

Deductive approach

This is a teacher-led approach that starts by presenting learners with theories and definitions, perhaps illustrating them with examples. Learners are then asked to apply the theory in a practical situation, thus moving from theory to practice. This approach is useful in situations where learners are likely to fail or harm themselves if they do not understand the theory before applying it.

Inductive approach

Active, learner-led approaches allow learners to use inductive reasoning. Learners start with concrete findings or practical examples and try to make sense of them, constructing theories about them and testing them out. These high-level cognitive tasks lead naturally to deep understanding of underpinning concepts.

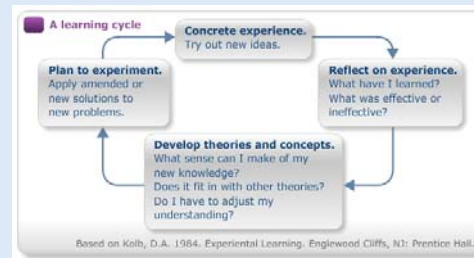
Problem-based learning

You can present learners with an ‘ill structured’ problem before they receive any instruction. This encourages them to use their inductive thinking skills to grapple with complexity and probe for solutions.

Quick start guide

Relating theory and practice

The learning cycle



You can help learners to plan their work so that they move effectively through the various stages in the learning cycle.

Projects, experiments and simulations

These provide opportunities for learners to construct knowledge through inductive reasoning. This approach is particularly useful for hard-to-teach topics. The learners control the process, constructing and testing their knowledge as they move more deeply into the topic.

Meta-cognition

This involves learners in understanding how learning takes place and how knowledge is constructed. Expert learners can reflect on their own thought processes and work out how to optimise their learning by moving between theory and practice at appropriate points.

Multiple environments

Any stage of the learning cycle can take place in any environment, including at home, in the workplace, on a visit, in the classroom, in cyberspace. For instance, a concrete experience may happen in the workplace, while reflecting and theorising about that experience may happen in the classroom. You can help by planning the learning so that learners can clearly see the links between the learning from different contexts.

Questioning

Your skilled use of questioning helps learners to get the most out of both inductive and deductive approaches. Open, probing questions might include:

- ‘What would happen if ...?’
- ‘What factors would you change ...?’
- ‘Is there a better solution to ...?’

Relating theory and practice

Learners in the lifelong learning sector have enquiring minds and are engaged by active approaches to learning. They often like to work in practical and collaborative ways. Some learners say they find theory sessions uninteresting and teachers* sometimes say that it is difficult to engage learners' attention in traditionally taught classroom sessions. Theories can seem abstract and can be difficult to explain and understand in isolation, and sometimes learners find it difficult to see the relevance of theories to their own experience.

* We use 'teaching and learning' and 'teacher' as generic terms to include:

- teaching, training and learning
- teachers, tutors, trainers, lecturers and instructors in the further education (FE) system.

In a traditional, deductive approach to learning, teachers might define and explain a theory then illustrate it with examples. They might then ask learners to apply the theory in practical situations. This deductive approach moves from abstract knowledge to concrete examples.

In active learning, learners form their concepts through inductive reasoning. Typically, learners might be presented with a real-life problem that leads them into in-depth exploration, experimentation and fact finding. They start with some concrete findings or examples and try to make sense out of them, or put them into order, by looking for similarities and differences. They then test their understanding of the concept, or theory, to check that they are using it correctly and that it still makes sense in new situations. These are high level cognitive tasks that lead to deep understanding of the underpinning concepts. This approach sets learners challenging goals, offers relevant learning tasks inside and outside the classroom, and motivates them to perform well. A successful learning experience also results in emotional and affective change. The two approaches are compared and contrasted below.

Deductive approach	Inductive approach
Directed to the application of knowledge	Directed to the acquisition of knowledge
Principles are given first, applications are deduced: the natural human teaching style	Facts and observations come first, principles are inferred: the natural human learning style
Learners work from the abstract to the concrete	Learners work from the concrete to the abstract
Characterised by project-based learning	Characterised by problem-based learning

In reality, most subjects need to be learned through a blend of both approaches. Many subjects, such as mathematics or engineering, have a hierarchical knowledge structure and require some direct teaching of essential technical skills before real life problems can be tackled and resolved using project based or problem based activities.

Problem based learning, where learners are presented with an 'ill structured' problem before they receive any instruction, encourages learners to grapple with complexity and to probe more deeply for solutions. Skills in metacognition are essential as learners define and manage the learning process. The vital role for the teacher is to check that the activity leads learners to 'construct' the 'right knowledge'.

References

Kolb, D. A. (1984). *Experiential Learning*, Englewood Cliffs, NJ: Prentice Hall.

You will find links that exemplify relating theory and practice in the Teaching and Learning Programme resources.