Learning styles

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This factsheet gives introductory guidance. It:

• considers the different theories and definitions of learning styles
• draws together key research findings
• summarises the most popular models of learning styles.

What are learning styles?

The term ‘learning styles’ has no one definition. It is used loosely and often interchangeably with terms such as ‘thinking styles’, ‘cognitive styles’, ‘learning modalities’ and ‘multiple intelligences’. Learning style theorists draw on the fields of pedagogy, psychology and neuroscience but generally fail to engage fully with any of them. This has led to a confusing array of models and terminology, and a body of research that is characterised by conflicting findings and methodological weaknesses.

Despite the serious concerns which have been raised about learning styles as a concept, the intuitive appeal of finding out how individuals think and learn has created a burgeoning market for models and diagnostic tools. It is therefore important to recognise that many of these models represent not only academic theories but also commercial interests. This is reflected in the nature of the research on learning styles, with many studies commissioned specifically to provide evidence in support of a particular model. Some are more influential than others, but no model of learning styles is universally accepted.

A number of researchers have attempted to break down the concepts and processes which underlie the term ‘learning styles’. At risk of over-simplifying a complex subject, learning styles might be said to consist of three inter-related elements:

• information processing – habitual modes of perceiving, storing and organising information (for example, pictorially or verbally)
• instructional preferences – predispositions towards learning in a certain way (for example, collaboratively or independently) or in a certain setting (for example, time of day, environment)
• learning strategies – adaptive responses to learning specific subject matter in a particular context.

Rather than representing a single concept, ‘learning styles’ is therefore an umbrella term covering a spectrum of modalities, preferences and strategies.

Are learning styles fixed?

One of the key differences between the various theories of learning styles is the extent to which they are thought to be stable, or hard-wired into learners’ brains. Some theorists believe that learning styles are rooted in fixed genetic traits, while others emphasise the influence of experience and context on how students learn.
Although the simplicity of assuming that everyone has a permanent, in-built learning style is appealing, there is little evidence to support this. The lack of longitudinal studies makes it impossible to be certain how stable learning styles are. There is the further problem of the reliability of the tools (often questionnaires) used to test learning styles – even if learning styles are stable, many of the tools cannot be relied upon to give consistent results from one test to the next.

Many learning styles theories seem to be based on concepts from popular psychology which are taken at face value despite the lack of supporting evidence. The belief, for example, that creativity resides in the right hemisphere of the brain and logic in the left is at best an over-simplification of messages coming out of neurobiological research. While many theorists link learning styles with a preference for right- or left-brain processing, there is little empirical evidence for this.

Neither is it clear how fixed the characteristics of an individual’s brain are. Even if there is a neurobiological basis to an individual’s learning style, it may be that the brain’s inherent adaptability will allow that style to change over time.

**Learning modalities**

Among those who regard learning styles as fixed traits, one of the most widely known and used concepts is that of learning modalities. A modality is a combination of perception and memory – in other words, how the mind receives and stores information. Learning modality theorists argue that all learners have a preference for one or more of the sensory modalities: visual, auditory, and kinaesthetic (some theorists also include a tactile modality). Visual learners learn best from pictures or written text, auditory learners prefer the spoken word, and kinaesthetic learners think in terms of actions and bodily movement. While there has been considerable research to support the existence of these modalities, the implications for teaching and learning are far from clear.

It is difficult to say how many learners have a very strong preference for just one modality – and, as with learning style tests in general, there is the issue of the accuracy and reliability of measuring these preferences. So it is perhaps not surprising there is little evidence that matching instruction to an individual’s sensory or perceptual strengths has any effect on achievement. It may be therefore that matching presentation with the nature of the subject matter is both more important and more achievable than matching individual preferences.

**Cognitive styles**

Cognitive styles are similar to modalities in as much as they are thought to be physiologically based and therefore relatively stable. As in the field of learning styles in general, there are many competing and overlapping theories. Although different authors may use different terms to describe them, two of the more widely accepted types of cognitive style are the verbal-imagery dimension and the wholist-analytic dimension.

Verbalisers represent information in the form of words; imagers tend to think pictorially. Imagers therefore learn best from graphic representations of information, while verbalisers learn best through text or the spoken word. For the wholist-analytical dimension, it is the organisation of information that is the key consideration. Wholists take a global, top-down view of information; analytics break information down into its component parts. Wholists therefore tend to prefer a breadth-first structure which gives an overall view of a topic before introducing detail. Analytics prefer a depth-first approach, where each topic is explored fully before moving on to the next one.

There are various tools on the market for diagnosing cognitive styles but again there are issues with their reliability and validity. Like modalities, there is strong evidence for the existence of cognitive styles but what this means for instructional practice is a considerably more difficult question.
Matching and mismatching cognitive styles

The key issue here is that of whether to match instruction to cognitive style. While there is evidence that matching a learner’s cognitive style improves both performance and satisfaction, some authors argue that mismatching materials and learning styles is beneficial as it helps learners develop a more balanced approach. A study of adults taking an item-recall test found that pictorial presentation was beneficial for all the participants – indeed, it was especially so for those with a strong preference for verbal processing.

There is also evidence that the effects of matching/mismatching may be related to ability, with lower-ability students benefiting most from matching, particularly when presenting difficult material. Higher-ability students, on the other hand, benefit from mismatching as it allows them to develop new approaches to learning.

Overall, the effects of matching and mismatching seem to be dependent on context and are certainly far from simple. Outcomes differ according to the subject matter and intended learning outcomes – for example, whether the aim is to gain conceptual knowledge or develop practical skills. Other factors such as gender and prior learning complicate the issue still further.

It may therefore be both more practical and more effective to think in terms of accommodating, rather than matching, modalities and styles. There is evidence that presenting information in a variety of formats has benefits in terms of both achievement and motivation. For example, presentations which include both visual and auditory elements can be more effective than those which cater for only one modality. Learners certainly seem to perform better when a range of instructional approaches are used, though it is open to debate whether this is an issue of cognitive style or simply avoiding boredom.

So, to accommodate learners’ cognitive styles, teachers and trainers should:
- give a structured route through learning
- provide a global perspective of the learning content
- present information both visually and verbally (written or spoken)
- make explicit the scope of the topic and its relationship to other areas.

Adaptive styles and strategies

A significant number of theorists and researchers have argued that learning styles are not determined by inherited characteristics but develop through experience. Styles are therefore not necessarily fixed, but can change over time, even from one learning situation to the next. Some theorists, on the other hand, are more interested in how learners tackle a specific learning task – their learning strategy – than any habitual preference or style.

What these authors have in common is an emphasis not simply on the learner but on the interaction between the learner, the context and the nature of the task. Indeed, some researchers argue that learning styles are only a minor factor in determining how learners react to learning situations – the effects of contextual, cultural and relational issues are much greater.

Learning to learn

If, therefore, learning styles are not fixed personality traits, it shifts the emphasis towards encouraging a balanced approach to learning and, perhaps more importantly, an explicit awareness of the range of approaches available to the learner. Even amongst authors who question the validity of learning styles as a concept, most agree there is a benefit in enabling learners to reflect on how they learn. Encouraging metacognition (being aware of one’s own thought and learning processes) is therefore perhaps the most important advantage that can be claimed for applying learning styles theory to teaching and learning. It may be that a knowledge of learning styles makes learners better able to adapt to different situations. Similarly, learners who
are aware of a range of learning strategies are more likely to select the correct one for a particular task.

This is where the fundamental difference lies between those who believe in fixed learning styles and those who believe in flexible learning strategies: instead of adapting instruction to the learner, the learner needs to choose the approach which is most appropriate to the requirements of the task at hand. Here the issue becomes as much one of learning skills as styles or strategies. The challenge, then, is to provide metacognitive support for learners, enabling them to reflect not just on what they learn but also how and why.

Learning styles models

In 2004, the Learning and Skills Development Agency published a review of the literature on learning styles which included an analysis of 13 of the most popular and influential models. The following is a brief summary of the key points of each model based on the findings of that review.

**Gregorc – Mind Styles Delineator**
- Two dimensions: concrete-abstract and sequential-random.
- Most learners prefer a variety of instructional approaches.
- Issues with validity and reliability.
- No empirical evidence that using Gregorc's model brings any learning benefits.

**Dunn and Dunn – Learning Styles Questionnaire/Inventory**
- Four styles: environmental, sociological, emotional, physical.
- Aims to help teachers identify individual instructional preferences and adapt pedagogy and the learning environment accordingly.
- Widely used internationally.
- Lack of independent research to support this model.

**Riding – Cognitive Styles Analysis**
- Two dimensions: wholist-analytic, verbaliser-imager.
- Evidence of links between cognitive styles and instructional preferences.
- Need to take working memory into account as well as cognitive styles.
- Although the model has potential value, Riding's instrument for measuring cognitive style is not reliable.

**Myers and Briggs – Myers-Briggs Type Indicator (MBTI)**
- Based on Jung's theory of personality – four bipolar scales (perceiving/judging, sensing/intuition, thinking/feeling, extraversion/introversion) producing 16 personality types.
- Conceived as a tool to categorise personality, not just approaches to learning.
- Limited evidence that matching teacher and learner types may increase performance.

**Apter – Motivational Style Profile**
- Based on motivational 'states', not fixed types, in four domains: means-ends, rules, transactions, relationships.
- Theory of personality, not learning style.
- Although not widely researched, the theory's emphasis on motivation may have considerable relevance for education.

**Jackson – Learning Styles Profiler**
- Four types: initiator, reasoner, analyst, implementer.
- Mostly used in business.
- Emphasises the importance of personal development through building up multiple strengths.
Kolb – Learning Styles Inventory
- Four styles: active, reflective, abstract, concrete.
- Learning styles are not fixed personality traits, but relatively stable patterns of behaviour.
- Students should gain competence in all four learning styles to become balanced, integrated learners.

Honey and Mumford – Learning Styles Questionnaire
- Four types: activists, reflectors, theorists, pragmatists.
- Learning style is defined as ‘a description of the attitudes and behaviour which determine an individual’s preferred way of learning’.
- Most people exhibit more than one trait.

Herrmann – Brain Dominance Instrument
- Four types: theorists, organisers, innovators, humanitarians.
- Most people have two or more strong preferences.
- although originally based on brain research, social, cultural and experiential factors are more important in determining learning preferences.
- Learners should develop the flexibility to respond to particular learning situations, regardless of their natural preferences.
- Well established in business.

Allinson and Hayes – Cognitive Styles Index
- One bipolar dimension: intuition-analysis.
- Relatively high level of validity and reliability.
- Intended primarily for use in business.

Entwistle – Approaches and Study Skills Inventory for Students (ASSIST)
- Three approaches: deep, surface, strategic.
- Deep learning is seen as the most effective and beneficial.
- Intended to characterise approaches, not individuals.
- Widely used in UK Higher Education.
- Offers recommendations for designing instruction to promote deep learning.

Vermunt – Inventory of Learning Styles
- Four approaches: meaning-directed, application-directed, reproduction-directed, undirected.
- Each learning style affects five dimensions: cognitive processing, learning orientation (motivation), affective processes (feelings about learning), mental model of learning, regulation of learning.
- Used mainly in Higher Education.
- Combines cognitive and emotional aspects.
- Emphasis on the teaching-learning environment rather than individual differences.

Sternberg – Thinking Styles
- 13 thinking styles divided into three functions, four forms, two levels, two scopes and two leavings.
- Distinguishes between styles and abilities – a style is ‘a preferred way of using the abilities one has’.
- Learners have a profile of styles, not just one single style.
- Profiles of styles may differ according to gender and cultural background.
- Styles are teachable and should fit the context – a variety of teaching and assessment methods is therefore desirable.
Summary

- Any theory or model of learning styles is necessarily a simplification of the complexity of how we learn.
- There is no secure evidential base to support any one theory of learning styles – it is important to be aware of the limitations of any learning styles model and indeed the field as a whole.
- Learning styles are at best one of a range of factors determining how learners react to learning opportunities – environment, culture (both the learner’s and the institution’s), teaching methods and learning aims are all part of a complex pattern of interactions.
- Representing knowledge in multiple formats does appear to result in learning gains, although it is important to match presentation to the nature of the subject matter.
- There is a danger inherent in learning styles of stereotyping learners – given the lack of robust evidence in the field, labelling strategies seems safer than labelling learners.
- An awareness of learning styles theories may help to develop metacognition and the ability to learn how to learn.
- At least some aspects of learning styles and strategies can be taught, regardless of natural inclination.

Useful contacts


References


Further reading

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