6 Learning and Training

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This chapter will review some of the processes by which people acquire and apply new knowledge, skills and attitudes. Factors in the environment and in the individual that can influence those processes will be examined, and frameworks for evaluating training programmes will be outlined. General themes applicable to learning in many situations will be explored in their particular applications to paid work.

Several factors emphasize the importance of learning by members of the work-force: the rapid pace of change in organizations, increased international pressure for greater competitiveness and for more effective ways of working, expanded use of computer-based systems, and a tendency toward more frequent transitions between jobs. These factors have given rise to the advocacy of 'lifelong learning' and the creation of 'learning organizations', and processes of learning underlie most of the issues considered in this book.

LIFE IS A LEARNING PROCESS

Learning is fundamental to life. In its absence a person is unlikely to survive, and at a societal level the existence of a culture depends on people acquiring common knowledge and norms. This pervasiveness presents difficulties for researchers, inside work organizations or elsewhere. If behaviour and social interactions are based on a steady stream of learning, usually in very small increments, how can we chop up this stream into discrete elements for study? Most often in the area of this book, the

answer has been to focus primarily on processes of *formal* learning, those which have been planned and structured, for example within a training programme.

In broad terms, learning may be viewed as cognitive and physical activity giving rise to a relatively permanent change in knowledge, skill or attitude. 'Training' involves organized efforts to assist learning through instruction and practice. Two main kinds are 'job-specific' training, and procedures to promote 'development'. Job-specific training seeks to improve effectiveness in a current role, whereas development activities take a longer-term perspective and may extend into career planning and reviews of personal progress (Noe, Wilk, Mullen and Wanek, 1997). Training and development activities may be described as either 'off the job' (occurring away from the work-place, for example in a training centre) or 'on the job' (involving work tasks which can contribute to learning).

The Outcomes of Learning

Learning brings about changes in knowledge, skills or attitude. In addition, the outcomes of learning can include increased employability, a greater income, or several less tangible changes. These results can benefit an employer, an employee, or both of those.

Knowledge (the first outcome mentioned above) can be viewed as either 'declarative' or 'procedural'. Declarative knowledge comprises factual information about what is the case, whereas procedural knowledge is made up of routines specifying how to do something. Those may be either physical or mental, so that the effective handling of a cricket bat or the conduct of mental calculations are both instances of procedural knowledge. Declarative knowledge is usually explicit, in that a person can report it; but procedural knowledge is often implicit, revealed in outcomes rather than in conscious awareness of the routines themselves.

Most learning involves the acquisition of knowledge of both kinds, but some declarative knowledge must be acquired before proceduralization is possible (Anderson, 1982, 1995). Initially (in what is often termed the 'cognitive' phase) a learner gains information about individual facts and their inter-relationships in different situations. Some of this declarative knowledge is converted through additional processing into cognitive or

behavioural procedures, through which it is applied in dealing with the environment. These procedures can become joined within increasingly long strings of actions, which (in the 'autonomous' stage) the person can execute as a whole, often with only limited conscious attention. Learners thus shift from cognitive effort and responses to single stimuli towards pre-structured, automated sequences of co-ordinated thought or action; once started, the latter can be difficult to interrupt.

Procedural knowledge is very similar to what is sometimes referred to as 'skill'. Skilled behaviour involves effective handling of particular situations, and the term 'skill' usually implies that a person's performance is a result of learning. 'Knowledge' and 'skill' contain similar elements, but 'knowledge' is more declarative and 'skill' is more procedural. Among the procedures that are built up within a skill are 'cognitive strategies', providing higher-order guidelines about appropriate priorities and sequencing of activities (e.g., Kraiger, Ford and Salas, 1993).

A related concept is 'expertise'. As described in Chapter 2, studies have contrasted experts in a particular domain against novices in that domain. Experts have been shown to have a superior and more organized knowledge-base, they perceive and recall larger meaningful patterns in their domain, search for and locate information more effectively, are better at anticipating future developments and potential faults, make more sophisticated plans, and can more quickly process new information within their established knowledge structure. They are able to execute fast strings of actions, that are not always under direct control once initiated (being 'autonomous' as described above) but which free mental resources and permit simultaneous processing of information (e.g., Sonnentag, 2000).

The outcomes from learning introduced above as knowledge and skill may thus also be viewed in terms of increased expertise. In addition, learning may give rise to shifts in a person's attitudes, values or preferences. For example, training programmes may be intended to modify employees' opinions and feelings about a working procedure, a piece of equipment, customers, a style of management behaviour, or the employing organization itself. These potential outcomes of training are more affective (based on feelings) than are the cognitive and behavioural components of knowledge, skill or expertise. As outlined in Chapter 1, attitudes are usually viewed as evaluative tendencies (favourable or unfavourable) towards an object.

Another potential outcome has been described in terms of greater

'employability', drawing attention to the fact that individuals need to continue updating their expertise in order to maintain the potential to move into different jobs with the same or another employer. The enhancement of employability can be an important objective for individuals considering future learning activities.

A related benefit is in terms of increased income. It is well established that members of the workforce with more training are likely to receive higher incomes than others (e.g., Blundell, Dearden, Meghir and Sianesi, 1999). The reasons for this pattern are multiple, in that high-income people may differ from others in respects apart from the training they have received (in terms of ability or previous education, for instance), but the differential in training-related income remains significant after statistical control for additional factors.

Other potential outcomes are less tangible. For instance, Nordhaug (1989) asked employees about the consequences of their most recent training course, and found that many reported an increased interest in learning in general (51 per cent of respondents), greater feelings of self-actualization (65 per cent) and increased self-confidence (42 per cent). In some settings training may have those outcomes as explicit goals. For instance, in seeking to encourage traditional non-learners to become more active in training and development (Birdi, Allan and Warr, 1997), it may be necessary first to enhance self-confidence and learning motivation, before more substantial skill acquisition becomes possible.

Some Training Methods and Their Effectiveness

In both off-the-job and on-the-job training, information is obtained in part by listening to and watching other people. Those activities may be formal, for instance through structured programmes of lectures, or they may be informal, through observation of colleagues' work behaviour. A third activity in most learning is practice of the behaviours to be improved, providing feedback (sometimes termed 'knowledge of results') about the effectiveness of specific responses or routines.

These three activities (listening, observing and practising) have been brought together systematically in 'behaviour modelling' training. Based in part on theorizing by Bandura (1977), this identifies 'learning points' (specific issues to be studied) and presents those first verbally and then

visually. The verbal account usually takes the form of a brief description or longer lecture, and this is followed by a visual presentation to demonstrate key behaviours. (These may involve a practical demonstration by one or more trainers, or the material might be shown on video-tape.) Learners are then required to 'model' those behaviours by practising the activities that have been presented. Feedback about each person's performance (guidance about strengths, limitations and possible improvements) is provided by trainers or fellow-learners. Different learning points are presented separately, before being combined into more extended activities.

Behaviour modelling has been shown to be effective, for example in managerial and computer training (Burke and Day, 1986; Gist, Schwoerer and Rosen, 1989). In a study of instruction to use a software package, Simon and Werner (1996) compared behaviour modelling against two other training procedures: lectures with visual aids, and self-directed exploration of teaching material. A control condition (no teaching) was also examined, and trainees were randomly allocated to different conditions. In addition, variations in learners' general cognitive ability were statistically controlled. Measures were taken of post-training comprehension, practical success, and attitudes toward the system in question. Behaviour modelling was found to be the most successful training procedure in all respects.

A refinement of the general approach is in terms of 'active interlocked modelling', which promotes learning through observation of another student. In this procedure trainees work in pairs, taking it in turn to carry out part of the task to be learned, and for the rest of the time observing and providing feedback to a partner. Dyadic learning of this kind has been compared by Arthur, Day, Bennett, McNelly and Jordan (1997) against individual training activities. Despite having half the amount of hands-on practice, participants in the dyadic condition achieved the same level of performance. In effect, this represents a 100 per cent increase in effective use of time, since twice the number of trainees attained the desired outcome in the same amount of time.

It is of course also important that learned material is retained subsequent to its acquisition, and some studies have examined retention after different training procedures. For example, the two experimental comparisons summarized above (by Simon and Werner, 1996, and Arthur et al., 1997) both demonstrated that patterns at the end of training were

replicated several weeks later: retention was better for the procedure that had been more effective during learning.

Skill loss or forgetting (the opposite of retention) occurs if learned material is not applied or further practised. The usual forgetting pattern across time is one of an initial sharp decrement followed by a levelling-off, and the strongest predictor of how much will be retained is the degree of overlearning (Arthur, Bennett, Stanush and McNelly, 1998). This means that subsequent retention can be increased by additional learning, either during an initial programme (for example, continuing well beyond merely adequate performance) or in later activities (for instance in 'relapse prevention' or remedial practice linked to the original training provisions). Retention is also better when different elements of the material are somewhat interdependent, so that they may better support each other by providing mutual associations, and when cognitive interference between different elements is not great.

Off-the-job learning activities have traditionally been undertaken in a training centre, school or college, but there is a growing interest in 'open' forms of learning. In these cases, individuals work on their own to learn material presented in books, computer files or audio- or video-tapes. A key feature is that open learners have more autonomy to decide what is studied, as well as how, when, where, and at what pace they will proceed.

Although open learning may be undertaken at home or elsewhere away from a place of employment, some organizations have computer-based learning facilities that can be used during the working day. These are sometimes located in an 'employee development centre', a company site in which written, audio-taped, video-taped or computer-based material can be studied or borrowed for use elsewhere. In a minority of cases, material is presented through an intranet, a computer network accessible only from within the company. Computer-based training is becoming increasingly common, and it has clear advantages when large numbers of employees are to be trained, especially if they are geographically dispersed. Individualized sequencing of instruction is possible, immediate feedback can be provided, students may undertake self-assessment tests, and their progress may be recorded and analyzed. In some cases, multi-media computer presentations can permit the powerful integration of written, diagrammatic and auditory information.

There appear to have been few experimental evaluations of computer-based systems, but there are frequent suggestions that training time is

reduced and that employees find the procedures attractive. Some systems make it possible for dispersed members of the organization to add fresh material, thus combining information from different sources. Conversely, some computer-based systems are inflexible, being difficult to change and with a content that becomes irrelevant or out of date.

The training methods examined so far in this section have tended to be off-the-job, as employees undertake learning away from their daily work. In addition, much learning occurs in actual job settings, either through formal training programmes or through informal activities. Formal on-the-job training is most common early in a person's career. That may involve scheduled periods of observation and practice under the guidance of a colleague or a trainer, and is sometimes interspersed with linked off-the-job instruction. However, most on-the-job learning is informal, gained through experience of one's own and others' activities in the absence of planned training inputs. Given that experience is acquired idiosyncratically, and that learning may accumulate slowly across long periods, this process is obviously difficult to study.

On-the-job learning is most likely when individuals are required to undertake activities that provide difficult challenges (McCauley, Ruderman, Ohlott and Morrow, 1994). Particularly important are unfamiliar and increased responsibilities, having to prove oneself in a new role, undertaking transitions to different positions, coping with job overload, and having to take risks. These activities can be stressful, pointing to the fact that lowered well-being is sometimes inevitable as part of an overall satisfying career.

There is a trend towards work-based learning through membership of temporary problem-solving groups, undertaking specific projects, shadowing other employees, job rotation, or secondment to other parts of the organization. For example, Campion, Cheraskin and Stevens (1994) studied the consequences of job rotation (for periods of several months) in managers and executives. They found four sets of benefits: positive well-being in terms of greater job satisfaction and career involvement, organizational integration benefits through wider networks and greater transfer of knowledge, work content benefits such as greater stimulation through task demands and work variety, and personal development benefits in the form of better coping skills and greater insights into personal strengths and limitations.

As outlined earlier, specific learning activities may be viewed more

broadly, as part of a person's overall development. Many large organizations link career development to training through a process of annual reviews. In discussion with a supervisor, an employee examines his or her work progress each year, identifying areas and activities in which additional learning could be valuable and planning that learning for the following year. In some organizations, employees are encouraged to prepare and update a 'personal development plan', summarizing short-term and longer-term career goals and progress toward those.

Other Environmental Features Affecting Learning

As with most variables examined by psychologists, learning behaviour is a function of both environmental and personal factors. Among relevant environmental features (exerting their influence from outside the person) are the different methods of training illustrated in the previous section. A more general aspect of the environment is the amount of support provided by an employee's supervisor or organization as a whole.

Support of this kind might influence either participation in learning or success in learning. We thus need to examine two issues: the relationship between supervisors' support for learning and employees' participation in learning activities, and the association between that support and the amount learned. In both cases, correlations have been found to be significantly positive.

For example, Birdi *et al.* (1997) examined how often in the past twelve months workers had taken part in five types of activity: required training courses in work time, work-based development activities in work time (in project groups, personal projects, etc.), voluntary job-related learning in one's own time (e.g., taking a job-relevant college course), career planning activities in work or own time (for instance, updating a career development plan), and voluntary non-job learning in one's own time (e.g., learning a foreign language). Employees' participation was significantly predicted by the amount of perceived supervisory support in all cases except for voluntary non-job learning.

In respect of the second issue (concerning the amount of learning), Colquitt, LePine and Noe (2000) reviewed previous studies, finding that both declarative knowledge and skill acquisition were significantly greater when more support was received from supervisors. The causal influence

is unlikely to be only from supervisors' support to participation or to learning success (for example, it might be in both directions), but some supervisory impact of that kind appears probable. For example, Colquitt *et al.* (2000) reported a significant positive association between support from supervisors and the probable mediator of raised motivation for training. Receiving encouragement from one's supervisor is thus likely to enhance both participation and learning success.

Some Individual Characteristics Affecting Learning

As well as being influenced by the environment, participation in learning is affected by a person's own characteristics. Studies have repeatedly shown that different kinds of people undertake different amounts of development activity. For example, employees with longer tenure in a job receive significantly less training than others, as do those in lower-level jobs, those with fewer educational qualifications, older workers, and those in smaller establishments (e.g., Department for Education and Employment, 1999; Osterman, 1995; Warr, 1994).

In terms of learning achievement, differential success has been shown to occur as a function of several individual characteristics. Particularly important are cognitive ability, learning motivation, aspects of personality, learning strategies, age and relevant previous knowledge.

Many studies have reported a significant positive correlation between scores on tests of general intelligence (sometimes referred to as 'g' or 'general mental ability') and learning achievement (Schmidt and Hunter, 1998; Colquitt *et al.*, 2000). The association with intelligence is particularly strong when tasks are novel or demanding, for example early in a training programme. Kanfer and Ackerman (1989) showed that the correlation between intelligence and learning performance was greatest in early trials and declined with increasing practice; this difference reflects a shift from the 'cognitive' to the 'autonomous' stage (see above). Conversely, the association with intelligence is lower when ability differences are outweighed by variations in knowledge. Prior knowledge then assists learning, irrespective of cognitive ability level.

Intelligence is also less predictive of learning in structured rather than unstructured tasks. In more structured learning, a teacher or teaching system controls content, timing and feedback, for instance ensuring that

tasks are undertaken in a pre-defined sequence. This structure particularly helps lower-intelligence learners, so that the correlation between learning success and cognitive ability is reduced in structured settings. In contrast, high-ability individuals gain from low-structure opportunities, and the ability–learning correlation is then greater. There is thus an 'aptitude–treatment interaction' (Snow, 1989), in which learner intelligence and task structure jointly determine learning success.

A second individual characteristic is affective rather than cognitive. Learning motivation has been studied in two ways, through scales with self-descriptive statements (e.g., 'I am enthusiastic about learning new things') or through measures of the perceived benefits and costs (the 'valence') of learning activity. In both cases, learning motivation has been shown to predict learning success (Colquitt *et al.*, 2000).

The factors underlying variations in learning motivation are both individual and environmental. For example, this motivation is greater among younger employees, those in higher job grades, people with higher educational qualifications and those with stronger organizational commitment. Support from supervisors and co-workers is also linked to greater motivation to learn (Warr and Birdi, 1998; Colquitt *et al.*, 2000).

Learning motivation may be viewed within a broader personality trait of conscientiousness (see also Chapter 5). Employees with higher conscientiousness scores have been found to be more successful in learning (Colquitt and Simmering, 1998), and this personality attribute predicts learning success over and above general cognitive ability (Schmidt and Hunter, 1998). A second personality trait associated with learning attainment is openness to experience. This broad notion includes a preference for complex thinking, new ideas, artistic developments, abstract concepts, and so on. Its focus on new ideas also suggests that a high-scoring person has a stronger motivation for learning. It is thus not surprising that this aspect of personality significantly predicts training performance (Barrick and Mount, 1991).

Other studies of individual characteristics have examined differences in the use of learning strategies. Those have been defined as 'overt and covert information-processing activities used by learners at the time of encoding to facilitate the acquisition, storage, and subsequent retrieval of information to be learned' (Kardash and Amlund, 1991, p. 119). Measurement is usually through self-completion questionnaires, in which indi-

viduals report how much they used each strategy in a previous learning activity.

Principal learning strategies may be viewed as cognitive, behavioural or self-regulatory activities (Warr and Allan, 1998). Among cognitive strategies are rehearsal (repeating to oneself the material to be learned) and elaboration (examining implications and connections between material). Behavioural learning strategies include trying things out in practice and seeking help from other people. Self-regulation may be in terms of emotion control (procedures to ward off anxiety) or motivation control (procedures to maintain motivation and attention despite limited interest in the task).

There is evidence from research in schools and colleges that students reporting greater use of specific strategies tend to learn more than others (Warr and Allan, 1998). Findings about occupational learning are less consistent, possibly because of wider differences between learning tasks in employment settings. For example, cognitive elaboration is sometimes associated with better learning (Warr and Bunce, 1995) but not always (Warr, Allan and Birdi, 1999). However, learning through practical application has been found generally helpful in occupational training.

An important question about learning strategies concerns their overlap with other concepts. For example, it may be that individuals who report greater use of certain strategies are also more motivated to learn. Observed associations between strategies and learning performance could in that case reflect differences in motivation. In other cases, learners may seek help from other people (a behavioural strategy) because they are particularly anxious about the difficulty facing them; in this case, learning anxiety might have more effect on learning outcomes than does the strategy (Warr and Downing, 2000). The place of learning strategies among the other concepts examined in this section is not yet clear.

What about age differences in learning? Kubeck, Delp, Haslett and McDaniel (1996) examined previous research into training, deriving the overall conclusion that older individuals, relative to younger ones, showed less mastery (in post-tests) of training material and took longer to complete the training. The average correlation between employees' training attainment and age was found to be -0.21; for time to complete training, the correlation was 0.40.

In general, older people are less likely to achieve equivalent learning outcomes in a given period of time. It follows that, if maximum training

time is restricted to that appropriate for younger ones, learning will on average be poorer at older ages. This can occur even in relatively young samples, if training time is short and the task is difficult. For example, age and post-test knowledge score were correlated −0.27 in a study of two-day intensive training for vehicle technicians, despite the fact that their average age was only thirty-one years (Warr *et al.*, 1999). In other cases, for example in open learning where individuals can adjust the time allocated to different elements, age may not be linked to poorer outcomes but older learners may report greater learning difficulty, having to adapt to a perceived greater workload by investing greater effort (Warr and Bunce, 1995; Warr, 2001).

That compensatory activity by older learners reminds us that the several factors outlined here should be viewed in combination rather than singly. For example, learning motivation and cognitive ability have a joint influence in any situation (e.g., high motivation can outweigh low ability), and their impact can also depend on the nature of the learning task (for example, its degree of structure).

Finally in this consideration of individual factors related to learning success it is important to include relevant previous knowledge. People who are more knowledgeable at the outset are likely to perform better on post-training tests. For example, the correlation between pre-test and post-test scores was 0.22 across nine months of training in Warr and Downing's (2000) study.

It is thus desirable in studies of learning to control for prior scores. However, that is rarely done. Most investigations record only post-test scores, although those may reflect previous knowledge as well as learning during the programme. It is nevertheless preferable to measure changes in knowledge from beginning to end of a learning episode (sometimes termed 'learning gain'), rather than merely attainment at the end (Warr *et al.*, 1999).

The Transfer of Learning

It is clear from everyday experience that material learned in one setting is not always applied in others. For instance, employees attending a course in a company training centre may make little use of the course content when back at work. Ford, Quiñones, Sego and Sorra (1992) found that

employees performed only half of trained tasks in the subsequent four months. Training transfer has two components: the retention of the learned material over time, and its generalization to new settings. In reviewing the factors affecting transfer, both those aspects need to be examined.

As indicated above, the principal determinant of retention is the degree of consolidation achieved in initial learning or through subsequent remedial activities; continued learning protects against forgetting. As well as merely the quantity of learning, greater cognitive elaboration also aids recall. Elaboration is a matter of reviewing personal meanings, implications, associations and so on, and memory for material is usually improved by its elaborate processing (Anderson, 1995). In addition, since items held in memory store can interfere with each other, retention is likely to be better if elements do not conflict with others (for instance, in linking one component with a range of inconsistent others).

The second aspect of transfer, generalizing to other settings, has been shown to be associated with five kinds of variable: appropriateness of the training content, opportunities available for use of the learned material, organizational support for its application, an employee's commitment to the organization, and his or her level of confidence.

The appropriateness of training content is partly a question of the similarity of elements between the training and application situations; greater overlap will naturally assist transfer. (In studies of training in simulators, for example by airline pilots, this overlap is referred to as the 'fidelity' of a simulation.) Instruction in general principles which might be applied across situations (rather than merely in training) is also helpful. Transfer of training is thus more likely for content that is relevant to a job and has emphasized general themes and their applicability in varied settings.

Second, does an employee have opportunities to apply what he or she has learned? Application opportunities derive in part from the similarity in content between training and job (above), but such similarity does not itself guarantee transfer of learning. If work pressure is continuous, an employee may have no opportunity to try out and develop new behaviour. In addition, task-allocation decisions taken by a supervisor are important. For example, Ford *et al.* (1992) found that employees who were perceived by a supervisor to be more competent and likeable were more often asked to undertake tasks which provided a greater breadth of experience and were more complex.

Another influence on transfer is general organizational support. When supervisors and colleagues encourage and reward the application of taught material (providing a positive 'transfer climate'), motivation to transfer is greater and training is more likely to yield positive outcomes in the work setting (Tracey, Tannenbaum and Kavanagh, 1995; Colquitt *et al.*, 2000).

A fourth factor associated with transfer of learning is an individual's commitment to his or her organization. Transfer has been shown to be greater for employees reporting stronger attachment to their organization (Colquitt *et al.*, 2000). Another relevant individual feature is a person's confidence, reflected in assertiveness in seeking out opportunities and undertaking new behaviours. This characteristic combines with other factors to affect the extent to which training is applied. For example, Ford *et al.* (1992) found that employees previously describing themselves as confident in performing the trained tasks were more likely to report later having had opportunities actually to perform them. In the study by Warr *et al.* (1999), trainees' learning confidence not only predicted later transfer but did this in combination with organizational support; both learning confidence and a positive transfer climate contributed to the extent of later changes.

THE EVALUATION OF TRAINING

An important aspect of training is the provision of feedback. This is needed by trainers as well as trainees. In order to improve their effectiveness, trainers have to obtain feedback about their performance. How can the quality of training be measured?

A first issue is that of perspective. From whose standpoint is effectiveness to be determined: an individual, his or her employer, or society more widely? In seeking learning outcomes such as increased income or employability, the goals of an employee are likely to be primary, but from an organization's perspective training initiatives are intended to improve productivity, profitability, flexibility and so on. Training evaluation is typically undertaken from an employer's rather than employees' viewpoint.

Two primary goals of training evaluation are to 'prove' or to 'improve'

a training programme. In the first case, the aim is to learn about the value of the programme: has it been worthwhile? That can be of major importance to an organization seeking to spend wisely its limited resources or to a training department that needs to justify its funding. However, it is not easy to define unambiguously the worth of a training programme (see below), and in many settings the principal goal of evaluation is different: to improve presentations of a repeated pro-gramme. Material obtained after one application of the course is fed back to improve the next application (or a continuation of the first one), and information is gathered then to improve the following one.

The two forms of evaluation are conventionally termed 'summative' and 'formative'. Summative evaluation involves observation without any intervention (since it is the programme that is being evaluated, not the programme plus the intervention), but formative evaluation uses the information gathered to modify current and later activities. Thus summ-ative evaluation gathers information to appraise a programme, whereas formative evaluation is more concerned with revision and improvement. Studies of training evaluation in many organizations start with a summ-ative goal, but often become formative as improvements are suggested by early findings. (Given that the information gathered can improve current training, it seems sensible to use it; but that frustrates the original summ-ative objective.)

Levels of Evaluation

Two frameworks for training evaluation will be reviewed here. The first was proposed by Kirkpatrick in the 1950s (e.g., Kirkpatrick, 1959), and identifies four principal 'levels' for examination. These are referred to as reaction, learning, behaviour and results.

Reaction
The easiest form of evaluation is through measurement of participants' subsequent opinions. Kirkpatrick advocated the assessment of how well trainees like a programme, describing this response as similar to an index of customer satisfaction.

Reactions can be measured through rating scales completed after a particular training session or after the course as a whole. That procedure is widespread in organizations (including universities), but the data are

rarely analyzed in depth. Although the focus is primarily on participants' feelings ('I found this programme to be enjoyable' is a typical item), reactions of this kind are known to be uncorrelated with learning or behaviour (Alliger, Tannenbaum, Bennett, Traver and Shotland, 1997). Thus, although enjoyment ratings may be of interest within organizations, they provide no indication of a programme's value in terms of likely changes in a work setting. Furthermore, these reactions reflect in part characteristics of a trainee rather than merely the nature of the training. Warr *et al.* (1999) measured participants' training motivation before a course and their reactions after it, finding a significant positive correlation: trainees who entered the course feeling positive about it gave more positive reactions afterwards.

Different reactions (other than enjoyment) may better predict learning or behaviour. For example, Warr and Bunce (1995) studied three aspects that were found to be factorially distinct: enjoyment of the training, its perceived job usefulness and its perceived difficulty. The review by Alliger *et al.* (1997) indicated that perceived usefulness was more likely than the reaction of enjoyment to predict behavioural outcomes. Judgements of usefulness concern both training content and the demands of the work-place, and this dual perspective may enhance their predictive value. The reaction of perceived difficulty has rarely been measured, but it can be associated with lower learning attainment (Warr *et al.*, 1999).

Learning
The second level of evaluation in Kirkpatrick's framework concerns the knowledge, skills, expertise, attitudes, etc. acquired as a result of training. This learning may be measured by tests administered immediately after training, but is preferably indexed as a gain score from prior levels (see earlier).

Behaviour
At the third evaluation level, measures are taken of criterion behaviours in a job (those identified as the targets of training). Criteria may sometimes be objective indicators (sales, time taken, errors, and so on), but such summary objective information is not available for most jobs. Instead, measures of job behaviour are usually obtained through ratings made by a supervisor or colleagues. In order to record progress attributable to training, change scores from before to afterwards are preferable, rather than ratings of subsequent work behaviour alone.

Results

Finally, Kirkpatrick argues for evaluation in terms of changes at the level of a group or organization. For example, has the training brought about improvements in the performance of a work-team (rather than only in individuals' training-related behaviour, identified as level three) or in company profitability, market share, customer loyalty, and so on?

Any changes observed at this fourth level may arise from a combination of factors, and it is unlikely that a particular training programme can be identified as their single cause. Level-four evaluation is thus difficult in logical as well as practical terms, and it is attempted only infrequently. Similar problems occur in respect of level-three evaluation (job behaviour), since transfer of training is in part determined by features unconnected with that training (see above). Very few organizations attempt level-three evaluation in terms of job behaviour (asking instead about reactions or learning), although changes in job settings are essential if training is to be successful.

How closely are indicators intercorrelated between levels two, three and four? (Level one has been considered above.) For example, does learning at the end of a course predict later job behaviour? The review by Alliger et al. (1997) found only non-significant associations of that kind, presumably because transfer depends also on the favourability of a job setting and the characteristics of an employee (see earlier).

This general independence between evaluation scores at different levels presents practical difficulties. Different outcomes are likely at each level, and correlations between levels are likely to be non-significant. (However, reactions in terms of perceived usefulness and difficulty, rather than enjoyment, are more likely to be predictive; see above.) In this circumstance, on which set of data should evaluation decisions be based: reactions, learning or behaviour? Coupled with the general difficulty of placing a value on specific findings (how high a mean score at each of those levels is needed to conclude that the course has been successful?) and the high cost and complexity of administration, this inconsistency between levels can lead many organizations to bypass evaluation or to rely simply on a level-one questionnaire.

A second evaluation framework builds on Kirkpatrick's thinking, but examines some features not present in his account. Originally developed by Warr, Bird and Rackham (1970), this framework has been expanded

with the abbreviation 'CIROOOP'. Those initials refer to context, input, reactions, three levels of outcomes, and process, as follows.

Context evaluation examines what action is desirable in a current setting. In the particular context in question, what is needed to advance toward strategic goals for the organization and behavioural goals for the employees? Performance must be examined relative to those two kinds of goals (broad targets for the organization as well as specific outcomes for trainees), recognizing that future requirements often need investigation as well as those that are more immediate. Procedures can involve observation, work samples, interviews, questionnaires, group discussions or examination of company records. Context evaluation recognizes that in some settings the analysis may not point towards training; instead, goals might be better attained by modifying working procedures or selecting new staff.

Context evaluation thus asks: is there a *training* problem? Organizations often commence training without adequate confirmation that training is the best solution. In cases when training is in fact inappropriate, evaluation levels one or two in the Kirkpatrick framework are irrelevant; reactions and immediate learning are of no concern if the activity was misplaced.

Input evaluation: assuming that some training is desirable, it is important to check that the best learning procedure has been selected. Many organizations continue with previous modes of delivery (for example, conventional lectures), rather than review all possible types of input. The objective of input evaluation is to ascertain and examine all possible options and to assess their likely benefits and costs.

Reaction evaluation: is level one in Kirkpatrick's framework (above).

Outcome evaluation: 'OOO' in the 'CIROOOP' abbreviation refers to immediate outcomes, intermediate outcomes and longer-term outcomes. Those are levels two, three and four in Kirkpatrick's framework.

Process evaluation: it is important to examine aspects of the training process that are not included in other enquiries. For example, how suitable were the training rooms and facilities, how did trainee–trainer relationships develop, how effective was the sequencing of material, the provision of feedback, the availability of time, and so on? These process features are assessed through observation, interviews or questionnaires, perhaps from trainers as well as trainees.

The CIROOOP framework can be viewed from the perspective of

'systems approaches' to training. Those specify and operationalize the components of an overall 'system', such as 'define objectives', 'develop criterion measures' and 'design training materials'. Systems approaches usually include 'evaluate the training' as one of the components. However, treating evaluation merely as a single part of the system is inappropriate. Instead, evaluation should be viewed as a superordinate or over-arching process. We need to evaluate the whole system, not merely the single component of instruction alone. The CIROOOP approach seeks to recognize this fact by assessing a wider range of system components than does the Kirkpatrick framework.

It is clear that comprehensive evaluation is time-consuming, difficult and expensive. Many organizations lack skills and resources for statistical analyses of quantitative material, and it is often felt that trainers' limited time should instead be applied to instructional work. Furthermore, evaluation results can be ambiguous. For example, there may be differences between levels (such that reactions to a course are favourable but no change in job behaviour occurs, for instance). An *overall* conclusion (combining all the different information) can be difficult. Full-scale evaluation of training programmes is thus rarely undertaken.

Given these problems, what form of training evaluation should be encouraged? An essential minimum should focus on reaction evaluation, personal action plans and context evaluation. First, the study of reactions should be expanded to examine opinions about specific features of the training that might be modified in future. For instance, measures should cover perceived usefulness and difficulty, instead of merely enjoyment; views about the instructors, practice time, facilities and so on should be obtained; and trainees should be asked about possible obstacles to application of the training content.

Second, this focus on job behaviour should be linked to the creation of personal action plans, drawn up by each trainee and subsequently reviewed with his or her supervisor. It is helpful if trainers can be included in that process, for instance by creating 'transfer partnerships' between trainees, supervisors and trainers. A major problem preventing effective transfer of learning is that no one is explicitly responsible for that process; it falls between trainers and supervisors. Joint examination of the barriers to transfer is likely to modify the work-place (making the climate more supportive of transfer) as well as the content of training provisions (making training more applicable) (Broad and Newstrom, 1992), and such

an examination serves as a valuable component of formative evaluation.

A third minimum form of evaluation examines the context. Much training is at least partly irrelevant to trainees' needs. A greater emphasis is now needed on whether any training at all is needed. Better context evaluation could considerably reduce wasted expense as well as improving transfer from what is provided, because that training would by definition be more relevant to job needs.

LEARNING AND ORGANIZATIONS

This chapter has emphasized that employees' participation in learning and their application of that learning depend greatly on characteristics of an employing organization. Two additional strands of research have explicitly focused on organizational features.

The Learning Organization

First are studies giving rise to the argument that managers should turn their company into a 'learning organization' (Burgoyne, Pedler and Boydell, 1994; Marquardt, 1996). This term has been defined in many ways, but the general prescription is that more employees should learn about more issues. Recommendations are thus made to increase participation in learning, the effectiveness of learning procedures and the transfer of learning; themes are similar to those addressed above. Associated terms are a 'continuous learning culture' and a 'positive learning climate'.

A positive learning climate has characteristics of the following kind: a persistent emphasis on the acquisition of new skills and knowledge, the provision of many different kinds of learning opportunities, support and encouragement from bosses and colleagues, an openness to change, regular reviews of learning processes and their possible improvement, an acceptance of mistakes during learning and early application, and a continuous concern to identify individuals' learning needs and to meet those in an effective manner (e.g., Tracey et al., 1995). In practice, short-term work pressures, coupled with some staff absenteeism (which makes it difficult to free employees for training) can prevent those developments.

There is no doubt that a positive learning climate can only be sustained with strong encouragement from senior members of management.

Organizational Learning

A second line of thinking is based on the need to encourage learning in groups and larger organizations as well as merely by individuals. Studies have examined the characteristics of organizational learning, seeking to differentiate those from individual processes. It seems clear that the acquisition of knowledge, skills and attitudes by individual members of staff is central to learning at the organizational level, but that supra-individual features are also present.

To say that an organization (rather than a person) has learned is to indicate that the changes are to some degree independent of individual members of that organization; even if the current staff were replaced, the knowledge would remain. That can be achieved by a process of institutionalization, whereby new material becomes spread across the organization. In part, this may be through formal records and policy documents, but more often the change is in norms, rules, procedures, strategies, technologies and collective frames of reference applied widely in the organization (Huysman, 2000). For example, the development of shared mental models in teams is illustrated in Chapter 13.

Organizational learning thus involves the distribution and storage of knowledge as well as its acquisition. There has to be some sharing of new learning between members of an organization. In part, this may be through meetings or project groups, but one difficulty is that the outcomes of learning cannot always be expressed to oneself, let alone to other people. Another form of sharing is through application, ensuring that new ideas are spread by practical activities. The future research agenda in the area of this chapter thus extends to the management of knowledge across an organization, as well as covering individual-level themes of the kind reviewed above.

SUMMARY

The outcomes from learning include changed knowledge, skills, attitudes, employability and self-perceptions. Several training methods have been shown to be effective in terms of their immediate outcomes and later retention of material. Retention itself depends on the degree of initial learning and the interdependence between elements learned.

Processes of learning are influenced by environmental and individual features. For instance, support from supervisors (an environmental feature) promotes both participation and effective learning. In evaluating training it is important to examine all components of the process (including the identification of training needs) rather than merely reactions or immediate learning. However, comprehensive evaluation is difficult in practice.

FURTHER READING

Many issues in this chapter are examined in *Improving Training Effectiveness in Work Organizations* (Ford, Kozlowski, Kraiger, Salas and Teachout, 1997). Other general texts are by Anderson (1995) (reviewing laboratory research and theoretical approaches to learning), Buckley and Caple (2000) (setting practical issues in a research context) and Goldstein and Ford (2002) (emphasizing the assessment of training needs). Approaches to the evaluation of learning activities are discussed by Patrick (1992), Kraiger *et al.* (1993) and Bramley (1996). Skills-related aspects of the British labour market are included in the website of the Department for Education and Skills (*www.dfee.gov.uk/datasphere*).

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