

Learning theories

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There has been a lot of research into the way people learn and certain theories have been influential on developments in all areas of education, but particularly in adult and higher education. Some of the key theories on learning are described below.

Domains of learning

Bloom's taxonomy (1956) of learning objectives is often used which identifies three **domains**.

- cognitive (knowledge and intellectual skills)
- psychomotor (physical skills)
- affective (feelings and attitudes)

Each of these domains is subdivided to form hierarchies of objectives of increasing complexity. For example the **cognitive domain** has six levels, increasing in complexity:

- knowledge (recognition and recall of information)
- comprehension (understanding or translating information)
- application (uses information in a new context)
- analysis (separates into parts to reveal new relationships)
- synthesis (combines elements to create a new situation)
- evaluation (involves judgement or decision making)

Newble and Cannon (1994) suggest that for practical purposes when developing learning objectives the six domains are 'collapsed' into three general subdivisions:

- recall of information
- understanding
- problem solving

Skills objectives are usually written in terms of competence. The **psychomotor domain** has five levels:

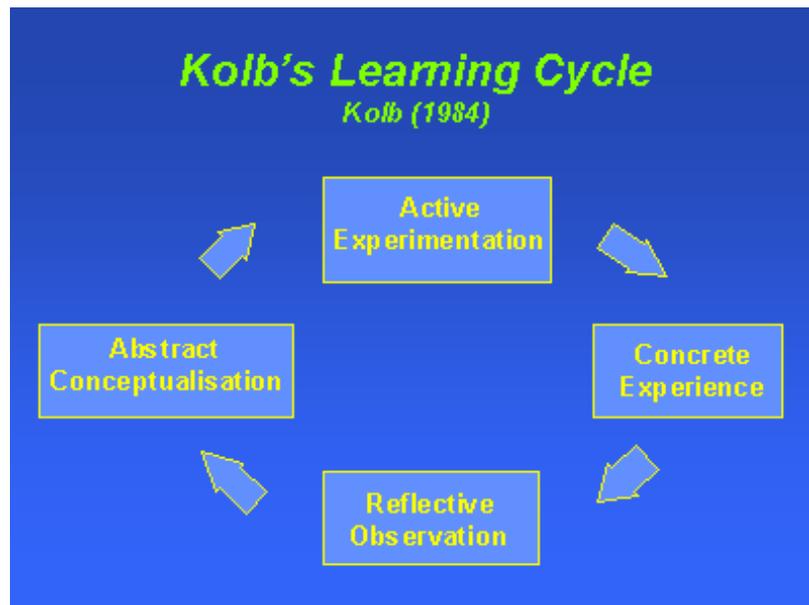
- imitation (observes skill and tries to reproduce it)
- manipulation (performs skill from instruction)
- precision (reproduces skill with accuracy and proportion)
- articulation (combines one or more skills in sequence with harmony and consistency)
- naturalisation (completes skilful tasks competently and automatically)

Attitudinal objectives are the most difficult to write because they really describe observable behaviour. The **affective domain** has five levels:

- receiving (aware of external stimuli eg. listening)
- responding (complies with expectations in response to stimuli)
- valuing (displays behaviour consistent with a single belief without coercion)
- organising (shows commitment to a set of values by behaviour)
- characterising (behaviour consistent with a value system)

Learning cycles and learning styles

Kolb was also influential in describing how learning takes place. His 'learning cycle, see below, approaches the idea of learning as **experiential** (learning by doing). Experiential learning is highly relevant to learning in medicine and healthcare and Kolb suggests that ideas are not fixed, but are formed and modified through the experiences we have and by our past experience. These concepts underpin prevailing ideas in medical and other professional education and training such as the 'reflective practitioner' and the shift from 'novice to expert'.



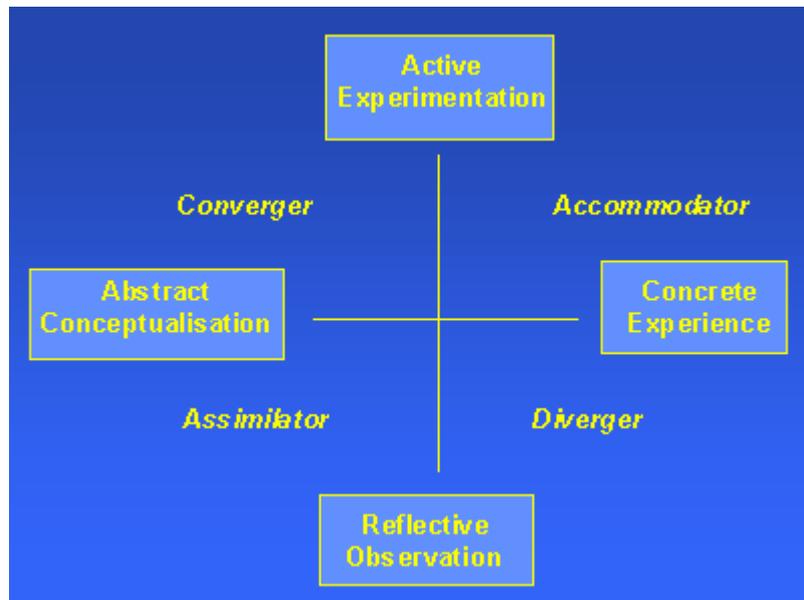
The learning cycle requires four kinds of abilities/learning contexts:

- concrete experience – learners are enabled and encouraged to become involved in new experiences
- reflective observation – time must be available for learners to be able to reflect on their experience from different perspectives, constructive feedback is important here
- abstract conceptualisation – learners must be able to form and process ideas and integrate them into logical theories
- active experimentation – learners need to be able to use theories to solve problems and make decisions and test theories in new situations, this takes learners back to the start of the cycle again.

For effective learning to occur, it is important that those planning the curriculum include opportunities for these learning contexts and abilities to occur.

Wolf and Kolb (1984) suggested that learners develop different learning styles that emphasise preference for some modes of learning over others. The styles are shown in the diagram below, they are placed between the two learning abilities seen to be dominant for that learning style eg. a convergent learning style is seen to have abstract conceptualisation and active experimentation as the dominant learning abilities.

- Converger - applies ideas in a practical way
- Diverger – has good imagination and generates ideas
- Assimilator – creates theoretical models and makes sense of disparate observations
- Accommodator – carries out plans and tasks that involve them in new experiences



Other work which developed the ideas of learning styles and which has been widely used is that of Honey and Mumford (1982). They suggest that there are four types of learner:

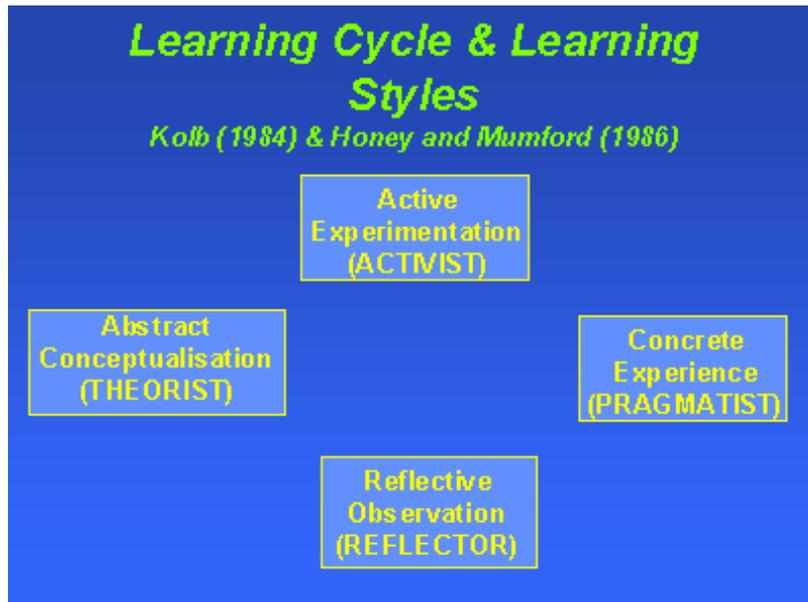
Activist – respond most positively to learning situations that offer challenge and which include new experiences and problems

Reflector – respond most positively to structured learning activities in which time is provided to think, reflect and observe. They like to work in a detailed manner

Theorist - respond most positively to logical, rational structure and clear aims. They need time to explore ideas and opportunity to question and stretch their intellect

Pragmatist - respond most positively to practically-based immediately relevant learning activities which allow them to practice and use theory

The diagram below plots the two theories together. There are a number of questionnaires available (eg. Honey and Mumford, Entwistle and Ramsden) which aim to define learners' preferred learning styles. These are of limited use for teachers, but can help students to identify and think about their preferred learning style and whether they might modify their behaviour.



Approaches to learning and studying

Other research (eg. Biggs, 1987) has categorised different approaches to learning. Biggs' research views learning as having five levels, three which indicate a **surface** approach to learning:

- an increase in knowledge
- memorising
- the acquisition of procedures

and two which indicate a **deep** approach to learning:

- the abstraction of meaning
- understanding reality

Students who adopt a **deep** approach to learning are interested in learning for its own sake, they want to understand ideas for themselves and learn by *transforming*. They tend to:

- relate ideas to previous knowledge and experience
- look for patterns and underlying principles
- be actively involved and interested in course content
- adopt an evidence based approach
- critically examine arguments

Students who adopt a **surface** approach to learning often want merely to get through a course and learn by *reproducing*. They tend to:

- study without reflecting on purpose or strategy
- memorise facts and procedures by rote
- treat the course as unrelated sets of knowledge
- have difficulty in making sense of new ideas and concepts
- feel pressured about the amount of work involved

In addition, a **strategic** approach to learning has been identified (eg. Entwistle, 1998). This describes students who want to achieve high grades

and pass the course, rather than who are interested in the intrinsic value of learning, they learn by *organising*. The strategic approach is categorised by students who:

- put consistent but focussed effort into studying
- seek out the right conditions and materials for learning
- manage time well
- are aware of assessment requirements and direct their learning towards them
- try to work in a way that they perceive teachers want

When we understand better how our students are learning or approaching studying, we can design courses which best meet their needs and which encourage the types of learning appropriate to medicine. If we wish to encourage a deep approach to learning and long term retention of knowledge and skills (which is highly relevant to professionals because it emphasises learning in context and relating earlier experience to current learning) then we can create a learning environment which facilitates this. However, everyone adopts all types of learning at different times and surface and strategic learning are highly appropriate for certain situations.

For example, when students are working with patients in clinical situations, surface learning might be used to retain facts about specific patients (name, family history etc.) so that these can be used when discussing the patient with others. This knowledge will probably not be stored in the long-term memory. However, a deep learning approach pertaining to knowledge relating to the clinical condition of the patient may well be highly appropriate. The student will be reflecting on similar cases, relating this case to earlier reading and other learning about the underpinning science and thinking about the evidence base when considering management options.

Incorporating understanding how learning occurs into curriculum planning

When we understand more about how learning happens, we can design courses and teaching sessions to facilitate different types of learning. Below is a summary of key aspects of the curriculum, of teaching and of assessment which incorporate learning theories.

The curriculum should:

- be linked to organisational goals
- clearly define goals and standards
- clearly relate to teaching methods and assessment
- define essential information
- utilise appropriate learning resources
- control and rationalise student workload
- emphasise vocational relevance
- be designed to encourage reinforcement of learning
- include and reward opportunities for reflection and experiential learning

Teachers should:

- explain the derivation of new terms to avoid memorisation
- emphasise principles and concepts not accumulation of details
- create opportunities for 'good' teaching rather than covering the syllabus
- actively engage students by learning from problem solving

Assessments should:

- provide feedback to enable students to monitor their own progress
- develop assessments and marking strategies which require the demonstration of understanding and application of knowledge to new contexts

Medicine as an academic discipline and as a profession

Becher (1989) describes how medicine and other health professions can be classified along with other academic disciplines using the ideas of Kolb and others as a starting point. However, his work describes medicine along with other 'hard applied' subjects such as science-based professions and engineering rather than with more reflective 'soft' disciplines such as social professions or education. Research like this emphasises that disciplines themselves are subject to change and development and within medical education, there are always competing tensions between the underpinning science and research and clinical practice with its more reflective, softer element. Course developers need to be aware of these tensions and try to accommodate these within their curricula as well as meet the expectations of their learners.

Other aspects of learning apply to the development of 'the professional' and the 'professions'. Schon's (1987) work has been influential in looking at the relationship between professional knowledge and professional competence and the development of the 'reflective practitioner'. We can see that there are many theories about how people learn which can be used in our work as course developers and teachers. In medical education, much of the learning is necessarily experiential, there is a lot of 'learning by doing' as well as 'learning by observation'. Providing opportunities for learners to develop these skills through practice, constructive feedback and facilitated reflection is essential for medical course developers.

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