



Learning styles

The idea that it is possible to raise attainment by teaching according to students' learning styles is a popular one, which appeals to many working in the field of special educational needs. But is it grounded in strong research evidence? A team from Newcastle University were asked to find out

There is enormous intuitive appeal in the idea that teachers and course designers should pay closer attention to students' learning styles: by diagnosing them, by encouraging students to reflect on them and by designing teaching and learning interventions around them. The shift to a focus on the learner, rather than on the subject matter would, it is argued, have a positive effect both on students and on teachers.

Our team has just completed a project for the Learning and Skills Research Council examining the claims made for learning styles. Our brief was to survey the field of learning styles and identify the most important and influential theories. The next step was to assess the effectiveness of the assessment instruments and teaching strategies developed from the theories. The results of our study will be published in full by the Learning and Skills Development Agency (LSDA) early in 2004 (Coffield et al, 2004 a, b).

Problems we found

We found several significant problems that affect the learning styles field, although some theories were more successful in avoiding these pitfalls than others.

Firstly, the theoretical and practical applications of many of the leading theories are either under-researched in educational contexts or mired in controversy. Learning style theory is complex and demanding and the desire to provide categories and groups inevitably leads to dangerous simplifications in practice. The practical applications of learning styles therefore *either* involve a complete overhaul of assessment and provision for different groups of students *or* a set of rather anodyne exhortations to differentiate curriculum delivery and some labels for individuals or groups which may be empowering or limiting depending on the way in which they are introduced.

Secondly, there is an emphasis away from learning on to learner characteristics. This could underplay the importance of both acquiring subject knowledge and skills and could also obscure the differences between the learning cultures of different academic subjects: for example, identifying an individual as a kinaesthetic learner may have less relevance when that individual is studying

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physics than when they are studying PE, unless this is an overt 'labelling' which implies that expectations of this person's achievements in physics are not set very high.

Most disappointingly, we found little good evidence to suggest that using a pedagogy influenced by the idea of learning styles, either directly or indirectly, has a significant effect on achievement or motivation (See Figure 2).

So how did we reach these conclusions? First we looked at the range of theories of learning styles. Most teachers have heard of VAK (visual, auditory and kinaesthetic) styles and the multiple-intelligence theories of Howard Gardner – but there are many more too.

Which learning styles?

It was a surprise to the team how large this field turned out to be: our initial systematic searches threw up

nearly 4,000 references. We eventually accumulated a research database of (at the last count) 836 references, covering 70 theories of learning style published between 1902 and 2002. It became obvious that we had to impose some kind of organising structure of our own, since none of those we found were capable of including all 70 or of differentiating between them in a way we found useful.

The most useful classification was to place models on a continuum according to the extent to which theorists believed that learning styles were changeable. This obviously determines the teaching strategies invoked in the name of each. If, for example, a model presented learning styles as essentially fixed, then it would be necessary to focus teaching on the individual's needs and to steer them away from uncomplimentary subjects and learning environments. If learning styles are more fluid, then it would be possible for learners to have strengths and preferences that could be extended and developed and weaknesses that could be improved.

Therefore our continuum (Figure 1) makes explicit the extent to which these underlying beliefs about the nature of learning style translate into implications for teaching and learning. Like any classification, it over-simplifies the subtleties of some of the models. Nevertheless, it is a useful organising device. The names in the columns are taken from the theorists rather than the strategies that make use of their work.

The 13 theories that we chose for in-depth evaluation were either well known and widely used in educational or business contexts or were models that offered new and interesting perspectives on learning styles. Our detailed findings are presented in Figure 2.

Research into practice

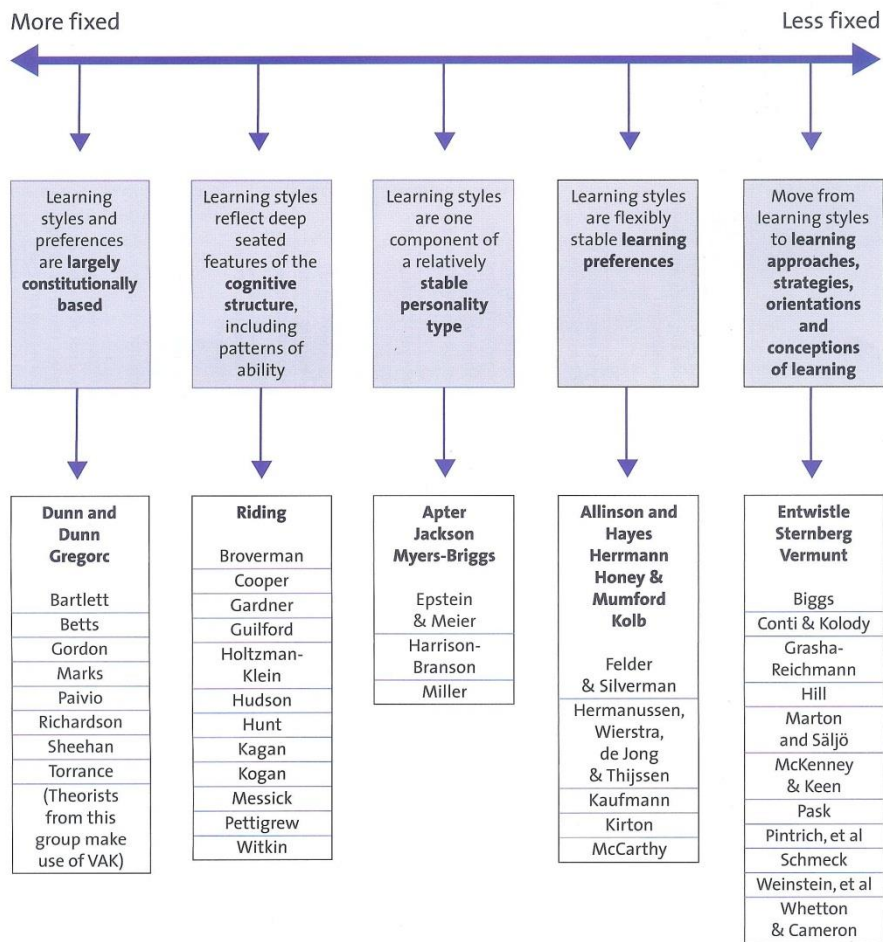
Overall, we concluded that teaching strategies which often spring from learning styles theories are not exclusive to this field, nor unfamiliar to accepted canons of good practice – many researchers do not go much further than suggesting that a variety of teaching approaches could benefit students. However, theorists do differ considerably in terms of what teaching should do for a student with a particular learning style, with views along a continuum from 'matching' teaching and learning styles to extending students' repertoire of skills.

As the continuum implies, the matching hypothesis stems from a belief that individuals are unable or unlikely to change their learning style, with the result that pedagogical approaches should follow on from diagnosis and match their style of learning. Gregorc, Dunn and Dunn, and Riding,



Figure 1

Learning styles as individual characteristics



Implications for teaching and learning



The theorists in bold type are the ones chosen for evaluation in depth.

Figure 2
Summary table: some key points from the evaluation of 13 learning styles instruments

Theorist Instrument	Instrument independently assessed as reliable and valid Score out of 4 criteria	Positive implications for teaching and learning	Potential drawbacks	Evidence of impact
<i>Gregorc</i> ● Mind Style Delineator	1	<ul style="list-style-type: none"> Teachers need to understand own and students' learning styles 	<ul style="list-style-type: none"> Matching does not develop a range of skills or encourage other preferences 	<ul style="list-style-type: none"> Some evidence of Mind Style correlating with subject choice
<i>Dunn, Dunn and Price</i> ● Learning Style Inventory ● Productivity Environmental Preference Survey	0	<ul style="list-style-type: none"> Teachers need to diagnose student preferences and match environment, resources, curriculum design and instruction Students experiencing difficulties need alternative experiences rather than negative labelling 	<ul style="list-style-type: none"> Statements of preferences can lead to generalisations and labels which limit students' development 	<ul style="list-style-type: none"> Matching is not proven to correlate with motivation and achievement
<i>Riding</i> ● Cognitive Styles Inventory	0	<ul style="list-style-type: none"> Teachers should make demands on inductive/deductive reasoning and visual/verbal forms of expression 	<ul style="list-style-type: none"> Cognitive styles seem difficult to change, with possibility of labelling 	<ul style="list-style-type: none"> Little evidence that matching improves outcomes
<i>Apter</i> ● Motivational Style Profile	1 3 unresolved	<ul style="list-style-type: none"> Reversal theory enables us to analyse fluctuating changes in motivation and orientation 	<ul style="list-style-type: none"> This model is a personality theory, whose application specifically to learning is as yet under-researched. 	<ul style="list-style-type: none"> None in educational settings
<i>Myers-Briggs</i> ● Myers Briggs Type Indicator	2	<ul style="list-style-type: none"> Can encourage 'best-fit' career advice 	<ul style="list-style-type: none"> The relationships between elements and scales - 'type dynamics' are very complex 	<ul style="list-style-type: none"> Little evidence of correlation between type and achievement
<i>Jackson</i> ● Learning Styles Profile	0	<ul style="list-style-type: none"> Feedback (Jackson) is non-labelling and promotes positive approaches to new learning 	<ul style="list-style-type: none"> Jackson's ideas yet to be empirically substantiated 	<ul style="list-style-type: none"> None
<i>Kalbf</i> ● Learning Styles Inventory	1 1 unresolved	<ul style="list-style-type: none"> Teachers and students should diagnose learning styles, according to subjects, and respond with differentiated techniques and activities 	<ul style="list-style-type: none"> The notion of the learning cycle may be flawed Conceptual development of experiential learning is needed 	<ul style="list-style-type: none"> Findings are contradictory and inconclusive
<i>Honey and Mumford</i> ● Learning Styles Questionnaire <i>Allinson and Hayes</i> ● Cognitive Styles Analysis	1 4	<ul style="list-style-type: none"> Used as a starting point for discussions to develop under-utilised styles Differences in learning style can be stimulated in management roles so that productive use is made of differences 	<ul style="list-style-type: none"> The model's constructs have been heavily criticised This model is under-researched in educational contexts 	<ul style="list-style-type: none"> There is no evidence of impact on achievement None
<i>Herrmann</i> ● Brain Dominance Instrument	2 2 unresolved	<ul style="list-style-type: none"> Students with different learning styles can learn from one another 	<ul style="list-style-type: none"> This model is under-researched in educational contexts 	<ul style="list-style-type: none"> None
<i>Sternberg</i> ● Thinking Styles Inventory	0	<ul style="list-style-type: none"> Need for teachers to be aware of the styles they encourage or punish 	<ul style="list-style-type: none"> This is a metaphor rather than a theory 	<ul style="list-style-type: none"> Mixed results from studies in the USA and China
<i>Ernst</i> ● Approaches and Study Skills Inventory for Students	2 1 unresolved	<ul style="list-style-type: none"> Inventories are diagnostic tools which give students and teachers a useful vocabulary to discuss effective / ineffective approaches to study 	<ul style="list-style-type: none"> The model focused is on Higher Education and not all contexts enable course designers, teachers and students to design courses and strategies 	<ul style="list-style-type: none"> It is not tested as a basis for pedagogical interventions
<i>Vermunt</i> ● Inventory of Learning Styles	3	<ul style="list-style-type: none"> Motivation and approaches interact in complex ways, so that consistency and variation co-exist 	<ul style="list-style-type: none"> Teachers need a sophisticated understanding of both the model and theory 	<ul style="list-style-type: none"> It is not a strong predictor of learning outcomes

who make use of VAK terminology, broadly espouse these views. It is argued that the benefit to teachers of these kinds of learning styles theories is that a 'type' of student can be identified and a specific curriculum designed for them, and with the increasing use of communications technology, individual 'prescriptions' can be provided. However, while these theorists admit the possibility of change and development, the strong emphasis on diagnosis and matching makes it likely that learners will accept labels and be reluctant to move beyond their 'comfort zones' to develop new skills or styles. This could have the effect of closing off areas of experience for lower-achieving students, particularly since some of these style measures appear to correlate to measures of ability.

For theorists who extrapolate learning styles from overarching models of personality, the position is more ambivalent. So far, there has been little empirical work that explores the extent to which aspects of personality that are more amenable to change interact with more fixed traits. As a result, it is unclear in the learning styles field as a whole whether emphasis should be put on matching dominant characteristics to particular career paths or activities (as the practical application of the Myers-Briggs model has so far implied) or whether greater understanding of personality can be used, either as a learning aid or professional development tool, to enhance an individual's repertoire, as Jackson advocates.

The theorists which we placed on the right-hand side of our continuum tend to emphasise the process of learning as one of a complex, interactive engagement between external factors such as the curriculum, environment and culture of a course or institution,

innate habits and dispositions, and lived experience. In other words a student's learning styles may appear to fluctuate depending on many factors including their liking for a teacher, their previous experiences with a subject, their willingness to persist with a task, their fear of failure, the influence of peer culture, the time of day of a particular activity and their motivation on a specific day.

Such theories, presenting a more complex picture, aim to increase teachers' and students' understanding of their own learning and to provide a common vocabulary in which strategies,

The two theoretical models that emerged most favourably from our review were those of Entwistle and Vermunt

motivation and the processes particular to each learning experience can be collaboratively explored. This is a very different approach to the diagnosis and matching of individual styles. The disadvantage here for teachers is that these models are more theoretically complex and do not (indeed, cannot) provide detailed 'schemes of work' for different 'types' of students and thus require a considerable investment of time and intellectual engagement. Nevertheless they highlight the importance of thinking about a wide range of influences on learning.

Learning styles in practice

Policy documents and inspection reports increasingly refer to the diagnosis and matching of learning styles as an example of 'good practice'. As a result, you may well find that there is an expectation that you should be making use of them in your teaching, despite the current lack of hard evidence that

they will improve students' performance or motivation.

The most dangerous aspect of learning styles is that they may be misused in an unreflective 'off the shelf' manner. As our research has shown, this is a theoretically complex field which demands serious engagement by anyone wishing to take the idea of learning styles seriously, so we are offering some suggestions for interest and further investigation. Alternatively, if you *have* to be seen to be using learning styles, the following approaches may be the most productive and the least potentially limiting.

Using inventories to diagnose individual learning styles has to be managed very carefully, since it is probably unhelpful to have groups of learners remarking, 'I can't do that, I'm a concrete learner'. The key is probably in the quality of the diagnosis, review and feedback about styles or approaches. A constructive dialogue between teachers and students about the results of those instruments that offer a sophisticated view of learning is, we believe, a positive thing. For example, *Jackson's Learning Styles Profiler* can be completed on-line and provides useful, non-judgemental feedback about the behaviours described, their associated strengths and weaknesses as well as indications of how these can be enhanced or toned down, depending on the context.

Learning styles instruments have also been used to group students within settings, placing them with similar and differently styled peers to support behaviours or stimulate new ways of working. *Herrmann's Brain Dominance Instrument* has been used particularly effectively in this way in business and management contexts.

Some of the ideas in the learning styles movement can help teachers to re-frame old problems and re-examine their approaches to persistent problems. For example, *Apter's Motivational Style Profile* uses the concept of reversal of motivational or emotional states to explain the fluidity and specificity of normally observed human behaviour. He says: "There are indeed characteristics that distinguish between people. But they are more like tunes than like continuously repeated single notes." (Apter, 2003, 474) and this focus on 'states' rather than 'traits' can be a productive start to imagining learning environments and interactions that could lead to greater engagement and achievement. The two theoretical models that emerged most favourably from our review were those of Entwistle and Vermunt, since they are comprehensive, theoretically coherent and embedded in the theory and practice of teaching and learning within a particular

environment, namely higher education. However, they are also amongst the most complex and are not easily accessible to the casual reader.

The theories that underpin these better models of learning style have the potential to provide teachers and learners with concepts of learning that can be both motivating and liberating. In this respect, the theories are greatly superior to the instruments that follow them, since they can all be misused to label or limit learners. By offering learners a vocabulary for understanding both how they learn and why they learn more effectively in different contexts at different times, learning styles may help students to become more autonomous, more motivated and more likely to continue 'learning to learn'.

Conclusion

If, we are in a 'knowledge

economy', is self-knowledge, particularly in relation to learning styles, a valuable currency? Our research would suggest that learning styles are *at best*, only one part of a series of essential and related elements of learning and thinking and *at worst* a red herring.

Elaine Hall is a Research Associate in the School of Education, Communication and Language Sciences at the University of Newcastle. This article, which originally appeared in *Teaching Thinking*, was produced on behalf of the team: David Moseley, Kathryn Ecclestone and Frank Coffield.

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