica, style and the arrangement of text (Landers & Jose, 1986). Graphics serve to motivate trainees, clarify concepts, enhance retention and promote the transfer of information presented to the trainee (Price, 1991). However, in order to be effective, graphics should possess the qualities of unity, relevance, simplicity and consistency (Landers & Jose, 1986). A further presentation consideration is the effective use of colour. It is critical to realise that the ill considered use of colour can detract from the lesson (Beaver, 1986). Thus, colour must be effectively used to enhance learning by setting a tone, organising content, directing attention, cueing responses and promoting interest (England, 1984). Screen design is that aspect of a programme most evident to the user, thus it is essential that screen displays be designed effectively for the transfer of learning to take place and for the eventual success of the CBT programme.

A final consideration in the development of the CBT programme is that of CBT software applications. There are various CBT software applications that can be used to transform the CBT plan into an actual working CBT programme. One of the available options is that of vendor supplied, off the shelf courseware or "generic CBT" which compensates for the expenses and time involved in producing CBT. However, courseware that is not developed internally may not address the company's exact needs and thus lack relevance (Heck, 1985; Heermann, 1988; Wilson, 1991). Programming and authoring languages represent further options for developing CBT systems. While they posess definite advantages, they do, however, necessitate certain programming skills and thus ease of use becomes limited (Retief, 1989). An authoring system, on the other hand, is developed to spare courseware authors the complex task of programming and it enables the developer to generate a lesson in a substantially shorter time span (Gery, 1987; Schwade, 1985). The choice of CBT development tools is contingent upon many factors, which need to be carefully considered by the CBT team.

THEORETICAL TAXONOMY

The necessary planning, development and implementation considerations appropriate for CBT lessons have been emphasised, in the form of the macro and micro success criteria of CBT. Figure 1 presents a diagrammatical representation of the theoretical success criteria of CBT. The elements listed here are presumed to be prerequisites for successful CBT development, planning and implementation. The use of the word criteria here thus refers to an evaluation template against which organisations can adjudicate if all the components of the taxonomy were included in the process of successful planning, development and implementation of their CBT. A successful CBT programme is thus completely contingent upon the incorporation of **each and every** micro and macro factors in the development and implementation phases.

The inextricable and mutually dependent link between the micro and macro success criteria has various implications for the practical application of the taxonomy. The success criteria in each segment affects and interacts with the success criteria in the rest of the segments in the taxonomy. The exclusion of any one criterion, micro or macro, negatively affects all the other criteria in the rest of the taxonomy and the taxonomy assumes that this will undoubtedly have a detrimental effect on the ultimate success of the CBT programme. The size of each segment bears no relationship to its relative importance. Each and every success criterium must be incorporated into the development and implementation of CBT to ensure success.

The taxonomy may be utilised in two separate instances. Firstly, an organisation that is considering the implementation can utilise the taxonomy as a framework to assist them in the development and implementation of successful CBT. Secondly, the taxonomy may serve to assist those organisations, that have completed the development and implementation of CBT, to obtain feedback in order to refine interventions leading to greater efficiency of their CBT. Thus, the utilisation of the theoretical taxonomy of successful CBT may prove to be of great benefit to organisations with varying requirements.

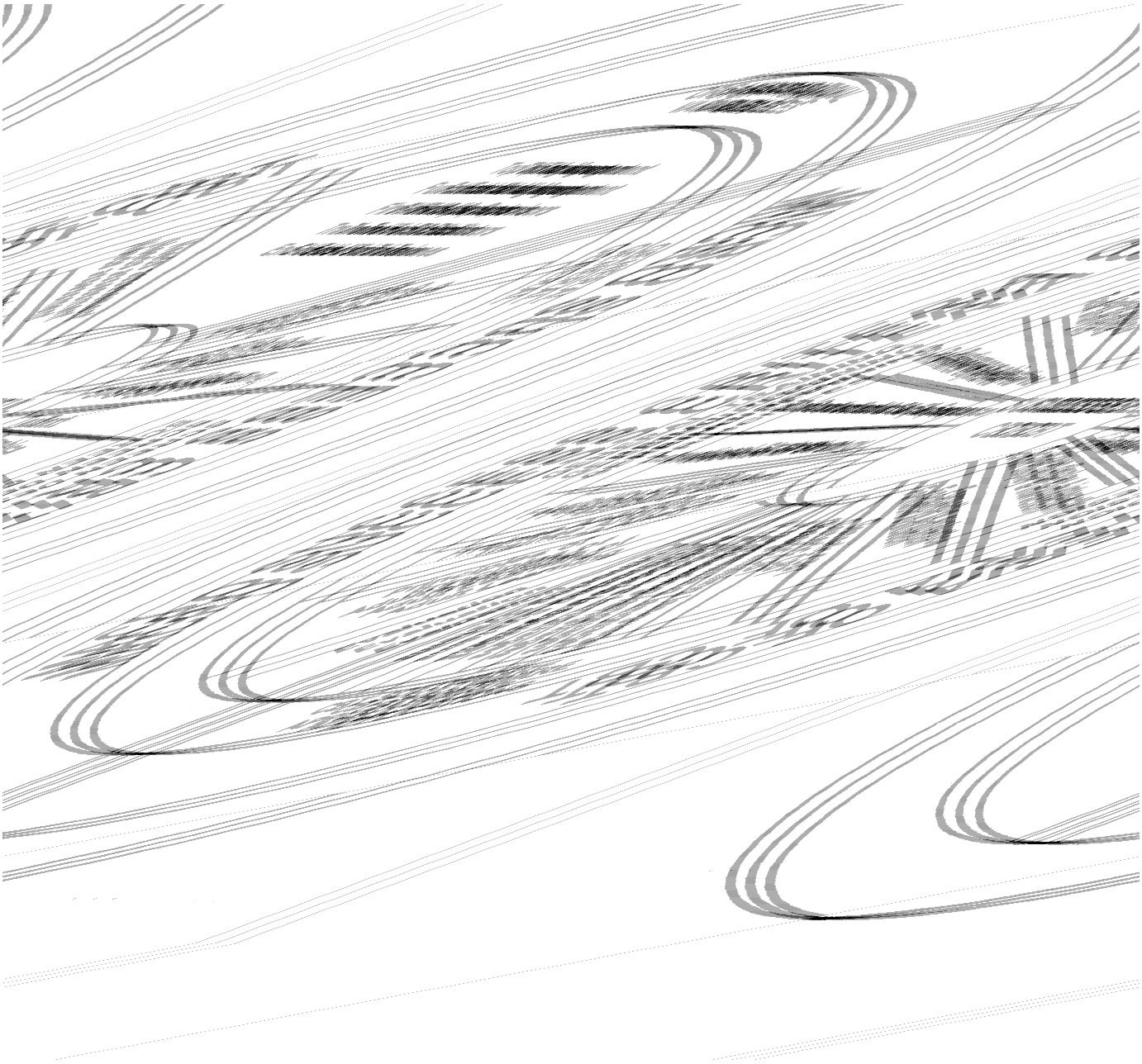

Figure 1: A theoretical taxonomy of successful CBT

The theoretical taxonomy is used in the study to assess the ex tent to which the development and implementation of CBT at one of the largest Life Assurance companies in South Africa adheres to the prerequisites for CBT success (McElligott, 1997). The theoretical taxonomy represents the "ideal" use of CBT in theory and provides the foundation for the construc tion of the questions in the diagnostic questionnaire and the focus group which are utilised to asses the usage/application and knowledge base of CBT at the Life Assurance company. If it becomes apparent that a mismatch exists between the criteria presented in the theoretical taxonomy and the satisfaction of these criteria in practice, then certain remedial procedures will be outlined in order to minimise the discrepancy between the "actual" and the "ideal" situation. If, on the other hand, there appears to be complete congruence, then it can be assumed that the CBT in the organisation should be of a successful na ture in terms of the planning, development and implementa tion thereof.

METHOD

Sample

In this research project, one of the largest Life Assurance groups in South Africa was approached to assist in the survey. The company initiated their investigation into CBT in the early '80's and is currently one of the largest CBT users in the country. A non probability judgement sampling technique was used in the survey which was conducted on a national basis and inclu ded every branch of the company that is currently utilising CBT. A total of 750 questionnaires was distributed via the com pany's internal mailing system in order to minimise costs and maximise the response rate. Each branch received four ques tionnaires to be completed by four experienced CBT users. A final response rate of 43,3% was obtained after two telephonic follow up attempts were made at two week intervals after the expiry of the return date.

Cognisance must be taken of the fact that the non probability method of sampling curtails the generalisation of the findings to the broader CBT user population.

Measuring instruments

Two measuring instruments are utilised in the study, that of a questionnaire and a focus/discussion group (McElligott, 1997). Essentially, the aim of the instruments is to investigate to what extend the taxonomy depicted in Figure 1 are adhered to in the selected Life Assurance company.

The diagnostic questionnaire utilised in the survey was constructed from the theoretical success criteria of CBT. Before finalisation of the questionnaire, a pilot study was conducted to determine and correct any problem areas in the questionnaire. Six training/personnel experts in the pilot study verified that each item within the questionnaire was unambiguous and that each item would elicit the intended information. The questionnaire comprises four sections. Section A served to gather biographic data regarding the end users' age, length of service, geographical situation, sex, academic qualifications, CBT course attendance, general computer usage and job grade. Section B aimed to elicit information concerning the end users' perceptions/ opinions of the content presented in the CBT course/s. Section C focused specifically on the screen displays of the CBT (i.e. micro criteria). The final section of the questionnaire elicited the end users' general attitudes towards CBT as a method of instruction. A 5 point Likert type scale was used (McElligott, 1997).

The focus/discussion group, consisting of members of the authoring team and management, was used to obtain further clarification on certain issues deriving from the diagnostic questionnaire. Certain macro issues such as the organisational variables, general training principles, etc., that ultimately have an effect on the successful implementation of a CBT project, were investigated.

Statistical Analysis

The data from the questionnaire were analysed using the Statistical Package for the Social Sciences (SPSS). The analysis included calculation of frequencies, means and standard deviations as well as various cross tabulations and the correlations thereof. The means and standard deviations of relevant questions are reported in brackets.

RESULTS

In terms of the Life Assurance Company's adherence to the micro success criteria of CBT, the results indicated that these criteria are, on the whole, satisfied in practice at the company.

CBT course content – macro and micro factors: It is evident that the process of task analysis is strictly adhered to by the authoring team ($\bar{x}$ = 1.46; SD = 0.69) and that the success criteria of effective storyboarding and flowcharting are fulfilled in practice ($\bar{x}$ = 1.62; SD = 0.76). The results indicate that the success criteria pertaining to certain facets of the individualisation component are actualised in practice, however, the success criterium regarding the consideration of the trainees' previous knowledge and experience is not fulfilled due to inadequate pre testing procedures ($\bar{x}$ = 2.63; SD = 1.34). These inadequacies require urgent attention as they have negative implications for the effective creation of the branching system and the testing facilities. The enforcement of stricter controls over the pre testing process, whereby each trainee is entitled to complete a single pre test, would greatly assist the authors in their branching design. The results illustrate that the "remedial" branching facet is successfully integrated into the CBT ($\bar{x}$ = 2.08; SD = 1.26). This is primarily due to the inadequate testing of the trainees' previous knowledge as well as the inability of the software to provide detailed branching facilities. A more flexible authoring system/language may thus constitute a worthwhile investment.

There appears to be insufficient facilitation in the CBT courses as minimal guidance, support and educational facilitation is provided ($\bar{x}$ = 2.12; SD = 1.16). Extensive training is suggested to assist the "CBT controllers" in their adaptation to the role of that of an educational CBT facilitator. This training should encompass interpersonal skills training, principles of adult learning, subject matter training and hardware and software training. The presence of a well trained educational facilitator would remedy the lack of personal interaction in the CBT ($\bar{x}$ = 2.16; SD = 1.11), thus eliminating one of the major problems associated with the CBT at the company, that of the lack of the human factor.

The results highlight certain problems regarding the level of difficulty of the testing within the CBT courses ($\bar{x}$ = 3.12; SD = 1.06). The testing is directed at basic cognitive levels, that of knowledge and comprehension, while the higher order levels are excluded. The attributing factors, once again, involve the limitations of the software and the inadequacy of the pre testing process.

Screen design: Regarding the screen design of the CBT courses, the text within the visual presentations is adequately presented, although there is a slight tendency towards textual screen crowding ($\bar{x}$ = 3.4; SD = 1.15). The utilisation of colour is effectively integrated into the instructional design and appears to contribute to the learning process ($\bar{x}$ = 2.06; SD = 0.95). Although the graphics in the CBT courses are consistent with the textual displays and are effectively integrated into the overall instructional message, it appears that the graphics do not play a major role with regard to the trainees' rate of comprehension and process of learning ($\bar{x}$ = 2.42; SD = 1.05). Thus, the incorporation and purpose of graphics in CBT needs to be questioned.

Macro factors: It appears that the majority of the success criteria, concerning the macro issues of the CBT, are actualised in practice at the company. Nonetheless, there are certain inadequacies present in the CBT approach. The results from the questionnaire reflect that the end users find the CBT to be effective in improving their learning ($\bar{x}$ = 2.06; SD = 0.99) and job performance ($\bar{x}$ = 1.92; SD = 0.96). However, the evaluation attempts fail to confirm these findings, as it appears that the company's approach to summative evaluation focuses primarily on the level one criterium, that of reaction. The company's attempts to evaluate learning, behaviour/performance and results are insufficient. The measurement of learning is problematic as it is based on the inadequate pre and post testing process. Although a behavioural measurement is conducted, this approach needs to be re defined in order to determine whether the improved job performance can be attributed to the specific CBT course treatment. The exclusion of the final level, that of a results evaluation, is highly problematic and detracts substantially from the entire CBT effort at the company as the financial impact of the CBT is unknown. The effectiveness of CBT is inextricably linked to the results of a cost benefit analysis. The inclusion of these three levels, namely learning, behaviour and results is essential if the authoring team is intent on demonstrating or proving the worth of CBT to the company.

It is evident that an environment of involvement, participation and co operation exists amongst the key players in the organisation. However, while top management do exhibit support and commitment to the CBT effort, they are not directly involved in the progress of the CBT. A possible strategy to elicit the more direct involvement of top management in the CBT projects, would be to convince top management of the relevance that CBT has to the organisation in terms of its cost effectiveness and its impact on the trainees' job performance. However, this could only be achieved if a formal and systematic summative evaluation of the CBT is implemented within the company.

CONCLUSIONS AND RECOMMENDATIONS

The results indicate that the CBT at the Life Assurance company is largely adequate in nature and satisfies the majority of the micro and macro success criteria as outlined in the theoretical taxonomy of successful CBT. However, a few inadequacies in the company's approach to CBT are identified, the most important of which include problems with the CBT branching facilities, test construction, a lack of facilitation on the CBT courses and an insufficient approach to the summative evaluation courses. The recommendations of the study involved the proposal of various remedial procedures to address the inadequacies in the company's CBT development and implementation. The incorporation of these remedial procedures would serve to increase the success of the company's CBT and would result in a highly efficient and effective CBT programme.

With regard to recommendations for further research, the questionnaire should be re distributed to the CBT users in the Life Assurance company once the remedial procedures have been incorporated into the CBT courses in order to confirm these results. An attempt should be made to elicit a greater response rate from the CBT trainee population in order to increase and allow justified generalisability of the results. This could be achieved by involving the facilitators in the study as they would have direct contact with the trainees and would be able to monitor the dissemination and return date of the questionnaires.

The limitations of the Life Assurance company's current CBT, as presented in this study, should be carefully considered when the company implements their planned Electronic Performance Support Systems. The most important factors to consider are the implementation of cost benefit analyses, comprehensive evaluation studies and feasibility studies. If the areas of concern in their CBT, as highlighted in this study, are taken into account, this will enable the company to proactively approach the implementation of their EPSS's rather than having to reactively respond to problems arising after the systems have been implemented.

The questionnaire can be utilised to construct a "success Criteria Index of CBT". This index can be used in any organisation to determine the extent to which the CBT in the organisation is successful in nature and to identify certain areas that require remediation. However, it must be remembered that the index cannot be used in isolation to determine the success of a CBT programme. An investigation into the macro factors must accompany the investigation into the micro factors as the two are inextricably linked.

This study emphasises the fact that CBT has the ability to provide efficient and effective instruction provided that certain criteria are adhered to in the development an implementation process. With individuals increasingly having to take responsibility for their development and learning into their own hands, CBT can provide a vital learning tool to train an emerging South Africa. The Government's Skills Development Bill directs us to find new ways of preparing for the future by developing the capacity of education and training providers. In his introduction to the Green Paper, the then Labour Minister Tito Mboweni emphasised that the re establishment of the linkages between learning and working is a condition for growth. Technology enhanced learning, in the form of interactive CBT, has the necessary potential to meet this challenge. Any company that is intent on developing its employees into a stronger and more productive workforce, through the CBT medium of instruction, should consider the guidelines provided in this study to ensure the success of their CBT and the implementation thereof.

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