

From learning to performing

The challenge of any kind of training and development activity is twofold, to ensure that the participants actually learn (ideally what the programme was designed to enable them to learn) and, having learnt something, apply it back in the workplace. It is this latter challenge - learning transfer - which this paper is all about.

Learning for transfer

(Learning) transfer is not as easy to attain as we would hope and ... transfer does not occur in many cases where we might readily expect it. ...broadly defined (learning transfer) involves prior learning affecting new learning or performance¹

Put more simply, learning transfer is using something learnt in one context and using it in another; for example, having learnt to drive a car, someone can usually manage to drive a large van. When we talk about learning transfer in the context of education and training, we tend to be talking about how well something that is learnt in a formal learning environment (on a course, for example) can be used when back in the workplace.

In the context of vocational and professional education and training, therefore, learning transfer is generally thought of as being about application. However, this would be too limiting a view, as the ability to apply what has been learnt elsewhere is challenging, certainly, but equally important is the ability to then apply it in a different context from that for which the training prepared the learner. For example, learning interview skills in preparation for selection interviewing requires learning transfer to occur, but subsequently using those same interview skills for a disciplinary interview is also learning transfer.

This latter idea is closely allied to the idea of the reflective learner; for example, Kolb and Fry's² model of *experiential learning* (from concrete experience, through observation and reflection, to the formation of abstract concepts and their testing in new situations) suggests a process by which something that is learnt in one context can be transferred, through reflection, to others. It also links to Argyris and Schön's ideas about *single and double loop learning*, and of *theory-in-use* and *espoused theory*³.

- * Single loop learning takes context as a given; double loop learning questions that context. Consequently, learners who engage in double loop learning are more likely to be able to transfer learning to different contexts.
- * People will often explain their behaviour by reference to a set of principles or standard practices (*espoused theory*) but, Argyris argues, their behaviour is more likely to be guided by a set of tacit structures or mental maps, firmly internalised but unrecognised, which he calls *theory in use*. Reflection which only sees the espoused theory will fail to appreciate what is really driving behaviour, making transfer to a different context far less likely.

So, when we talk about learning transfer and, most importantly, about designing learning programmes to enable transfer, we need to be aware of both the immediate transfer into the workplace and the more distant transfer to other contexts, and the cognitive processes that will enable this to happen.

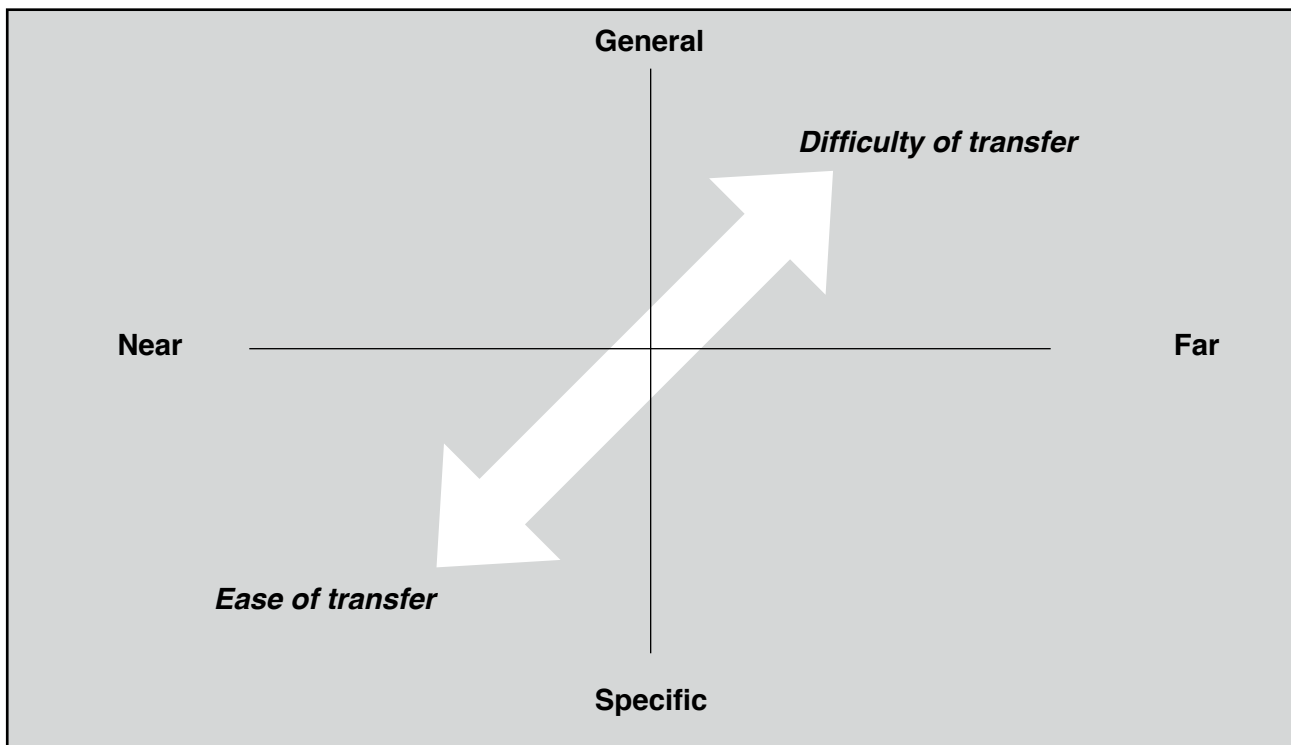
¹ Anne McKeough, Judy Lupart & Anthony Marini (eds.) *Teaching for transfer: Fostering generalisation in learning* Lawrence Erlbaum Assocs, Hove: 1995

² David Kolb and Roger Fry *Toward an applied theory of experiential learning* in Cary Cooper (ed.) *Theories of Group Process* London, John Wiley: 1975

³ Chris Argyris and Donald Schön *Theory in Practice. Increasing professional effectiveness* San Francisco, Jossey-Bass: 1974

Distance and generality in learning transfer

The two dimensions of transfer, distance and generality, are important in understanding learning transfer. *Distance* refers to the similarity between tasks in the learning context and in the transfer context; *generality* to the breadth or range of tasks and/or contexts in which learning may be applied. A task that can be learnt in a close simulation of the actual workplace, or which can be taught as real in the workplace, has little distance to travel in being transferred (*near transfer*). By contrast, the harder it is to simulate reality or to learn in the workplace, the greater the distance to travel (*far transfer*). Equally, where the learning is to be applied to a very *specific* context, transfer is relatively easy; but when there is a high degree of *generality* (variability in the task or the contexts in which it is likely to be performed), transfer becomes that much more difficult.



There is general agreement amongst those who have studied learning transfer that near, specific transfer is possible; there is less agreement over the scope of far, cross-task and cross-context (general) transfer.

A similar way of thinking about distance and generality was developed by Perkins and Salomen. They argued that 'transfer goes beyond ordinary learning, in that the skill or knowledge in question has to travel to a new context⁴'. They put forward the concept of *low road* and *high road* transfer; low road transfer occurs when there is 'considerable perceptual similarity to the original learning context' causing the 'automatic triggering of well-practiced routines'. Thus, the closer the new context is to the context in which knowledge and skills are developed, the more likely they are to be transferred⁵. This corresponds to the lower left quadrant in the diagram above, whereas high road transfer, where the context is perceptually significantly different from the initial learning context, corresponds to the upper right quadrant. Perkins and Salomen's analysis was written long before current insights into cognition resulting from the use of brain imaging had started to

⁴ Perkins, DN and G Salomon (1988) *Teaching for Transfer in Educational Leadership* September 1988

⁵ Salomon, G., & D. N. Perkins (1984) *Transfer of Cognitive Skills from Programming: When and How?* Journal of Educational Computing Research No. 3, pp149-169.

transform our understanding of learning, but aligns well with what we now know about the processes that occur in the brain when we acquire new knowledge.

The most common form of low road transfer is reading. This is a skill that is learnt in one context (eg by using graded books designed to develop reading ability – such as the Janet and John series familiar to older readers, or Ant and Bee to younger ones) so that it can be used in reading other books, and printed and electronic media. It is notable that books designed to develop reading ability are not themselves written to be read for any other purpose; they are intended deliberately to develop a transferable skill.

However, many adults with poor literacy levels struggle to transfer their skill beyond media similar to those with which they are familiar from their initial learning, such as tabloid newspapers or simple documents. They have serious problems reading complex forms or train timetables because the context is too different, requiring Perkins' and Salomon's high road transfer. High road transfer, they argue, depends on 'deliberate mindful abstraction of skill or knowledge from one context for application in another' (*op cit*), either by identifying how:

- the new knowledge or skills could be applied to situations that the learner is familiar with; or
- existing knowledge and skill could be applied to new situations.

This former, reflecting on how what has just been learnt can be used in a variety of contexts, is what Perkins and Salomon describe as *forward-reaching high road transfer* – the change in context makes it high road (or *far*) and, by considering all possible future contexts (making it *generalisable*), it is forward-reaching. The latter, seeking existing learning to use in a new context, they call *backward-reaching high road transfer*, for obvious reasons.

In either case, the learner is obliged to engage in a form of *meta-cognition* (ie thinking about what they know, or thinking about thinking) that involves considering the characteristics of both the situation and the knowledge and skill, and from this abstraction, determine the best fit. Forward reaching transfer requires that the characteristics of the new learning are assessed for potential applications to different contexts from those in which it has been learnt. With backward-reaching transfer, a situation is assessed for its key characteristics, then these are compared to various sets of characteristics to determine the best match, and the existing learning appropriate to that situation is applied.

The level of reflection required for high road transfer obviously varies with the degree of complexity of the situations and or knowledge and skill being required. By comparison, low road transfer is essentially automatic, just as an experienced driver can drive more or less any vehicle with the same basic characteristics as those previously driven (eg automatic transmission, right-hand drive). More significantly, the learner needs to be able to recognise which form of transfer is required; for example, recognising that moving to a left-hand drive car requires a degree of high road transfer. Thus learners need to be alert to the cues which tell them that high road transfer is either possible (that learning is transferable or that the situation can use transferred learning) or necessary (that low road transfer is not appropriate).

The challenge to designers of learning is to enable the recognition of both future contexts to which learning can be transferred (something that can be included in the learning design) and also to develop the ability to recognise opportunities for backward-reaching high road transfer, something that occurs not just outside the formal learning environment but at some distance in time as well.

The conditions for effective performance improvement

High road (or *far*, generalisable) transfer is concerned with the further learning that takes place after the initial, formal learning has occurred. It implies individuals have the ability to learn through their own volition and to do so by building on what they already know and can do. Whilst most leaders and managers will claim to be committed to continuous professional development (CPD), many will conceive of this as being relatively formalised learning. In fact, most professional bodies that require CPD tend to encourage this viewpoint. What the literature about learning transfer shows, however, is that when presented with a new context, those who are able to reach back to

former learning and apply it in the new context are engaging in a learning activity, acquiring new knowledge.

It is commonplace to talk about learning as developing both knowledge and skills, as if the latter is somehow different from the former. A more realistic distinction is between *declarative* and *procedural* knowledge.

- * Declarative knowledge (or *knowing that*⁶) is knowledge about facts and theories, principles, procedures and practices. Any body of knowledge that can be systematically acquired, no matter how simple or complex, large or small (eg the many theories about leadership), can be declarative knowledge. Knowing how a leader can motivate team members is declarative knowledge.
- * Procedural knowledge (or *knowing how*) is the ability to behave in particular ways. Any set of skills or behaviours, no matter how simple or complex, important or unimportant, is procedural knowledge. Leaders who are very good at motivating team members possess procedural knowledge, without necessarily knowing what it is that they do (declarative knowledge) that makes them good at it.

This last point is important; *knowing that* doesn't imply *knowing how*, or *vice versa*. However, for a leader to be able to transfer learning, especially far or high road transfer, it is likely that both the procedural knowledge and the underpinning declarative knowledge are required.

In order to understand what those who design learning can do to enable continuing learning to occur, it is useful to consider what makes for effective performance improvement. Ericsson, Krampe and Tesch-Romer identified⁷ four essential conditions for optimal learning and improvement of performance:

1. The subjects' *motivation* to attend to the task and exert effort to improve their performance
2. The design of the task should take into account the *pre-existing knowledge* of the learners so that the task can be correctly understood after a brief period of instruction
3. The subjects should receive immediate informative *feedback* and knowledge of results of their performance
4. The subjects should *repeatedly* perform the same or similar tasks.

These four conditions have emerged consistently from studies over the last century or so, and should be seen as essential design characteristics of any development programme, not just in leadership and management but in any domain. Ericsson, Krampe, and Tesch-Romer have also shown that the most significant factor shaping high performance is not innate ability (although some physical or cognitive abilities such as height in basketball or perfect pitch in music can be important) but the combination of evidence of early ability (initial interest and motivation, and the creation of the basic knowledge) coupled with an average of ten years' sustained practice (comprising regular feedback and repetitive performance) that makes some people stand out from the crowd.

Motivation, as a necessary pre-condition for learning, is so obvious that it hardly seems worth considering in great detail, yet many trainers working with groups who have been 'sent' on a course by their employers will know that motivation cannot be assumed. Motivation is primarily an internal condition, deriving from the individual, but learning design can help to create and

⁶ Although *declarative knowledge* and *knowing that* (as are *procedural knowledge* and *knowing how*) are broadly similar, the concepts of 'knowing that' and 'knowing how' were developed by philosophers exploring the concept of knowledge (*epistemology* - see Gilbert Ryle (1971) *Knowing How and Knowing That* in *Collected Papers* (Vol 2), New York: Barnes and Noble). Declarative and procedural knowledge are concepts developed by cognitive psychologists exploring learning and memory. The discussion here is concerned with this latter set of concepts.

⁷ K. Anders Ericsson, Ralf Th. Krampe, and Clemens Tesch-Romer *The Role of Deliberate Practice in the Acquisition of Expert Performance* *Psychological Review* 1993, Vol. 100. No. 3, 363-406

encourage motivation. Equally, the conditions of the learning environment can act to demotivate learners, including physical and affective distractions (such as a cold room or a poor relationship between the trainer and a learner), and it is also possible that a particularly high quality learning environment may have some positive motivational effect.

The design of learning activities so that they build on pre-existing knowledge and skills implies that there is a reasonable degree of testing or similar diagnostic activity, and that this is used to shape the programme design and delivery, at the individual level. The importance of individualisation of learning cannot be over-stated – everyone is different, and there is no point identifying these individual differences and then ignoring them.

The significance of pre-existing learning becomes clearer when one looks at the physical processes in the brain that enable learning to occur. The brain consists of many millions of neurons, each of which is capable of joining up to other neurons (*synaptic links*), which are believed to be organised in functional networks located in specific parts of the brain. As a result of an electrical signal, the neuron releases a chemical signal (*neurotransmitter*) that is sent to other neurons (through something called the *synaptic link*); the strength of the signal is determined by the type and amount of neurotransmitters, and the number of receptors (other neurons). The creation and development of these links is a physical process that can now be seen by use of fMRI and similar tools – the brain has ceased to be the ‘black box’ that has hindered our understanding of the learning process.

The brain continually perceives, processes and integrates information derived from personal experience, and therefore undergoes changes in the physical connections within its networks of neurons. This continual development is the result of the brain’s normal operation and implies a permanent learning capacity. This means that development is a constant and universal feature of cerebral activity and that a human being can learn throughout the lifespan.

Neurobiological studies show that the structuring of our brain mainly occurs in childhood and youth. Nevertheless, structural and functional changes continue into adulthood and throughout the lifespan, although they tend to be less marked than in early life (except in the case of dementing diseases of the elderly). Because of age-related changes in processing efficiency, as one grows older the learning of new material takes longer whilst already existent knowledge is being more and more differentiated and made more precise. The significant roles that attention, motivation and emotion play in the learning success, which brain researchers have pointed out, validate pedagogical findings.

It is generally true that learning is related to the creation of meaning. Learning happens through the interpretation of sensory impressions. The meanings constructed in this way enable the creation of new synaptic links between the neurons of the brain and therefore learning.

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Crudely, repetition of an action in an increasing variety of contexts will create stronger and more diverse synaptic links, constantly reinforcing the existing links and building new ones in a complex network. Edward de Bono has compared this to water running down a hillside, forming little rivulets, then streams, then rivers. The more water that flows, the more diverse the range of rivulets but, ultimately, the deeper and wider the final river. Constant repetition of an experience may make a river deeper, but variations of that experience (like rain falling in different areas, from different directions and at different levels of intensity) are needed to create the complex waterways that are needed to develop the breadth of learning that enables people to respond to a wide range of experiences.

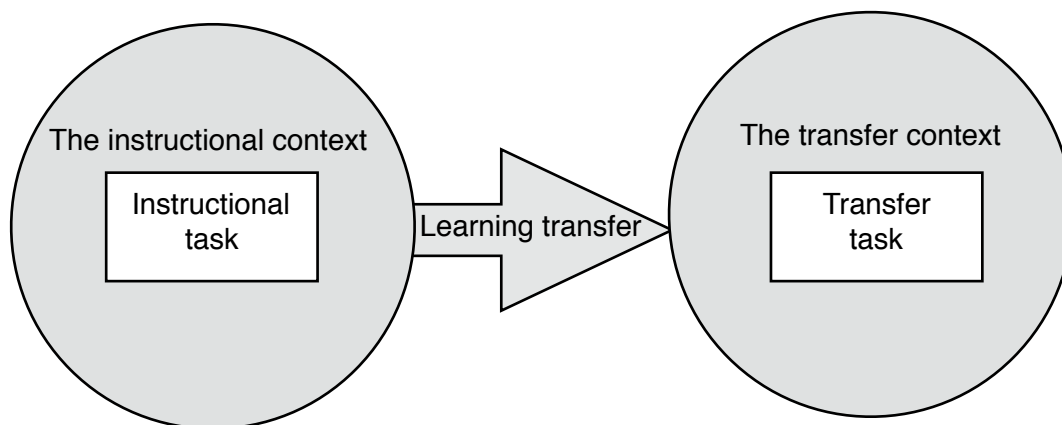
However, if the water falls too far away, it can create a new and unrelated network. This is why the most effective learning starts from whatever the learner already knows. It excites the existing neural pathways and strengthens, widens and deepens them through the accretion of new learning. However, the downside is that existing neural pathways may be so well developed that new learning struggles to get established – a tendency to default to the known rather than adopt to the new.

Strategies for learning transfer

There is no clear agreement amongst researchers about what works best in enabling effective learning transfer. Much of the research has focussed on the transfer of declarative (content) knowledge, largely in an academic, rather than vocational or professional, contexts, but they have tended to disagree on whether depth (detailed knowledge of a limited domain) or breadth (broad conceptual knowledge) is best. Those exploring the transfer of procedural knowledge have looked mainly at using specific transfer strategies, such as problem solving, metacognition (thinking about what one is thinking), etc. A key issue here is the extent to which the transfer is explicit (learners consciously use transfer strategies) or implicit (learners are not aware that they transferring their learning).

The underpinning principle of teaching for transfer is that the learner comes to the learning with set of personal resources (existing declarative & procedural knowledge, dispositions and processing capacity) and to be successful at the transfer of new learning must leave with adequate resources to make the transfer possible. In planning for learning transfer, therefore, the trainer needs to consider four critical variables (independent of the individual learners themselves):

- The instructional task (ie the learning activities)
- The instructional context (includes social setting)
- The transfer task (ie the performance of the task in the workplace)
- The transfer context (the workplace itself)



If the instructional context and the transfer context, and the instructional task and the transfer task are similar, then near/specific (or low road) transfer is likely. The catering student working in a college training restaurant is a good example of this. How well does leading a team to build a raft transfer to leading a team of customer service agents in a call centre (very high road or far transfer)? This is not to say that it can't, but the transfer process is significantly more difficult, and the need for transfer solutions to be built into the development process is far more acute.

In broad terms, one might speak of two techniques for promoting transfer *hugging* and *bridging* (or *scaffolding*). *Hugging* means trying to create the conditions for effective low road transfer (ie making the instructional task and context as close as possible to the transfer task and context). A college's training restaurant is a good example of hugging, but in leadership and management development, there is no easy equivalent of a training restaurant. Instead, the techniques that are available include:

1. *Setting expectations*: Alert learners to occasions where they can apply what they are learning directly, without transformation or adjustment. This means identifying more or less all the range of possible contexts in which the task could be performed and exploring how it would be performed in each. This is what Salomen & Perkins meant by *forward-reaching high road transfer*.
2. *Matching*: In some of the more rule- or process-driven aspects of management (basic costing, perhaps, or statistical analysis of data) it is possible to design instructional tasks that are very similar to the transfer tasks – the context is different but the task is very similar.
3. *Simulation*: Simulations and role playing activities are designed to approximate to the ultimate applications. Both the transfer task and, sometimes, the transfer context are created in the learning environment (for example, a disciplinary or selection interview). Business games are also examples of simulations. However, what is always missing in such exercises is the emotional connection between the learner and the tasks – no simulated disciplinary interview will engender the same raw emotions that make them so challenging for managers; no business game really puts the business at risk.
4. *Modelling*: One of the growth areas in leadership & management development in recent years has been the use of theatre to illustrate situations and alternative behaviours. Coupled with audience interaction, this creates a simulated version of the transfer task in the transfer context, for learners to apply their learning.
5. *Problem-based learning*: Here learners apply their learning to problems, pulling in the content as they need it. They bring the transfer tasks into the instructional context. Leadership and management development has been using a technique for doing this for some 60 years, in the form of action learning. It was developed by Professor Reg Revans and he himself emphasised that it was a very simple idea – that leaders and managers learn best by working together in a group (called an Action Learning Set) to help each other to find solutions to real work problems by discussion. They make progress on their problems (by taking action, hence the name) and then meet again to discuss and review the outcomes of their actions, in an iterative way. This is not intended to be like a committee tackling each problem, but to help each individual to acquire a wider range of skills, understanding and models for action that can then be used and refined when dealing with future problems.

Bridging means teaching so as to meet better the conditions for learning transfer - building bridges (or a scaffold structure) between what is being learnt and its application in the workplace. Rather than expecting learners to achieve transfer spontaneously, the trainer 'mediates' the processes of *abstraction* (identifying the underpinning principles) and *connection* (linking these to a range of possible tasks and contexts) by pointing out explicitly the general principles that lie behind particular skills or knowledge or, better still, encouraging learners to attempt such generalisations themselves

1. *Anticipating applications*: Encouraging learners to predict possible applications remote from the learning context, by brainstorming or similar techniques. This is the use of deductive logic, to predict what will happen as a result of the application of general principles to specific examples.
2. *Generalising concepts*: Encouraging learners to generalise from specific experiences to develop widely applicable principles, rules and ideas. This is the use of inductive logic, whereby generalised principles are derived from specific examples.
3. *Using analogies*: Encouraging learners to find and elaborate an analogy between a topic under study and something rather different from it. The use of critical incidents in warfare, for example, can be used to explore analogous incidents in business.
4. *Parallel problem solving*: Encouraging learners to solve problems with parallel structure in two different areas, to gain an appreciation for the similarities and contrasts. Again, this uses inductive logic to derive generalised principles from specific examples
5. *Meta-cognitive reflection*: Encouraging learners to plan, monitor, and evaluate their own thinking. For example, after describing a specific event, learners are asked "What went well, what was hard, and how would you handle it better next time?" This is best illustrated by the use of coaching in leadership and management development, because the questioning style used by coaches is all about encouraging this kind of reflection.

However, in all these approaches, it is critical (if transfer is to occur) that learners have access to the necessary resources – including active support from others - to transfer the learning (something that junior managers often find problematic), the recognition of a transfer opportunity and the willingness (motivation) to transfer the learning. This is a reminder of what Ericsson, Krampe and Tesch-Romer identified:

1. Motivation (the willingness to seek out and take advantage of the transfer opportunity)
2. The pre-existing knowledge needs to exist, for transfer to occur
3. Feedback comes from the active (rather than passive) support of line managers and others, to help the continuing learning to occur
4. Repetition is only possible if the recognition and support occurs

A well-designed leadership and management programme, whatever the learning methodologies employed (classroom-based, activity-based, e-learning, etc) should put strategies for learning transfer at its very heart. The better the strategies for transfer, the more valuable the learning, and the balance of investment in development should take note of this. If the majority goes into designing a delivery programme that fails to incorporate effective transfer strategies, then the probability is that most of the investment will be wasted. For programme designers, commissioners and participants alike, the primary question should be 'How will learners be helped to put what they have learnt into practice?'