

CHAPTER II LITERATURE REVIEW



2.1 Interventions of Maternal Health Care

Various interventions have been proposed and implemented to improve maternal health care, but only few studies dealt with the provision of midwives including community health workers and TBAs have been reported.

Recognizing the important role of TBA, from the early 1970s WHO has actively encouraged countries to initiate programs which train and utilize TBAs as extension of maternal health services. Indonesia has initiated a TBA training program since 1974, and yet the maternal outcome has not been improved significantly in spite of intensive efforts to train TBAs. Bobadilla , (1998).claims that the TBAs performance were very poor. He further claims that trained TBAs still lack of certain skills and knowledge in recognizing risk factors.

Recognizing the lack of acceptance of young woman and inexperienced midwives by mothers, the government of Siera Leone has conducted training of a new category of health workers, the Maternal and Child Health (MCH) aide, the local literate and mature woman recruited from the place where would eventually be posted, and become the Supervisors of the TBAs who continue to carry out most of deliveries (Bobadilla,2003). Unfortunately, the effect of the approach on maternal health care has not been reported.

From those several findings, one may interpret in several ways. First, those TBAs still play an important part in the maternal care, and it might be true for most developing countries. Second, studies indicate that mothers are beginning to accept scientific health care when there is no social distance between midwife and mother. Third, studies show explicitly that mothers in rural areas for some reasons prefer to the deliver at home. Fourth, posting of nurse-midwives in villages would have the best potential for saving lives if they are given proper training, means, supervision and back-up as well as are accepted by community especially women. Fifth, the inadequacy of health manpower would dictate the delegation of health care task to the least trained health personnel, even to the community health workers.

A study to evaluate the village midwife-training program was conducted in Sudan in 1993. The evaluation included the midwives' knowledge, their performance. Village midwives and mothers were randomly selected from study areas. Measurements and questionnaires were used to collect data as well as observation of midwives in action (Bramley,2003). The questionnaire for midwives was designed to determine the characteristics, knowledge, and practice regarding antenatal care.

The same type of study was also conducted to evaluate the role of the village midwives in antenatal care service in Sudan in 1999. The obstetric care coverage was assessed; the village midwives were interviewed; and a sample of mothers who delivered in the previous 6 months was also interview. The questionnaire was designed to investigate the use of midwives services (Bramley, 2003)

2.2 Studies on Competency Based Training (CBT) Approach

The study undertaken by Bramley P. (1999) to investigate the areas of competence required for each job in health workers of MCH programmes. The study used probably method of linking behaviours to effectiveness to list the competence areas that are associated with success. The list may be derived from interviews with, or from checklist filled in by, those who do the work and their managers. Training needs can then be established by assessing individual performance against this list of competence areas. Developmental opportunities, on or off the job, should then be provided in areas of perceived weakness. The training activities to achieve this would be evaluated in terms of whether the learner and his or her manager felt that performance in this area was no longer weak.

The areas of competence required were varied from job to job. The assessment of whether or not there is still a weak level of performance in a particular area can be made realistically only against the requirements of the particular job. Some organisations appear to be attempting assessment of ability on a set of competence areas which all should reach to some absolute standards. Chasing high standards in everything, whether or not this is needed, can be very costly in terms of training time and money.

The management Charter initiative description of personal competence offers a good example of the competence approach that has survived the test of time for managers (MCI). There are four clusters within this planning, managing others, managing oneself, and using intellect and each cluster is broken down into dimensions and indicators of desirable behaviour (CIPD, 2003)

The study was conducted by Anta (2003), the competency based training (CBT) aims to link training to workplace performance. CBT is concerned with the individual achieving competencies to specific standards while at the same time emphasising what the trainee does in his or her workplace as a result of training. Competency is defined as a combination of knowledge, skills, and attitudes that can be consistently implemented in the workplace as a required exact, standard.

The CBT Training Cycle was conducted by programmers or Healthy mothers healthy babies project, the cornerstone of the implementation of CBT is what is known as the “training cycle”. This cycle consisted of a number of key stages which include:

- Trainers are trained according to the competency standard for trainers
- Trainers are assessed
- Competency standards are developed for the roles and responsibility of trainees in the workplace.
- Modules are developed according to the competency standards
- Training of health workers is conducted based on competencies using adult education principles and team teaching techniques
- Assessment instruments are developed
- Competency of trained health workers is assessed *in the workplace* the trainer.
- Refresher training is carried out to ensure trained health workers achieve required standards of competency.

In addition, to implementing this training cycle, the Project conducted a number of other related activities such as a Training Needs Analysis, procurement of training material. (Anta, 1998 adopted HMHB Project) Care must also be taken in comparing the data from the TNA, conducted in 1998, which shows gaps in competencies with the competency standards achieved after training conducted by

HMHB and programmers. However, while results cannot be directly comparable, BDD are now achieving competency in many areas where there were previous skill gaps. While the competency standards and the assessment process are yet to be standardised across all training packages, the fact that the competency standards of successive batches of trainees for Normal Delivery training is improving over time, this does suggest that the assessment process of CBT system does provide an important feedback loop not only to the trainee, but to the trainers.

The fact that there is since a system in place to assess the competency of the health worker in the workplace after training and to provide follow up training if necessary is likely to make the CBT approach more effective even if there is not quantitative data to support this at this stage.

During 1998, UNFPA worked on creating a learning-oriented culture within the organization. Its efforts were in line with the recommendations of the external evaluation of the Fund's staff training programme for the period 1992-1996. The Fund reinforced the role of managers and supervisors as on-the-job coaches. The new guidelines on staff training and development require managers and supervisors to foster an environment conducive to learning, to provide constant mentoring and to assess the impact of structured training on their staff's performances.

Several initiatives to promote self-learning were also launched. A pilot exercise on computer-based training on financial rules and procedures relating to projects was completed and field-tested in the regional finance management/UNIFOS workshops conducted in Malaysia and Peru. CD-ROMs on that subject as well as on programming procedures will soon be made available Fund-wide. Staffs were informed of distance learning opportunities, such as the nine-month "Capable Manager" programme offered by the United Kingdom's Open University, which was completed by four staff members. Fostering self-learning will continue to be a UNFPA priority.

2.3 Effectiveness of Training Programs.

The study undertaken by Damian Walker (2002) to investigate the a training evaluation, conducted in august 1999, the study used quantitative scores for overall performance of five key skills common to all three programmes, and the percentages of competent providers, defined as having an overall score of at least 70 %. Facility based midwives (FMWs) and Village midwives (VMWs) from the districts of Banjar, Barito Kuala, and Hulu Sungai Selatan, and interns from three other districts, were selected from lists of training participants. Because no baseline performance scores were available, FMWs and VMWs from other district in South Kalimantan, who had not participated in any of the training programmes, were chosen to represent the level of knowledge and skills of the midwives before participation. They are identified as untrained in the present study.

The evaluation was conducted at a central site in South Kalimantan. Each participant was provided with a unique identifier to blind the evaluators to the participants' training status. Seven senior midwives, who were LSS trainers from the Indonesian Midwifery Association National Office and the midwifery Academy based in Jakarta, were selected to serve as evaluators. Five stations were set up to deal with each skills assessed. The same evaluator's performance being assessed at each station in order to achieve internal consistency.

Clinical skills were evaluated by using checklist adapted from training materials common to all three programmes. The aggregate scores of FMWs and VMWs from the various training schemes were compared among themselves and with those of untrained FMWs and VMWs in order to estimate the improvement in skills acquired. Kruskal-Wallis tests were used to determine P-value (Damian Walker, 2002) Breast self-examination (BSE) appears to be an effective method for earlier detection of breast cancer. The provision of specialized training programmes in BSE may increase the awareness of breast cancer as well as improve the practice of BSE. This study assessed the cost-effectiveness of a BSE programme at Danish health authority which was considered to be implemented in year 1999. A model was developed that related the cost of training (of a specified target group) to anticipate the effects of training. These anticipated effects included increased knowledge of BSE, more routine use of BSE, fewer cases diagnosed with breast cancer where the tumour is larger than

20 mm and fewer cases where the cancer has spread to lymph nodes. The model was calibrated with data synthesized from the literature, own survey data and local expert guess. In the baseline scenario, the incremental cost per person with better knowledge of BSE was estimated to be 106 euro (2002 price level), the cost per person who begins to undertake BSE to be 180 euro, and the cost per person who correctly applies the technique to be 142 euro. The cost per avoided cancer with spreading to lymph nodes was estimated to be 15 410 euro and the cost of avoiding a cancer tumour larger than 20 mm to be 16 318 euro. Sensitivity analysis showed that these cost-effectiveness ratios varied with different assumptions for the effects of BSE training (Bramley and Hullah, 1997)

Training managers are always hard-pressed to prove the effectiveness of the training programme they conduct. Mohan Bangaruswamy, 2003 gives an update on one of the most popular techniques—the Donald Kirkpatrick model. Organizations are under pressure to justify various expenses. The training budget is, often, not exempted from this purview. There are a number of questions raised on the value derived from training programmes—both directly and indirectly. Business heads and training managers are under pressure to prove the effectiveness of training. One of the most popular methodologies for measuring training effectiveness was developed by Donald Kirkpatrick. But also this model was developed by CIPD (2003) articulates a four-step process as follows:

* Level 1: Reactions.

At this level, they were measured the participants' reaction to the programme. This is measured through the use of feedback forms (also termed as “happy-sheets”). It throws light on the level of learner satisfaction. The analysis at this level serves as inputs to the facilitator and training administrator. It enables them to make decisions on continued the programme, making changes to the content, methodology, etc.

*Level 2: Participant learning.

They were measure changes pertaining to knowledge, skill and attitude. These are changes that can be attributed to the training. Facilitators utilize pre-test and post-test measures to check on the learning that has occurred. However, it is important to

note that learning at this level does not necessarily translate into application on the job. Measuring the effectiveness of training at this level is important as it gives an indication about the quantum of change vis-à-vis the learning objectives that were set. It provides critical inputs to fine-tuning the design of the programmer. It also serves the important aspect of being a lead indicator for transfer of learning on to the job context.

*Level 3: Transfer of learning.

At this level, they have measured the application of the learning in the work context, which is not an easy task. It is not easy to defined standards that can be utilized to measure application of learning and there is always this question that preys on the minds of various people: 'Can all changes be attributed to the training?' Inputs at this level can come from participants and their supervisors. It makes sense to obtain feedback from the participants on the application of learning on the job. This can be done a few weeks after the programme so that it gives the participants sufficient time to implement what they have learnt. Their inputs can indicate the cause of success or failure; sometimes it is possible that learning was good at level-2, but implementation did not happen due to system-related reasons. It can help the organization deal with the constraints posed by systems and processes so that they do not come in the way of applying learning.

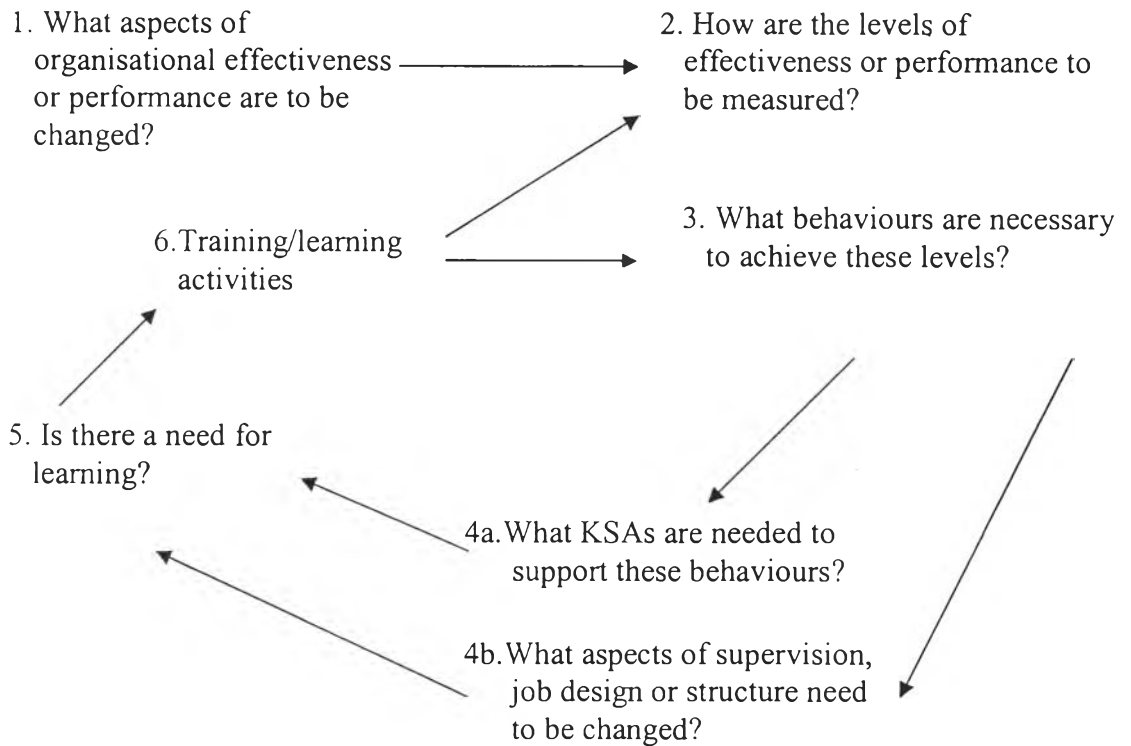
* Level 4: Results.

This measures effectiveness of the programme in terms of business objectives. At this level they was looked at aspects such as increased in productivity, decreased in defects, cycle time reduction, etc. Many organizations had been measured effectiveness of training at this level; the fact remains that it is not very easy to do this, as it is improbable that we can show direct linkage. However, it is worthwhile making the attempt even if the linkage at this level is indirect. It is possible for organizations to measure effectiveness for all programmers at level-1 and level-2. This can be built into the design of the training programme. They were found that it is easy to measured training programme related to technical and functional areas at level-3 and level-4. It is not easy to do this with behavioral skills programmer.

They were articulated an example to show how they can measure some training programmers at levels-3 and level-4. Let us consider the case of an IT services company that conducts technical training programme on products for their service engineers. Learning at level-2 can be measured at the end of the programme by the use of tests—both written and practical. Measurement at level-3 is possible for these programme by utilizing the wealth of data the organization will have on calls attended by engineers at various customer sites. This data is generally available in “Call Tracking Systems”. They have found valuable insights by comparing data pertaining to the period before the training programme and after the training programme. To simplify analysis, we can take a 24-week cycle—12 weeks prior to the training and 12-weeks subsequent to the programme. The data gives a picture on aspects such as: How many calls did the engineer attend on the given product prior to and after the programme? We need to analyse this data. If sufficient calls were not taken after the training, is it due to the fact that there were no calls in this category or because the engineer was not confident to take calls? comparison of the average time to complete a call. Did the cycle time to close similar calls reduce? Comparison of the quality of the solution, eg did the problem occur again within a specified period? Did the engineer change parts when they were not required to be changed? Such speculative change of spares gives an indication of the diagnostic capability of the engineer. Organizations get to know the details of such speculative changes when the repair centre with a statement that there is no problem with it returns a so-called defective spare.

2.4 Evaluating of Learning in Training Process: Changes in Knowledge and Skill

In this study it was analysed the effectiveness of training and most important component of competent midwives. The model used to study these two aspects can be depicted as follows:



There is an interesting debate about when learning can be said to have taken place. Some psychologists would argue that learning is a relatively permanent change in behaviour, and thus that learning in an organizational context can be demonstrated only by changes in the ways in which work activities are carried out. Others would argue that learning takes place when people begin to think differently. Learning can then be end in itself, regardless of whether it results in different work behaviours. The debate is interesting because it forces one to think about the underlying model of training. The model based upon technical education as its third stage, 'changes in levels of knowledge or skills' and the fourth stage, whether or not these are applied, remains an assumption. When using the model, the effect of the training would be evaluated by assessing whether learning has taken place. Training as process of increasing effectiveness assumes that learning is required to produce changes in work behaviour. A more appropriate level at which to evaluate learning would thus be that of assessing changes in behaviour. (Braley Peter,2003)

Whichever model is being used, it is possible to specify what learning is required for satisfactory job performance, measure the level before a training activity

and again afterwards, and thus evaluate whether the expected learning has taken place. Learning is a 'whole person' activity and it has knowledge, skills and attitudinal components but, to achieve some clarity in presentation, techniques for measuring aspects of learning will be described.

Almost all of the tasks within a job require the job-holder to have some knowledge. One aspect of designing a training activity would, therefore, be to:

- discover what knowledge is required for satisfactory job performance
- discover what trainees know when they start the training
- plan how best to facilitate the closing of this gap

A method of clarifying what knowledge is required that I have found valuable is to carry out an analysis at three levels of complexity (Bloom 1956):

Level 1, facts: the basic requirement for knowing fact, rules and list. This is often called declarative knowledge; information about 'what'. For instance, a counter clerk at the post office would need to know what forms have to be filled in and what documents produced in order to apply for a vehicle license disc.

Level 2, procedures: knowledge of procedures, how things are done, how to order sets of actions. This procedural knowledge implies information about 'how'. For instance, starting up a processing plant involves a series of actions, which must be done, in a certain sequence.

Level 3, analysis: being able to recognize the key features in particular situations and thus select the most appropriate procedure from a number of possibilities. This is often called strategic knowledge; information about 'which', and 'why'. For instance, a social worker might have to decide whether a youngster's needs are best met by leaving her in the family of origin or by taking her in care, either by fostering or in a residential home.

If a preliminary needs assessment identifies level 3 activity as an important job skill, subsequent task analysis can specify the types of problem most frequently encountered and discover whether it is important to be able to identify problems, generate possible solutions or evaluate potential solutions (Kraiger K., 2002). This

should, of course, affect the accuracy of the simulation of the job situations required to provide a realistic preparation.

The three levels are built on each other in increasing complexity and the training should be designed to move up the levels. The training needs analysis would be at all three levels to facilitate this design process. The evaluating might be at any level, but will usually be a demonstration of ability at level 2 or 3. The present trend away from classroom training will make this more difficult. The ASDP report in 1999 (Bassi and van Buren, 1999) predicted that companies would reduce classroom training by 20 percent between 1997 and 2000, replacing it with various forms of computer-based training. The CIPD 2003 report also picks up on this trend to increase the use of new technology. The percentages claiming to use the method for some of their training have increased:

	2002	2003
Intranet	25.5%	52.2%
Extranet	9.8%	21.6%
Internet	26.4%	47.7%

Such learning packages are often very efficient at facilitating learning at levels 1 and 2 and testing of the learning can be built into package. However, they are not good at facilitating learning at level 3, and one fears that this may be left to casual on-the-job supervision-one of the least effective ways of learning. The motivation for the use of new technology is often that it was reduced the costs of instructors, travel, etc, and thus prove less expensive and more convenient, but experience has shown that this is usually not the case (Tracey B.J.,1995).

2.5 Cost-effectiveness Training of Midwives for Maternity Care Providers.

The study undertaken by Snyderman, in USA (2001): Soaring health care costs effect every American. Third party payors, small businesses, labor unions and families without health insurance are all struggling with the spiraling costs of health care in our country. Today, as the move toward "Health Care Reform" gains momentum, we face a dilemma: how to reduce health care costs while improving the access to and quality of health care services. In the area of maternity care, research has shown that midwives

offer quality care at significantly less cost. Midwifery fees are lower in 1992, midwifery fees averaged \$1900 for comprehensive maternity care, while physician charges averaged \$2500 (and did not include another \$2,500 to \$3,000 in hospital charges.)

Midwives use fewer expensive technologies to provide safe care. Studies have consistently shown that midwives use less medications, electronic fetal monitoring and episiotomy than do physicians. Additionally, midwifery clients experience fewer cesarean sections. Consequently, all charges, including length of hospital stay, are significantly reduced. Midwives spend more time to provide education, information and social support to their clients. All of these factors have been cited as significant contributors to reducing adverse outcomes, especially prematurity and low birthweight, for which our entire society pays a high price.

In a 1988 survey only 9.6% of nurse-midwives said they had been named in a suit. A 1990 survey revealed that fully 77% of obstetricians had been sued at least once. Therefore malpractice insurance premiums for midwives have averaged one-sixth the cost of policies for physicians. [This translates to lower fees charged by midwives]

Increased use of midwives would reduce the cost of training maternity care providers in many other countries, where midwives are the primary maternity care providers, it would be considered an expensive misuse of limited health care resources for physicians to routinely care for healthy pregnant women. In our country, a shift to training more midwives and fewer obstetricians would save an enormous amount of money. The Office of Technology Assessment compared the cost of training a physician in 1985 with the cost of training a certified nurse-midwife with a Master's degree \$86,100 vs. \$16,800. The cost of training a Licensed Midwife in Washington State during the same time was \$8,200

Out-of-Hospital births for healthy women, either at home or in a licensed birth center, offer dramatic savings in health dollars. Consider that in 1991 there were 78,346 births in Washington State; approximately 75% were considered "low risk". If a modest 15% of these low risk births had been attended by a midwife, out-of-hospital, Washington citizens would have saved 28.8 million dollars! These potential savings are shown in the following table.

	Midwife Attended/out-of-hospital		Low-risk in-hospital	
	Cost	%Birth	Cost	%Births
Normal Vaginal Delivery	\$2000	84.2	\$6000	79.6
Complicated Vaginal Delivery	\$9500	11.4	\$7500	10.0
Cesarean Delivery	\$12000	4.4	\$10000	10.4
Total Average Cost	\$3295		\$6566	

2.6 Cost-effectiveness Comparisons between for Two Training

The study undertaken by Nida (2003) in rural Georgia, USA, They was illustrated the estimates of infant health status and prenatal care expenditure before and after the implementation of a nurse-midwife program. The comparison examines neonatal mortality, birth weight, gestational age, and the presence of symptoms of disease as measures of birth outcome. Three types of expenditure were estimated including hospital care, physician care and care delivered by nurse-midwives.

Drummond et al (1997) defined cost-effectiveness analysis (CEA) is one form of economic evaluation where both the cost and consequences of health programmes of treatments are examined. In order to carry out a CEA an organization will have a set of objectives. Moriarity and Allen (1987) also stated that in cost accounting that management of the entity will require information for planning how to achieve these objectives and also information on whether objective are actually being achieved. This letter aspect focused on two factors : 1). Whether the goals were met—that is, effectiveness and 2). Whether it was able to provide the service with a minimal expenditure of resources – that is efficiency. In general, by measuring effectiveness and efficiency is to help management control the activities of the organization.

John, B.R. and R. Hutubessy (2004) described that cost effectiveness analysis is able to show the extent to which a given system of enhancing is economically efficient and one way of applying this method of analysis to the study of a health project of intervention is to try to minimize cost once the objective has been determined.

It can be seen from the above review that although cost-effectiveness analysis is commonly used in a cost and its related outcome, it also provides a system of enhancing the efficiency as needed to health project or intervention to minimize cost to achieve the expected goal.

Sometimes more than one training approach could be considered. For instance, should he buy in someone to run a particular activity or should he run it with our own people? One of the criteria on which the alternatives should be compared is the cost of providing the training. The cost of each approach would be estimated and the alternatives compared on this basis.

It is usually assumed, by accountants, that the expected outcomes are the same and thus that one should simply select the cheaper alternative. This may account for the quantity of training that is now 'outsourced' to training consultancies. There are, however, added benefits from providing training internally. For instance:

- The training needs analysis might be done more thoroughly by an internal trainer than by a line manager who buys someone in to deal with his problem.
- The internal training department should be better aware of organizational priorities and plans and should, therefore, see more ways of integrating the training with work tasks.
- The mix between what the supervisors will do and what the trainers will do might be easier to agree when the trainer has regular contact with that department on a range of training issues.
- The follow-up evaluation and continuity of learning into the work will probably require an internal trainer anyway.

They do not want to be unduly critical of the principle of buying-in training. There are many training providers who work on a regular basis with an organization and can offer most of the advantages of internal trainers, plus some greater flexibility and

experience, at a lower cost. Some, however, are selling standard packages and claiming that these can be tailored during the event to suit the delegates' objectives. The perceptive reader will not be surprised to learn that they are suspicious of this. My view is that a careful analysis should be made of the behaviours that need changing, in order to improve effectiveness, before the training is designed.

A simple might help to clarify some of the issues involved in cost-effectiveness comparisons. Suppose that the cost of a full-time trainer is \$25,000 salary plus \$10,000 a year for overheads. Such a person could deliver some 35 five-day courses/workshops a year and still have time for needs identification, preparation and holiday. The cost of delivery of a five-day programme for (say) 10 participants with two trainers would thus be \$2,000 plus the overheads of cost of training rooms etc.

Training consultants was provided at rates that vary between \$500 for one trainer and \$2,000 for more than one trainer per day. Taking a rate of \$1,000 for two trainers, the cost for five-day programme would be \$5,000 (again plus room etc). The cost of sending 10 participants on an open course run by an agency might be some \$500 per day delegate, i.e. \$25,000. The cost can be easily compared, but there are other questions about effectiveness, which might include the following:

- Can sufficient participants be provided to justify two trainers for 35 weeks?
- Can the trainers cover enough topics to offer 35 really useful weeks per year?
- How does 14 weeks (two-fifths of 35) with different consultants compare with 35 weeks with two internal trainers (range of topics, expertise, number of delegates)?
- If external consultants are to provide the training, who will do the needs analysis with the line manager?
- Which method of delivery is likely to provide the most effective training, given the problems of the organizational context and transfer of the learning?

Where two methods of delivery are to be considered, it is possible to estimate the costs and compare the likely effectiveness of the two programmes and the offer a rationale for deciding whether the increased effectiveness of one programme justifies the extra cost. This comparison is more convincing when pilot versions of the two programmes can be run, so that actual, rather than estimated, levels of effectiveness

can be used. For example, one of the high street clearing banks was interested to compare the use of computer-based learning (CBL) with delivering a traditional five-day off-job programme. The course was designed to teach some aspects of bank work connected with lending money on mortgages. It was a knowledge-based programme, and some of it was at the 'analytical' level, ie analysing a situation so that the correct procedure can be selected (Peter Bramley, 1996). The CBL package was produced and, in piloting, it was found that average trainee could complete it in the three days. It was intended that the three days would be spent in the branch at which the trainee worked, or one very near it, and that the learning should be spaced at regular intervals during periods.

Costing was made for the development, delivery and evaluation of the CBL method. The delivery aspect was rather provisional, as it was not known just how much co-ordination would be necessary for it to work well. (One of the problems with open learning systems is to achieve the amount of structure that is necessary to allow the trainees to develop their learning in a systematic way. An hour or so here and there does not produce optimum learning.) The traditional five-day course had been running for some time and could be costed accurately. The development costs were spread over the number of people likely to be trained in three years. It was thus possible to make comparison on the basis of estimated cost per student trained on each of the systems. The system could also be compared on an estimate of effectiveness.

- Shorter training time and less time away from work for CBL system
- Less travel time and expense for the CBL package
- Less covering cost for trainees on the CBL package
- Better learning gain on the CBL package
- Some increment in computer literacy among staff using CBL

A further basis for comparison of effectiveness would be the preference of the trainees for the methods being offered. Some would, no doubt, like to get away from the workplace for five days. Some would like to learn with others. There may also be some benefit in their discussing how the work is organised in different branches (Kraiger K, 2002).

The cost of design was spreader over the life of the programme (ie shared by the proposed number of programmes) as its otherwise account for some 50 percent of the overall costs. As a rough guideline, a technical course was needed some five hours of preparation per hour of delivery. Programmes or packaged instruction has much more expensive, as up to 100 hours of design are needed for one hour of instruction. With computer-based learning the ratio can be as high as 400:1. The cost of designing the learning event might include things like: 1a Cost of preliminary analysis of training needs, development of objectives, course development, lesson planning, programming, audio-visual aids production, consultant advice, and contractors. 1b offices, telephones. 1c Production of workbooks, slides, tapes, tests, programmes, printing and reproduction (Brown K.G.,2002)