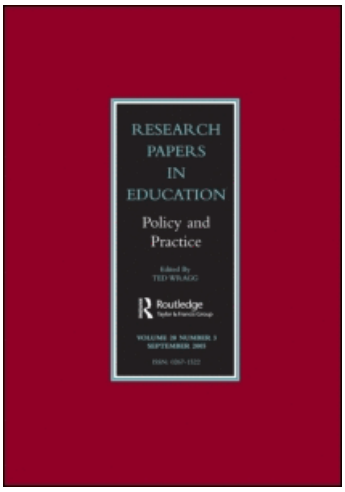

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VAK or VAK-uous? Towards the trivialisation of learning and the death of scholarship

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VAK or VAK-uous? Towards the trivialisation of learning and the death of scholarship

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Developments within education, psychology and the neurosciences have shed a great deal of light on how we learn while, at the same time, confirming for us all that learning is a profoundly complex process and far from understood. Against this background, and in this position article, we consider the recent rise in interest in the concept of learning styles as VAK (visual, auditory, kinaesthetic) in primary schools in England and Wales and begin to identify and interrogate some of the more unorthodox claims frequently used to legitimise and lend support to its validity. Through the casual acceptance and promotion of VAK, and its often wider association with the notions of accelerated and brain-based learning, it is our assertion that the complexity of learning is becoming increasingly trivialised and scholarship at all levels within certain sectors of the education community compromised.

Keywords: VAK; learning styles; accelerated learning; brain-based learning

Introduction

Learning styles, as a singular concept, is *the* thing in schools at the moment, and in the primary schools of England and Wales in particular. But this is not the learning styles from within educational and cognitive psychology where learning styles theories and practices are presented and debated at the highest academic level. This is learning styles as a thing called VAK. We already know that many local authority advisors and head teachers have been busy promoting VAK in primary schools and many primary teachers, in turn, have been busy administering VAK learning styles questionnaires to children and labelling them as visual, auditory or kinaesthetic learners. Most likely as a result of its appearance in schools, VAK has also found a place in universities and colleges, where it is being introduced to students as part of their courses of initial teacher training and education studies degrees. To us at least, the buzz words visual (V), auditory (A) and kinaesthetic (K) seem relatively commonplace, are recognised by teachers, trainees and others almost everywhere we go, and have meaning, however idiosyncratic that might be. But something somewhere is very wrong. The VAK commonly encountered in primary schools, as we indicated only a moment ago, is not a part of the learning styles 'establishment'. Scratching beneath the surface of it all, we find a rather intriguing world of accelerated and brain-based learning, a world of pseudoscience, psychobabble and neurononsense, and a world acknowledged, quite naively perhaps, by the Department for Education and Skills (DfES).

From this brief but hopefully revealing consideration of both the 'strong' version of learning styles and VAK, its 'weak' but increasingly influential counterpart, we are drawn to take the position that VAK is an overrated phenomenon and contend that the information gleaned from certain VAK learning styles questionnaires, as we have encountered them, offers little to no diagnostic,

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predictive or pedagogical power whatsoever. It is our current belief that many advocates of VAK provide its converts with little more than a statement of the obvious: that children learn through their senses, that environment and motivation are important, and that the human brain is pretty well adapted to processing the information from everything that they see, hear and do. Good primary teachers know this already and do not need what may amount to little more than a gimmick to remind them. Perhaps more importantly, however, we also believe that the casual acceptance of VAK at all levels within certain sectors of the education community as a whole not only trivialises the complexity of learning, and for that matter learners themselves, it highlights low levels of scholarship in an evidence-based profession which prides itself on critical analysis and reflection.

The 'strong' version of learning styles

Learning styles research has a history which can be traced back over 100 years or so, with most activity picking up pace from about the 1960s on. The works of Pask (1976), Entwistle (1981), Keefe (1982), Curry (1983, 1990), DeBello (1990), Riding and Cheema (1991) and Riding and Raynor (1998), together with the more recent publications from Cassidy (2004) and Coffield et al. (2004), form an essential reading list for anyone interested in the field. Even the most cursory glance at this collection of work, which we summarise and offer brief comment upon, reveals a staggeringly confusing array of models, theoretical frameworks, instruments, applications, interpretations and claims pointing out that learning styles researchers are certainly not unified in all of their views. With recent attention turning to learning styles in schools, however, progress continues to be made.

Learning styles defined

Learning styles research, conducted in schools or in other places of work, essentially concerns itself with the habits and other behaviours of individuals and not their abilities. In other words, it sets out to explore how individuals approach and deal with learning situations rather than how well they complete the tasks within them (Pask 1976; Entwistle 1981). While definitions vary from author to author, all highlight learning styles as a multidimensional construct:

> Learning styles are cognitive, affective, and physiological traits that serve as relatively stable indicators of how learners perceive, interact with, and respond to learning environments. (Keefe 1982, 44)

According to Keefe (1982), the cognitive component of learning styles involves information processing, 'the learner's typical mode of perceiving, thinking, problem solving and remembering' (44); the affective component involves motivation, 'viewed as the learner's typical mode of arousing, directing and sustaining behaviour' (48); and the physiological component involves the characteristic learning behaviours of the human body, 'modes of responses that are founded on sex-related differences, personal nutrition and health, and reaction to the physical environment' (49). As terms, learning styles, cognitive styles and learning strategies are often used synonymously and interchangeably in the research literature, though there is perhaps a useful, if only pragmatic, distinction to be made between them. According to Riding and Cheema (1991), for example, cognitive styles relates specifically to the information processing component of learning styles as described by Keefe, while learning styles might be thought of more as all encompassing, including, in an addition to cognitive styles, 'more practical, educational or training applications and are thus more action-orientated' (194). Learning strategies, on the other hand, relates to 'the ways that might be used to cope with situations and tasks [and these] may vary from time to time, and may be learned and developed' (195–6). Riding and Cheema also noted from within the research literature that while measured cognitive styles elements are

usually considered bipolar (e.g. field dependence–independence, verbaliser–imager, diverging–converging, impulsivity–reflectivity), measured learning styles elements are not usually presented as such 'either-or extremes' (194). Other subtly different definitions reflect this styles continuum:

> The term 'learning style' should be understood to refer to an individual set of differences that not only include a stated personal preference for instruction or an association with a particular form of learning activity but also individual differences found in intellectual or personal psychology. (Riding and Raynor 1998, 51)

There remain, however, and perhaps rather unfortunately, 'nearly as many definitions of learning styles as there are theorists' (DeBello 1990, 203).

Models and their classification

Perhaps not surprisingly from their multi-dimensional nature, a great many learning styles models have been developed. While estimates of the number of models in existence vary from about 20 to 100, depending on the age of the review and the interpretation of the reviewer, about 12 or so have been identified as particularly sophisticated – that is, sufficiently well documented, tested and influential enough to be taken seriously (Table 1). These models have been classified in different ways, again depending on the age of the review and the interpretation of the reviewer. Some of the many challenges associated with defining learning styles were usefully unravelled and simplified in one of the first learning styles classification schemes proposed by Curry (1983). Curry considered it possible to place most existing learning styles models available at the time into one of three groups, each group concentrically arranged like the layers of an onion, depending on what their authors claimed they measured. According to Curry, the innermost layer, or core, concerned itself with cognitive personality, the most fundamental, stable, permanent and controlling dimension capable of affecting an individual's learning behaviour. The middle layer concerned itself with information processing and how an individual acquires new knowledge, understanding, skills, attitudes and beliefs. The outermost layer concerned itself with instructional preference. This was thought the least stable, least permanent and least controlling dimension capable of affecting an individual's learning behaviour, largely because instructional preference can be influenced by strong external factors, including the nature of the learning environment itself. While helpful, Curry's classification of learning styles models has since generated many questions concerning the actual content implicit or hidden within each layer and the mechanism of interaction operating between them and the learning strategies an individual chooses to adopt. Such questions have given rise to further classifications, each of which attempts to reveal the multi-dimensionality of learning styles further (e.g. Riding and Raynor 1998; Coffield et al. 2004; see also the citation analysis of Desmedt and Valcke 2004). One possible relationship between these classification schemes, with examples, is provided as shown (Table 2). As reminded by Cassidy (2004), the choice of any learning styles model for any given real-life educational context is clearly of importance:

> Whilst educators in all fields are becoming increasingly aware of the critical importance of understanding how individuals learn, it is equally important that any attempts to integrate learning style into educational programmes are made from an informed position. … For those working in an educational setting wishing to utilise learning style to promote more effective learning, whether through individual or group profiling, design of instructional methods, or identifying learner preferences, operationalising learning style is a necessary but highly problematic endeavour. (420, 440)

Interestingly, no single learning styles model, it would seem, has ever been successful at providing a comprehensive assessment of any individual's learning habits or behaviours (Coffield et al. 2004).

Table 1. Overview of twelve relatively well known and influential 'strong' version learning styles models (from Riding and Raynor 1998; Cassidy 2004; Coffield et al. 2004).

Model	Description with strengths and limitations
Learning Style Inventory (Dunn, Dunn, and Price 1975–1999)	Relatively user-friendly, modified for different age groups and broken down into sub-categories. Mixed model based on cognitive personality, information processing, instructional preferences and constitution. Instrument assesses the cognitive, affective and social domains of learning as well as learner physiology and the learning environment. Used extensively in schools and other educational contexts, particularly within the United States. Reports of very strong validity and reliability balanced alongside problems with design and construction, the justification of certain test items and how they interrelate, and overall pedagogical claims. Criticisms over unsophisticated and simplistic assumptions and adoption of ideas from various related fields (e.g. neuroscience). Independent evaluation lacking.
Learning Style Inventory (Kolb 1999)	Relatively user-friendly, adapted and modified over time. Model based on information processing and learning, derived from the work of Piaget and Jung. Instrument assesses four dominant learning styles or preferences (i.e. converger, diverger, assimilator, accommodator) and how mainly adult experiences guide knowledge acquisition and concept formation and the direction of new learning opportunities (in the form of a four-stage learning or training cycle). Used in educational contexts but with varied pedagogical claims. Mixed messages over evidence of validity but generally good in relation to reliability. Well researched but findings often contradictory and inconclusive.
Myers-Briggs Type Indicator (Myers and McCaulley 1985)	Model based on cognitive personality, skills and type, derived from the work of Jung. Instrument assesses personality types on four scales (i.e. judging/perceiving, sensing/intuition, thinking/feeling, introversion/extroversion). Used in careers guidance and counselling and group dynamics and team-building in leadership and management settings but generally limited pedagogical significance. Other educational application lacks independent evidence. Overall validity remains controversial but reliability considered very good.
Approaches and Study Skills Inventory (Entwistle and Walker 2000)	Model based on information processing, orientation to study and learning approaches. Instrument assesses deep, strategic and surface levels of learning and significance. Used extensively in educational management research for sharing ideas about effective and ineffective learning strategies and course design but with limited pedagogical application elsewhere. Complex and well tested but with some questions over claims and validity. Internally consistent and generally reliable.
Learning Styles Questionnaire (Honey and Mumford 1992)	Model based on information processing and learning. Instrument assesses an individual's learning styles by way of attitudes and behaviours (i.e. activist/reflector, theorist/pragmatist). Essentially used in commercial contexts and management to prepare personal development plans, improve personal performance and enhance teamwork. Some limited application in education. Little evidence relating to pedagogical impact. Questions over validity and reliability and in application beyond its intended purpose.
Cognitive Styles Analysis (Riding and Raynor 1998)	Model based on cognitive personality, skills and structure. Instrument assesses ways of organising and representing information (i.e. wholist/analyst, verbaliser/imager). Used in educational contexts with older students to link cognitive style to learning preference but pedagogical claims inconclusive. Considered reasonably valid but with mixed reports over reliability.

Table 1. *(Continued).*

Model	Description with strengths and limitations
Thinking Styles Inventory (Sternberg 1997)	Model based on information processing, learning orientation and intellectual functioning using the metaphor of self-government (i.e. legislative, executive, judicial, monarchic, and so on). Instrument assesses meaning and intellectual styles and preferences. Used in educational contexts with older students to raise general awareness of individual and pedagogical styles and issues, but limited impact and little independent evidence. Considered both valid and reliable but with limited support.
Mind Styles Delineator (Gregorc 1985)	Model based on instructional preferences or constitution. Instrument assesses dominant learning style (i.e. concrete sequential, concrete random, abstract sequential, abstract random). Some educational application with older students. Claims to match instructional materials and methods to individual learning styles preferences but evidence mixed and varied. Overall validity acceptable but reliability thought poor. Lacks support from independent investigation.
Cognitive Style Index (Allinson and Hayes 1996)	Model based on information processing and learning. Instrument assesses learning characteristics along a single dimension (i.e. intuitive/analytic). Application with older students and adults in management. Pedagogical application in educational contexts including schools limited. Considered to be both valid and reliable.
Inventory of Learning Styles (Vermunt 1994)	Model based on information processing, orientation to study and learning approaches within the cognitive and affective domains. Instrument assesses the direction of thinking and learning (i.e. meaning, application, reproduction). Application with older students and teachers with some potentially worthwhile pedagogical significance, particularly with respect to the teaching and learning environment. Both validity and reliability acceptable.
Holist-Serialist Style (Pask 1976)	Model based on cognitive personality, skills and structure. Instrument attempts to differentiate between individuals who approach tasks and problems either globally or holistically or serially and in discrete step-like stages. Pedagogical significance mixed. Lacks empirical data with which to evaluate validity and reliability.
Learning Styles Profile (Keefe and Monk 1986)	Model based on cognitive personality, skills and structure. Instrument assesses perceptual responses to visual and auditory stimuli and study and instructional preferences. Potential pedagogical value from studies with older students but lacks empirical evidence. Claims over validity and reliability mixed.

Validity and reliability

Learning styles research relies heavily on measurement and measurement requires instrumentation. This often takes the form of a self-declaration questionnaire, a requirement to complete certain tasks or tests, or an interview protocol. To fully evaluate any learning styles model and its instrument usually requires a detailed technical understanding of inferential statistical analysis (e.g. Cohen, Manion, and Morrison 2000). To the uninitiated, this is perhaps the driest and most off-putting yet essential aspect of learning styles research (see Harty and Beall 1984, 1987 and Gardner 1987, 1996 for a good example of argument and counter-argument associated with the development of a children's attitude measure). Establishing face validity (that the instrument actually measures what it reports to measure, literally taken at face value), construct validity (that any measurement produced by the instrument is fairly explained by appropriate learning styles constructs or concepts), predictive validity (that any measurement produced by the instrument

Table 2. Mapped classification of 'strong' version learning styles models.

Curry (1983)	Riding and Raynor (1998)	Coffield et al. (2004)	Examples
Cognitive personality	Cognitive skills	Personality type	Myers-Briggs Type Indicator (Myers and McCaulley 1985)
		Cognitive structure	Cognitive Styles Analysis (Riding and Raynor 1998) Holist-Serialist Style (Pask 1976) Learning Styles Profile (Keefe and Monk 1986)
Information processing	Learning processes	Learning preferences	Learning Style Inventory (Kolb 1999) Learning Styles Questionnaire (Honey and Mumford 1992) Cognitive Styles Index (Allinson and Hayes 1996)
	Orientation to study	Learning approaches, strategies and orientations	Approaches and Study Skills Inventory (Entwistle and Walker 2000) Thinking Styles Inventory (Sternberg 1997) Inventory of Learning Styles (Vermunt 1994)
Instructional preference	Instructional preference	Constitutionally based	Learning Style Inventory (Dunn, Dunn, and Price (1975–1999) Mind Styles Delineator (Gregorc 1985)

accurately predicts learning habits and behaviours or anticipated outcomes as measured using other instruments), ecological validity (that any measurement produced by the instrument provides an accurate reflection of naturalistic rather than contrived settings) and cultural validity (that any instrument designed for use within one cultural context, or any measurement provided by that instrument, can be taken and used between cultural contexts) ideally requires obtaining and considering independent, empirical evidence. This may not always be available. Similarly, and with respect to reliability, it is essential that what any instrument measures is internally consistent and stable over time if generalisations are to be stated with confidence. Commenting on the variety of learning styles models and instruments used in schools and colleges, one UK-based think-tank group raised the following concerns:

> [T]he research evidence for these styles is highly variable, and for many the scientific evidence base is very slender indeed, since the measures are of doubtful reliability and validity. The authors are not by any means always frank about the evidence for their work, and secondary sources – often the ones that teachers are most likely to encounter – may ignore the question of evidence altogether, leaving the impression that there is no problem here. … [T]here is usually even less evidence that, when applied in classrooms, these schemes really do help to enhance the character of teaching so that learning is improved. (Demos 2004, 11)

The psychometric strengths and weaknesses of various learning styles models have been investigated and reviewed in some detail by Coffield et al. (2004). Surprisingly few were found to satisfy all conditions normally associated with validity and reliability, leading these authors to advise, in their opinion, against any pedagogical intervention based solely on any one instrument alone and state that 'each model and instrument has to be evaluated in its own terms' (58). As also noted by these authors, some critics of learning styles research have suggested that the whole concept of learning styles is simply too vague to be of any theoretical or practical value whatsoever, a few even suggesting that the whole construct is entirely without foundation. The validity and reliability of all learning styles models, including the instruments they employ and the measurements they provide, remain the subject of debate, the seriousness of which is closely related to what they claim to do. This extends even to the dozen or so 'strong version' learning styles models which have achieved more widespread recognition (Table 1).

The case of the Learning Styles Inventory (LSI)

Established learning styles models have been developed with a great many target groups and audiences and in mind. The Learning Styles Inventory (LSI) of Dunn, Dunn, and Price (1975–1997) stands out among the dozen or so 'strong' version learning styles models because it was specifically designed, with modifications, for use in education and in the elementary and secondary schools of the United States (3rd through 12th grades, or 6- to 18-year-olds). Recent reviews of the LSI published from its 'home-base', the St. John's University Center for the Study of Learning and Teaching Styles in New York, have indicated that well over 20 textbooks, 350 articles and a number of research studies, almost all positively promoting the LSI, have been produced and made available from this one location alone (Dunn and Griggs 2003; Dunn 2006). The LSI is, by all of these accounts, a formidable tool which remains very much in use today. In brief, the LSI is designed around a 100-item, self-reporting questionnaire comprising five major construct factors, each with its own individual learning styles elements. These include environment (sound, lighting, temperature, room layout or design), emotionality (motivation, persistence, responsibility, structure), sociology (preference for working relationships – pairs, peers, adults, self, group), physiology (perceptual strengths – visual, auditory, tactual and kinaesthetic strengths, time of day, energy levels and food intake, mobility) and psychology (global vs. analytical processing, hemisphericity, impulsiveness). The LSI evolved to explore its designers' definition that:

> [L]earning style is the way students begin to concentrate on, process, internalise and remember new and difficult academic information [encompassing] both biological and developmental characteristics that make the identical instructional environments, methods and resources effective for some learners and ineffective for others. (Dunn, Theis, and Honigsfeld 2001, 5)

Throughout the development and use of the LSI, a variety of interesting findings have come to light. Not only has it been long maintained that attending to learning styles results in significantly higher academic performance, particularly in schools (Dunn 1982; Dunn, Beaudry, and Klavas 1989), other studies, reviewed in Dunn, Theis, and Honigsfeld (2001), have demonstrated that learning styles profiles among talented children and older students appear to exhibit similar characteristics within particular subjects or curriculum areas but not necessarily between them (e.g. in literature, mathematics and athletics), that learning styles profiles appear to exhibit characteristics that differ by gender and by age and as people grow older and pass from elementary to secondary school to college (and from work to retirement), and that learning styles profiles appear to exhibit characteristics that differ by culture (e.g. Native, Hispanic, African, Asian and European Americans). In all studies, however, considerable variation is reported in the learning styles profiles obtained from participants, and trends are often only discernible in some factors and specific elements of the model and not necessarily all. Many of these studies are often psychologically and physiologically focused, of course, with findings analysed statistically. They are not always studies of everyday life in everyday classrooms.

Despite its strengths, the LSI, like all other 'strong version' models, is not without its critics, the validity and reliability of the LSI often coming under close scrutiny. Sternberg (1997), for example, has pointed out that it has never been made clear how the LSI's various components were chosen at all and that the LSI incorporates many variables which affect learning styles rather than define them. Riding and Raynor (1998) have suggested that while the large number of studies available appear to support the LSI's validity and reliability, these aspect of the model's development and evolution require further independent investigation and evaluation. Coffield et al. (2004) have indicated that the LSI appears to deal with instructional preferences not learning preferences and that the styles labelling particularly of children and older students has

led to over-simplistic assumptions about pedagogy. Coffield et al. (2004) have also drawn attention to some test items of dubious relevance:

> Those who simply wish to send up the Dunn, Dunn and Price LSI for 6–18 year olds reveal that it contains such items as: 'I like to do things with adults'; 'I like to feel what I learn inside of me'; and 'It is easy for me to remember what I learn when I feel it inside of me.' It is not surprising that some psychologists argue that criticism should not be directed at individual items and that one or two poor items out of 100 do not vitiate the whole instrument. Our response is that if a few items are risible, then the instrument may be treated with scorn. (45)

It should also be noted that despite being of some international significance, the majority of LSI literature, as far as we can tell, reports mostly findings and implications from within the United States. Transporting educational findings and their implications from one country to another can be a hazardous activity, for education and school systems are culture specific. And while it is also easy within LSI literature as a whole to find sweeping reference to how children prefer to learn, it is also easy to confuse 'most' with 'all', 'tend to' with 'always', 'boys and girls' with 'men and women' and 'school and classroom' with 'office and boardroom'. As with all learning styles instruments, the meaning intended by participants in response to the questions presented, assuming they can complete the questionnaire by themselves and without help, may not always be equivalent to the meaning ascribed to the respondent by the researcher.

Learning styles, schools and pedagogy

For teachers and other educators, the notion of being able to use an individual's learning styles as a diagnostic, predictive or pedagogical tool for the purposes of improving academic performance at school is an appealing one. Indeed, Curry (1990) noted that learning styles researchers have often made claims of long-term improvements in the pedagogical impact of their work, particularly in the areas of curriculum design, teaching methods, assessment and student counselling and guidance, though these claims remain unevenly researched, with most attention devoted to the secondary and tertiary rather than primary sectors (e.g. Evans 2004). While it is commonly asserted that learning styles cannot be ignored in any educational context, there remains considerable disagreement over the perceived status of learning styles as a critical factor in the processes of teaching and learning and how learning styles differences should be addressed in the classroom (e.g. DeBello 1990). Some studies have certainly pointed to teachers, on having been exposed to learning styles research, becoming more sensitive to their own learning habits and behaviours and the individual learning differences of those they teach, leading to positive interventionist beliefs which in turn legitimise practice, the role of metacognition in teacher education and training being of considerable importance (e.g. Rosenfeld and Rosenfeld 2004). But the appropriateness of interventionist beliefs and the legitimisation of practice is subject to all of the limitations associated with definitions and the means by which learning styles can be validly and reliably measured as well as whether or not the learning habits and other behaviours of individuals are fixed as traits or dynamic, changing over time as circumstances and context demand (most authors favouring the latter, e.g. Riding and Raynor 1998; Gredler 2005). Indeed, most new and experienced teachers and other educators know full well that individuals of all ages approach different tasks in different areas of their work in different ways, learn at different rates, and apply what they learn with different degrees of confidence and success. In other words, they know that learning styles is only one of a great many variables which affect academic performance (or, as we prefer, performance-related potential), some of which they have no control or influence over whatsoever. Yet despite all of this:

> [Some] teachers, despite the best of intentions, are using learning styles in ways that constitute poor professional practice. For example, it is sometimes claimed that learning styles are largely fixed and

> innate. This belief – which is curiously reminiscent of now largely abandoned notions of fixed and inherited intelligence – can lead teachers to label students as having a particular learning style and so to provide materials and sources that are appropriate to that style. Students may then come to internalise this label and think of themselves as a certain type of learner who should concentrate on this diagnosed style. … Whilst it may be true that some learners have a dominant learning style, a good education does not limit them to that style or type, but ensures that students have opportunities to strengthen the other learning styles. … In misguided hands, learning styles could become not a means of personalising learning, but a new version of general intelligence that slots learners into preconceived categories and puts unwarranted ceilings on their intellectual development and achievement. (Demos 2004, 12)

What can be generalised from the wealth of learning styles research available is that an individual's academic performance at school is most likely to be adversely affected if the mismatch in balance between how teachers prefer to teach and how learners prefer to learn is extreme (e.g. Entwistle 1981). But teaching, like learning, is also heavily influenced by its own set of theories, ideologies, practices and controversies, political, social and economic as well as educational. Primary teachers in England and Wales know full well what this means – for example, having witnessed the introduction of a National Curriculum for English in 1989, a Literacy Strategy a decade later, and, more recently still, a move to teach reading using synthetic phonics. The choice of what they teach and how they teach it is not always in their hands. But neither could what they do and how they do it be considered extreme (e.g. entirely child-centred, discovery-led and open or entirely teacher-centred, transmission-led and closed). Regulation, prescription and compliance see to that. Primary teachers also teach whole classes and groups, not just individuals, and primary children do not study as individuals on their own in the same way or to the same extent as secondary or tertiary students do (even with end of Key Stage tests and homework). But focusing on the learning styles of individuals raises at least one other important matter. Not only does this displace the burden of responsibility for learning on to the shoulders of teachers and other educators and the environments they provide, it completely ignores the capacities of individuals *to* learn. While this is an aspect of learning that many of us might choose not to discuss, neither should it be overlooked. In a powerful argument presented by Coffield et al. (2004), the uncertainties surrounding the nature of learning styles are perhaps matched by the uncertainties surrounding any notion of a universally agreed and accepted pedagogy. How, then, can the two ever be usefully integrated?

Teachers' ideas and beliefs about VAK

As indicated at the outset, learning styles in the primary schools of England and Wales appears dominated by a thing called VAK. Our initial interest in learning styles as VAK was stimulated by discussions with colleagues in our own institutions, the increasing prominence of VAK in the responses provided by students in assignments related to teaching and learning (in both initial teacher training and education studies), and our casual encounters with VAK in primary schools themselves. What perplexed us most was that no one we spoke to seemed to have any idea about where the VAK they were familiar with came from. We also quickly established that the VAK instruments we had been able to find and look at in schools bore little resemblance to any of the research instruments from within the learning styles 'establishment'. In order to shed some light on all of this we undertook a small-scale, snapshot survey of teachers' ideas and beliefs about VAK in each of our own regions using a free-response questionnaire. This was complemented with an equally small-scale, snapshot survey of head teachers local to one of us by email. A selection of the most revealing and informative responses is presented (Table 3).

In many respects we found what we expected to find. Of the 76 questionnaires returned, which included teachers of all age groups of children (Reception through Year 6) working in all

Table 3. Summary of teachers' ideas and beliefs about VAK.

(i) When did you first come across the notion of learning styles and VAK?
During my PGCE year at [university]. In my NQT year at [school] I attended an INSET [in-service education and training] on VAK and Brain Gym. The School made a push to differentiate within lessons. All planning had to be annotated with VAK.
VAK as an idea was introduced to colleagues who attended an Accelerated Learning Course.
The school was involved in a research project with [name] three years ago around Howard Gardner's Multiple Intelligences.
When visiting a colleague and friend in [location] about six years ago.

(ii) Have you ever used a VAK learning style questionnaire with a class of children?
Yes. Every year in the first half-term the children fill in a questionnaire and we discuss outcomes and their best/preferred learning style.
Yes, but the questionnaire is not enough. I think much more detailed research needs to be done.
No. Activities have always been planned to cater for a range of learning styles.

(iii) Where did you get the VAK questionnaire from?
Head teacher gave it out – don't know where it came from.
Got it off the Internet.
I used a questionnaire based on my own personal views and I delivered a staff meeting on the same.
One from a course on learning styles and one from the LEA [Local Education Authority] – I amalgamated them to suit my needs.
LEA from ALPS [Accelerated Learning in the Primary School] work.

(iv) Did the VAK questionnaire come with any instructions or background information?
No, but the questionnaires were discussed at a staff INSET meeting.
There are some in the book but my head teacher briefed me.
Brief instructions, no background.
Yes, along with ways to support children depending on the score.
Yes. It explained what children had to do and gave a child friendly description of each learning style.

(v) What information did you think the VAK questionnaire would provide?
The VAK questionnaire allowed me to understand that children need a variety of teaching styles in order to access the curriculum. I now try to incorporate each of these styles into each lesson.
A profile of pupils' preferred learning styles and the areas of weakness. To enable us to plan and encompass and develop all pupils' MIs [Multiple Intelligences].
Tells me what learning style the children have – will enable me to plan accordingly. To use Brain Gym activities.
I have taught for nearly thirty years and have always recognised that children learn in different ways. I have always tried to include a range of experiences in my teaching to accommodate the different styles.

types of school (infant, junior and primary), VAK was recognised in almost every instance, with a little under half of the respondents indicating that either they personally were using VAK to help them plan and teach or their schools were, occasionally at a more strategic or whole school level. Head teachers were generally more sceptical about VAK, even when acknowledging its popularity with staff. What we did not expect to find was that most teachers seemed to be relying fully on the authority, knowledge and say-so of others for their information and that VAK seemed to be working its way around some schools on a 'by word-of-mouth' basis. We were also surprised at the association of VAK with such disparate concepts as accelerated learning in the primary school (ALPS), multiple intelligences (MI) and brain gym. But our teacher survey did help us track much of this to the work of at least one individual, Alistair Smith (Smith 1996, 1998; Smith and Call 1999, 2001).

The 'weak' version of learning styles

We need to be clear here that we are not setting out to discredit Smith's work. Far from it in fact. For some of Smith's strategies and activities for teachers are sound and reflect what we would agree constitute good primary practice (as far as good practice can be shared and understood). We could, indeed, have selected almost any of the sources of VAK alluded to by the teachers in our survey had we been able to trace their exact origin. But the nature of Smith's work and its relative popularity within our teacher survey invites particular comment. The VAK within Smith's work (a term he attaches to instrumentation, strategies and activities), like all VAK we have encountered so far, is, in our opinion, 'weak'. It is 'weak' because the instrumentation used to establish children's preferred mode of learning comes with no reported history of design and development, it does not appear to have been properly trialled and tested, and no apparent attempt has been made to establish validity and reliability. Smith's VAK is also 'weak' because his eclectic model and the brain-based theoretical framework which underpins his work as a whole is entirely without foundation.

VAK and accelerated learning in the primary school (ALPS)

Smith's work, at least in terms of the four professional books we choose to highlight here (Smith 1996, 1998; Smith and Call 1999, 2001), is of considerable interest. There is a great deal to unpack in each of these publications and we can only begin to deal with some of it in this critique. We are always conscious of the ease with which any author's work can be misrepresented, of course, but would point out that while Smith's own personal ideas and beliefs may have moved on (discussed later), educational inertia prevents this from happening within the primary teaching profession at anything like the same pace. VAK is embedded within what Smith refers to as his model of accelerated learning in primary schools, or ALPS (though this seems to have evolved out of an original application in the secondary sector). According to Smith (1996):

> Accelerated learning is an umbrella term for a series of practical approaches to learning which benefit from new knowledge about how the brain functions; motivation and self-belief; accessing different sorts of intelligence and retaining and recalling information. Accelerated learning carries with it the expectation that, when properly motivated and appropriately taught, all learners can reach a level of achievement which currently may seem beyond them. (9)

In brief, Smith outlines the fundamental principles of ALPS via the acronym 'NO LIMIT': k***N***ow the about the brain and how it works; remain ***O***pen and relaxed and therefore receptive to new information and ideas; develop ***L***earning to capacity through challenging teaching in a supportive environment; ***I***nput information by way of visual, auditory and kinaesthetic means (VAK); adopt strategies to access ***M***ultiple Intelligences; ***I***nvest in learning by developing self-belief and self-esteem; ***T***ry out and test new knowledge and skills. These principles are incorporated into what Smith describes as an accelerated learning cycle. While it is never made entirely clear just what exactly is being 'accelerated' in accelerated learning, though improvements in academic performance are implicated, what is clear is the role of VAK. VAK plays a prominent role in Smith's ALPS for visual, auditory and kinaesthetic sensory modalities and preferences are considered fundamental to how children interact with the world around them, and this, in turn, affects how they learn:

> Our learning model places VAK at its core and uses it for engaging different levels of sustainable cognitive challenge. (Smith and Call 1999, 197)

Smith is quick to point out that while he is not the originator of the terms 'accelerated learning' or 'VAK' or any of the other disparate concepts found within its methodology (for that he directs you to the likes of Rose and Goll 1992, Dryden and Voss 1994, and Jensen 1995), his ALPS does

bring each of these concepts together into one coherent approach for the purpose of classroom application for the first time. Smith also provides further insight into the deeper origins of VAK within ALPS with explicit reference to neuro-linguistic programming (O'Connor and Seymour 2003), a highly controversial field associated with adult counselling, communication and the attainment of personal excellence at times strongly challenged by the mainstream academic and scientific communities:

> The discipline of NLP (Neuro Linguistic Programming) concerns itself with observing the subtleties of human behaviour and particularly how we communicate with others and ourselves. The work of the pioneers of NLP, Richard Bandler, John Grinder and Michael Grinder has now progressed to such a degree that we are able to identify three distinct communication and learning preferences [VAK]. … We do, to some extent, utilise all three [sensory modalities]. But just as we each have a hand preference, an ear preference, an eye preference and a brain hemisphere preference, we also have a representational system preference. The leading practitioners in NLP have spent many years characterising the 'typical' attributes of visual, auditory and kinaesthetic learners. This work is not research based. It is pragmatic and based on detailed elicitation and modelling. (Smith 1998, 146–7)

Now ALPS is not NLP, well not entirely, and Smith is careful to place some distance between VAK and NLP as his work unfolds. But both are influenced by it. This may reflect something of Smith's own training and educational philosophy and ideology (according to his books, Smith has been a classroom teacher and an advisory teacher, trained in NLP, and described as 'the leading UK trainer in the use of accelerated learning techniques in the classroom').

On the determination of individual learning styles preferences, Smith begins by suggesting that these can be 'discerned through noticing different [physiological and linguistic] cues' (1996, 42), a technique imported, we assume, from NLP. Children with visual learning styles preferences, for example, might direct their gaze or move their eyes upwards, their breathing might be shallow and take place high in their chests, their voices might come across as high pitched, they might comment, 'I see what you mean', and they can 'readily construct imagined scenes'. But no evidence is presented to help the reader establish how such cues ever came to lead to such determinations. Smith then affords us the opportunity to consider three VAK learning styles instruments (1996, 43–8), two of which he himself obtained from colleagues in schools, the third the LSI of Dunn, Dunn, and Price (1975–1997), which does contain visual, auditory and kinaesthetic elements embedded within its physiological factor (though the suggested use of the LSI does not entirely conform with the designers' specification). He later provides primary teachers with his own VAK learning styles questionnaire (Smith and Call 2001, 163–4), a 15-item, self-reporting instrument using a Likert-type scale and the basis upon which visual, auditory and kinaesthetic learning styles can be determined and measured for primary children of all ages and all curriculum areas (this is followed immediately with learning styles questionnaires for teachers and for parents). This was by far the most common example of a learning styles instrument provided to us by teachers in our survey. But this is not a research instrument. Smith asks us to take every aspect of this questionnaire from its construction to how it should be used and interpreted entirely on trust. Validity and reliability have never been documented as far as we can tell. As our survey shows, teachers are being led to believe, though not at all by Smith, that this instrument provides them with information about their children which is both deep and meaningful. Consider the following statements drawn from Smith's questionnaire: 'I like the pictures in books the best' [V], 'I like music when I do my homework' [A] and 'I like it when we make things in class' [K]. How could children's own responses to 15 statements like these tell you anything diagnostic about their preferred visual, auditory or kinaesthetic learning styles? And how could children's own responses to 15 statements like these result in anything of any pedagogical value? Smith does, however, remind us that:

> Children will not use one sensory approach to the exclusion of all others and it is verging on the absurd to say that a child is a visual, auditory or kinaesthetic learner. (Smith and Call 1999, 191)

Yet VAK labelling in primary schools is very real, as we know from our own experiences and the experiences of others (e.g. Revell 2005). In establishing the importance of VAK and promoting it within ALPS, as a means of both determining children's learning styles preferences (instrumentation) and addressing them (strategies and activities), Smith makes full use of what we can see as his undeniable gift for writing persuasively and getting a point across. He employs an extensive range of cartoons, anecdotes and quotes, though none of these literary devices proves anything by itself. Cynically, perhaps, Smith tells us little more than children learn using their eyes, their ears and their hands. Perhaps this explains why, to the very best of our knowledge, independently verified quasi-experimental and longitudinal studies producing conclusive evidence pointing unequivocally to such a close relationship between VAK, ALPS and children's academic performance do not exist.

VAK and multiple intelligences (MI)

Gardner's multiple intelligences (MI) theory (1983, 1993, 1999), is, like VAK, firmly embedded within Smith's ALPS. The relationship between VAK and MI theory is based upon Smith's view that it is also possible to determine an individual's balance of multiple intelligences and then address it as appropriate using the range of VAK strategies and activities he presents. While VAK and MI are joined at the hip within ALPS, Smith is clear about the distinction between the two, an important point Gardner himself draws attention to:

> Without doubt, some of the distinctions made in the theory of multiple intelligences resemble those made by educators who speak of different learning or working styles. … But MI theory begins from a different point and ends up in a different place from most schemes that emphasise stylistic approaches. … Children may well exhibit one style with one kind of information (such as being impulsive in the musical realm) while exhibiting a contrasting style with other information (such as being reflective when working on a jigsaw puzzle). (Gardner 1993, 44–5)

Unfortunately, this distinction was not so evident in the minds of many respondents in our teacher survey. According to Gardner, MI theory pluralises the traditional concept of a singular intelligence or 'g' factor in favour of up to nine cognitive competences described in terms of sets of abilities, talents or mental skills (there were seven intelligences originally, but these have increased over time). These cognitive competences or multiple intelligences include linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, naturalist and possibly existential forms. Gardner's MI theory has received considerable attention in recent years, not least of all for its educational implications and his own involvement in 'Project Zero' (Gardner 1995, 2007). Indeed, and in the overview provided by Kagan and Kagan (1998), MI theory is described to resonate well with teachers and educators because 'students are smart in different ways … the basic premise aligns so well with [their] everyday experience in schools' (xix). But this apparent alignment, particularly with the curriculum in schools in England and Wales, can be misleading. Kagan and Kagan also point out and emphasise that as MI theory deals with the range of human intelligences, its consequences are far reaching, with 'many educational practices falling under the MI blanket' (xxiii). Despite having its own vast and impressive literature base, MI theory also has its critics (e.g. Perks 2004; White 2004). Their criticisms can be summarised as questions: 'Does Gardner's MI theory deserve its status as a theory at all?', 'Are Gardner's intelligences actually intelligences or something else as his own definition suggests?', 'Just how many intelligences will there turn out to be?', 'Are Gardner's intelligences fixed at birth or can they be developed over time and change?', 'Can an individual's multiple intelligences be assessed in a valid and reliable way?',

and, 'If MI theory has a place in education, what are teachers, parents or children themselves expected to do with the information it provides?'.

Smith approaches multiple intelligences in the same way he approaches learning styles. MI theory is adopted almost without question, with only passing regard to the MI theory debate, and presented in an almost entirely unproblematic and brain-based way. He presents his case by turning to his own background and influences:

> Work completed by others in the field of Accelerated Learning suggests that the development of a full range of intelligences assists long-term learning generally. Effective teaching will provide learning opportunities for a range of intelligences. (Smith 1996, 53)

Having adopted MI theory in preference to any other multiple intelligences possibilities, which he briefly outlines (e.g. the componential, experiential and contextual intelligences offered by Sternberg 1989), Smith then goes on to point out rather oddly that 'the extent to which one agrees with Gardner's theory of Multiple Intelligences is irrelevant' (Smith 1996, 10), later stressing:

> The debate over intelligence, what it is and how it is defined, will continue around us. For the purpose of the ALPS model, we operate under the guiding belief that teachers can intervene in meaningful ways to develop intelligent responses. (Smith and Call 1999, 218)

Guiding beliefs, of course, are not as convincing as hard evidence. And while they can eventually turn out to work in your favour, they can also come back to haunt you. Developing intelligent responses is one thing, intelligence itself is something else. Nevertheless, Smith goes on to provide his reader with a way of determining and measuring an individual's multiple intelligences with, like VAK, a self-reporting instrument using a Likert-type scale in the form of a questionnaire (increasing the number of statements over time from four to five per intelligence as Gardner's intelligences increased in number). This again is not a research instrument. Smith asks us once more to take every aspect of this questionnaire from its construction to how it should be used and interpreted entirely on trust. Validity and reliability have never been documented as far as we can tell. Yet, Smith attempts to convince his reader that outcomes can be used 'as a resource for work on ability and potential' (Smith 1996, 59) to develop children according to Gardner's multiple intelligences (Smith and Call 2001, 171–5) and that 'the model of multiple intelligences [can be used] to structure different sorts of lessons [and to] teach for each intelligence as a subject in itself' (Smith 1998, 152). He also provides a means of visually representing an individual's balance of multiple intelligences by way of a multiple intelligences wheel. Returning to Gardner:

> If reliable tests could be constructed for different intelligences, and these tests did not rely solely on short answers, often through pencil and paper representations, but instead used the materials of the domain being measured, I believe that the correlations that yield g would diminish. Tests of musical intelligence would examine the individual's ability to analyse a work of music or to create one, not simply to compare two single tones on the basis of relative pitch. We need tests of spatial ability that involve finding one's way around, not merely giving multiple choice responses to depictions of a geometric form as rendered from different visual angles. … The solution – easier to describe than to realise – is to devise instruments that are intelligence-fair. (Gardner 1993, 176)

As a direct consequence, then, when Smith presents statements for children to respond to like 'I have a well-developed vocabulary and am expressive with it', 'I always do things one step at a time', 'Charts, diagrams, visual displays are important for my learning', I have a good sense of balance and enjoy physical movement', 'I can remember the words to music easily', 'I enjoy community activities and social events', 'I know myself well and understand why I behave as I do' and 'I can recognise and name different types of birds, trees or plants' (Smith 1998, 187–8), what do these tell you about their intelligences? Are these statements 'intelligence-fair'? Interestingly, and like Gardner himself, Kagan and Kagan (1998) have pointed out that no attempt to reduce the complexity of human intelligence to one set of numbers has ever been successful,

'especially if those numbers are to be used to decide that some students should receive different instruction or curriculum than others' (1.5), and that 'we cannot trust any of the many available [multiple] intelligences tests to be valid' (18.8). These authors also point to the fact that most individuals may actually present strengths and weaknesses within any one of Gardner's multiple intelligences. In other words, a child may be 'good' at reading but not so 'good' at writing, or may be 'good' in shape and space but not so 'good' in algebra. All of this perhaps explains why, to the very best of our knowledge, independently verified quasi-experimental and longitudinal studies producing conclusive evidence pointing unequivocally to such a close relationship between VAK, multiple intelligences and children's academic performance do not exist. According to Demos (2004), MI theory illustrates, as with learning styles, how all potentially valuable educational developments and initiatives can be very easily derailed and end-users confused or even misled. Both MI theory and learning styles should have led to practice- and evidence-based research programmes to test and establish the value and limitations of their relevance and application in educational settings in order for teachers and other educators to select and use what works. But they did not. As Gardner himself is reported to have commented:

> I learned that an entire state in Australia had adapted an education programme based in part on MI theory. The more I learned about this programme, the less comfortable I was. … much of it was a mishmash of practices, with neither scientific foundation nor clinical warrant. Left-brain and right-brain contrasts, sensory learning styles, 'neuro-linguistic programming', and MI approaches commingled with dazzling promiscuity. (Demos 2004, 15)

Interestingly, children's beliefs about their *own* intelligence is thought to influence their performance in the classroom (Cain and Dweck 1989). Some children who maintain that intelligence is something that can be developed and improved (whether or not this is true) believe that their skills and other abilities can be improved with practice and mastery and failure to perform as expected is something that can be addressed. Some children who maintain that intelligence is a fixed entity (whether or not this is true) believe that they are as they were born and that failure to perform as expected leads to feelings of helplessness. Now *that* is interesting.

VAK and brain-based learning

Smith makes explicit links between VAK, MI theory, ALPS and brain-based learning throughout his work, stating that:

> An understanding of the three parts of the brain – the reptilian, limbic and neo-cortex – and what functions they control will help teachers to design appropriate learning activities which are challenging, without being stressful, and which deliver whole-brain, holistic learning. Lesson structure and content which demonstrates awareness of the different needs of right and left brain learners will automatically have a greater impact. (Smith 1996, 10)

He then provides pen-portraits of four imaginary children and the sorts of left–right hemispheric activities they enjoy the most and indicates that their individual needs might be met by following his approach (Smith 1996, 46–7). He later presents nine key principles of brain-based learning (Smith 1998, 29) and draws upon what he believes provides neuroscientific evidence to support his position. Smith also incorporates into his strategies and activities the likes of laterality exercises, different types of music for different lessons and times of the day, brain breaks and brain gym (Dennison and Dennison 1989), another highly controversial field at times strongly challenged by the mainstream academic and scientific communities, all of which are implicated in bringing about improvements in self-esteem, motivation, classroom behaviours and academic performance. He highlights anecdotal quotes from children exposed to VAK, commenting on how much 'stronger' their brains feel and how better prepared they feel to move forward with their lives and their studies, how well they will do in tests, and how people will want to employ

them because they 'are powerful' (Smith 1998, 192–6). Interestingly, and at much the same time as Smith was publishing his own work, the relationship between neuroscience, psychology and education and the relative merits of merging findings from within each field was being investigated thoroughly elsewhere (e.g. Bruer 1997; Byrnes and Fox 1998; O'Boyle and Gill 1998; Blakemore and Frith 2000), with signs of disquiet about brain-based learning as a whole coming to light:

> Brain science fascinates teachers and educators, just as much as it fascinates all of us. When I speak to teachers about applications of cognitive science in the classroom, there is always a question or two about the right brain vs the left brain and the promise of brain-based curricula. I answer that these ideas have been around for a decade, are often based on misconceptions and overgeneralisations of what we know about the brain, and have too little to offer to educators. (Bruer 1997, 4)

The emergence of brain-based learning in education later prompted further response:

> We agree with Bruer that misinterpretations of the science are problematic, perhaps even potentially dangerous, and certainly counterproductive for informed consideration of educational issues. Recent appeals based on misinterpretations of laterality studies for teachers to educate half the brain of their pupils (usually the right half) should be too ridiculous to flatter with serious consideration, save that they appear with increasing frequency in popularist, if not mainstream literature. (Geake and Cooper 2003, 12–13)

> Some popular beliefs about what brain science can actually deliver to education are quite unrealistic. … The three [neuro]myths given most attention … are (1) the lay belief in hemispheric differences ('left brain' versus 'right brain' learning etc.), (2) the notion that the brain is only plastic for certain kinds of information during certain 'critical periods' and that therefore education in these areas must occur during the critical periods, and (3) the ideas that the most effective educational interventions need to be timed with synaptogenesis. (Goswami 2004, 2, 10–11)

While neuroscience, psychology and education are now at a point where collaboration between fields might be a profitable enterprise, particularly over studies involving literacy, numeracy, problem solving and reasoning, giftedness, and special educational needs, it is still far too early to draw any sensible conclusions about how outcomes in one field might influence another or lead to practical suggestions for teaching (e.g. Gredler 2005). The problem for Smith is that he falls into the trap of taking neuroscientific information out of context and using it to generalise elsewhere in perhaps too fanciful a way. Neuroscientific facts, some of the limitations of which he does draw attention to, are given far greater educational relevance and significance than they deserve. The notion that different hemispheres of the brain carry out different functions, for example, is well known in the neurosciences. But these findings were obtained using highly specialised neuro-imaging techniques in tightly focused, strictly controlled and rigorously conducted experiments in laboratories, not classrooms or communities. In our everyday lives, however, substantial connections exist between both hemispheres of the brain, with both hemispheres working closely together in every task we perform (Bransford, Brown, and Cocking 2000). Even when neuroscientists and teachers appear to ask similar questions and explore similar aspects of learning, they do so in very different ways and at very different levels of abstraction. All of this perhaps explains why, to the very best of our knowledge, independently verified quasi-experimental and longitudinal studies producing conclusive evidence pointing unequivocally to such a close relationship between brain-based learning and children's academic performance do not exist.

Smith on Smith

Smith's brain-based accelerated learning in the primary school (ALPS) is well presented and easy to read and we can see why VAK has appeal with teachers and other educators. Beyond

instrumentation, his work provides teachers with very real strategies and activities which they can apply in their own classrooms. His ALPS, however, is not beyond criticism, and for very good reason, as we have tried to demonstrate. But you do not have to believe us or take our word for it. Smith himself agrees. Reading the preface to the 2002 reprint of *Accelerated Learning in the Classroom*, Smith presents his reader with a highly laudable and honestly expressed retraction.

> I wrote *Accelerated Learning in the Classroom* quickly in the summer of 1995. … I now know I cannot go back there again despite wanting to. I would like to start from scratch. If I was to write about Accelerated Learning in the classroom again, I'd do it differently. … When I read the book now, I think it has a great deal of practical ideas to offer, I think the accelerated learning cycle is sound and the text alludes to a number of questions which have since become the focus of critical attention here in the UK. I also think that the references to the brain and to human intelligence in the book have more metaphorical than literal worth and this is especially so for classroom teachers. In truth, brain research does not validate any learning approach, nor does it say that 'one must do this' and 'avoid doing this'. … With hindsight I would change the interpretation of brain research in this book to be less conclusive and more open to question. … For those of you who are intrigued by references in *Accelerated Learning in the Classroom* to brain development and to the study of the human brain I recommend looking at *The Brain's Behind It* [Smith 2002]. Dissatisfaction with some aspects of *Accelerated Learning in the Classroom* prompted me to write it. … [The book] has had an influence which was way beyond its author's original intent. It has forced its author into updating and revising his thinking again and again. (1996, 4, 5)

And, as an introductory reader for teachers and others, Smith's *The Brain's Behind It* (2002) is both balanced and informative. Unfortunately, it is also described on its back cover as 'what promises to become the bible of the brain-based learning movement', the very movement Smith seems to be uncertain about and perhaps distancing himself from. More recently, Smith has been reported as stating that, while still maintaining a strong case for a learner-centred approach, 'I've moved on, the science has moved on. … My position on VAK is that it is one model among many. … The brain-based stuff has a value as a metaphor, but we need some honest brokers to let teachers know what is worthwhile and what isn't' (Revell 2005).

But does it matter if the theoretical framework underpinning Smith's model of learning is flawed? Yes and no. For one thing, if it is no longer a brain-based model of learning, then what is it? And, as we have already indicated, there is much in Smith's work in terms of strategies and activities to commend it. There may be no need to throw the baby out with the bathwater. Indeed, strip away the layers of pseudoscience, psychobabble and neurononsense, and see through the other distractions, and what you have left is a potentially attractive, practitioner-based model of very real importance. But this is a model of *teaching*, not a model of *learning*, and a model of teaching which *can* be rigorously and empirically tested and by teachers themselves. And rigorously tested it must be if we are ever to see anything of its impact beyond anecdote and the novel effect of introducing children to something perhaps new and different. More importantly, however, teaching is a serious profession. Teachers are highly trained and educated individuals. They have a responsibility to ensure that whatever models, strategies and activities they adopt and use are credible and effective. We do not expect them to carry around in their heads the unsubstantiated claims, misconceptions, half-truths and plain wrongs of others. Teachers are also publicly accountable to parents, governors and their local authority and under pressure to get results. They are busy people with few opportunities to carry out or evaluate their own research and, like any of us, will naturally consider anything which they think might give them an advantage in what they do. They often turn to others for help, as our teacher survey shows. For lecturers, local authority advisory staff and head teachers, introducing teachers, trainees and others to VAK with little regard to the issues surrounding learning styles, VAK and the likes of ALPS, there are no excuses. They, like the children they teach, deserve better. We know that Smith did not expect

his work to have such an influence at the chalk face – he himself has said so – but it has and now it must be addressed.

Learning styles, VAK and the Department for Education and Skills

It would not seem unreasonable, of course, for teachers and other educators to look to the Department for Education and Skills (DfES), recently renamed the Department for Children, Schools and Families (DfCSF), for learning styles advice. And this you can find in abundance (as you can for multiple intelligences). Type 'learning styles' into the Department's website search facility and you will be taken to a variety of locations, including its *Standards* and *Teachernet* pages (DfES 2006). These pages and the information they contain change on a regular basis, even if their authorship is uncertain. What they always do, however, is reflect current government thinking on all matters of an educational nature. At the times of our visits, the quality of guidance was perhaps mixed. On the one hand, teachers were clearly reminded that research into learning styles has produced a wide range of different models and that this can be confusing, largely because of the lack of general agreement over definitions and classifications. It was also suggested that while teachers should acknowledge and cater for the range of children's preferred learning styles, children should nevertheless be encouraged to develop a range of learning strategies fit for purpose and that it would not be in any learner's interest to be taught through their preferred learning style at all times. Teachers were directed to further reading in the form of the 'strong' version LSI provided by Dunn, Dunn, and Price (1975–1997) and the reviews of learning styles provided by Riding and Raynor (1998). On the other hand, VAK was introduced as 'a quite simple and immediately applicable model [which] has emerged from some of the sensory representational systems found in the theories of neurolinguistic programming' (DfES 2006, 1). Is the Department really promoting NLP, and all of the controversy surrounding it, as a driving force behind the education of the nation's children? Does anyone at the Department know what NLP is? Teachers were certainly directed to further reading in the form of O'Connor and Seymour (2003) on NLP and Smith (1998), Smith and Call (1999) and Lemire (1996) on accelerated learning. On occasion, they have also been directed to the brain-based work of Barbara Prashnig, founder of the Creative Learning Centre (CRC 2006), a commercial learning styles organisation in New Zealand. The Department's relationship with 'weak' version brain-based learning styles has provoked Geake (2005) to point out bluntly that:

> Even the DfES has succumbed with an endorsement of VAK so-called 'learning styles' on their website. It is not clear who should be more insulted: neuroscientists (for the mis-interpretation of their hard-won results), or teachers (for the implication that they are too dumb to understand scientific complexities). (12)

Rising to its defence, we believe that the Department may have been acting or reacting more to the speed with which learning styles as VAK appeared in and spread throughout schools rather than working proactively to investigate it with a view to providing more effective leadership. At no time, however, has the Department indicated that teachers are under any obligation to adopt VAK in their teaching at all, though the potential benefits of doing so are clearly implied, possibly as a result of government's drive towards individualised and personalised learning (e.g. Demos 2004; Perks 2004). The Department might, however, consider taking more care in its own choice of quotes. Its view that '[t]he significance of ideas on learning styles for teaching has been argued passionately by Robert J. Sternberg … ' (DfES 2006, 1), for example, is not entirely accurate. You will only find two references to learning styles in the index of *Thinking Styles*, the book in question (Sternberg 1997). The first directs you to criticisms of the LSI as presented earlier, the second to a criticism of learning styles assessment and teaching:

> Right now, many schools are buying into systems for assessing students' learning styles and for teaching the students that have no solid research base at all. There may be 'research,' but its quality is so low that it serves as little more than a marketing device for those who are pushing their own system of styles. This area probably won't be taken very seriously in the world of psychological research until it stops being dominated by commercial interests. (Sternberg 1997, 155)

Further, Sternberg's book concerns itself directly not with learning styles but with thinking styles, preferences in intellectual functioning, a point he goes to great lengths to point out. Nor does it offer so much of a theory, as is also stated by the Department (though this is how Sternberg sometimes refers to it), but a metaphor of mental self-government (which is how Sternberg also sometimes refers to it) in which the cognitive and other components of the human mind organise themselves and work.

Summary and conclusions

In this position article, we have tried to show that learning styles is an educational minefield. As a minefield, teachers and other educators need to tread carefully. As our own teacher survey demonstrated, learning styles as VAK, or VAK within ALPS in the case of Alistair Smith's work, is popular in many primary schools in England and Wales and it is easy to see why. When written about and presented authoritatively and well, VAK appears to provide primary teachers with, at first sight, a perfectly plausible model which includes a theoretical framework, instrumentation, and concrete strategies and activities to try out in their own classrooms. As our survey also demonstrated, however, teachers' ideas and beliefs about VAK are often second-hand, confused and misinformed, including how the likes of learning styles, multiple intelligences and other disparate concepts are linked. Responsibility for all of this rests not so much with teachers themselves but, as we suggest here, with the many prominent authority figures operating at all levels within the education community as a whole who we contend have been quick to grab hold of VAK without fully considering any of the multitude of issues surrounding it. VAK is not part of the learning styles 'establishment', the 'strong' and research-based version developed from within educational and cognitive psychology. Even this has its problems. VAK's theoretical framework, as far as we can establish, often lies entangled within neurolinguistic programming, accelerated learning and brain-based learning, sometimes all three at once, all highly controversial fields at times strongly challenged by the mainstream academic and scientific communities. VAK, as it appears to us, is, in many instances, shrouded in pseudoscience, psychobabble and neurononsense. VAK's instrumentation, as far we have encountered it, is seriously flawed, never establishing any sense of validity or reliability. As such, it can lay no claim to any diagnostic, predictive or pedagogical power whatsoever. The labelling of children in schools as visual, auditory or kinaesthetic learners is not only unforgivable, it is potentially damaging, though the various authors associated with VAK are not to be blamed for how VAK has been taken and applied. Any evidence that VAK 'works', be it with instrumentation, activities or strategies, is, at the present time, entirely anecdotal. We, of course, might argue that much of what VAK provides in terms of activities and strategies simply reflects or complements what primary teachers do well already, the current regime of initial teacher training in England and Wales having standardised classroom practice away from the extremes of the past. But any additional help is always welcome. VAK is a 'weak' version of learning styles. If it is ever to be taken seriously and conceptualised at anything more than a personal and intuitive level, VAK in primary schools has a long way to go. There are, of course, significant opportunities for teachers to take the lead in developing and validating learning styles and its use in schools through carefully considered, supported and funded practitioner-based research (though not just with VAK), and disseminating theoretical and empirical findings and knowledge in a more conventional professional and

academic manner. Sensing forces conspiring against 'strong' version learning styles research of the highest quality degenerating into hype or fad and being looked upon as providing some kind of educational panacea, Gregorc (1982), even some 25 years ago, drew our attention to the dangers of failing to observe what is going on around us without proper care and attention:

> We have recently witnessed a tremendous growth in the number of educational consultants specialising in learning style/brain research. Many of these consultants are knowledgeable, insightful, and excellent presenters. They have validated the content and messages they are conveying and some have done their own research. Such individuals play a vital role in broadening learning style concepts and by training teachers in the use of specific techniques. There is, however, a second type of consultant that I choose to call 'the itinerant snake oil peddler' or collectively speaking, the 'Saturday Night Specials.' These individuals have no original equipment; they often steal and modify materials beyond recognition and original intent. They 'borrow' handouts from sessions they have attended, perform their research at the kitchen table on a Saturday night, and fashion a dog-and-pony show which they plan to market on Monday. These individuals often go off half-cocked, sell their product cheaply, and take the position, 'You pay your money and take your chances.' (9)

Now, we are not suggesting for one moment that any of the authors associated with VAK mentioned by name in this work is peddling snake oil, including Alistair Smith, whose work we have attempted to dissect in detail. Not at all. But there *are* a lot of snake-oil peddlers out there. You can find them on the Internet at the push of a button. You might also find them a lot closer to home and where you would least expect to find them. As an evidence-based profession which prides itself on critical analysis and reflection, we are genuinely concerned at the apparent readiness with which learning styles as VAK has been adopted by some schools and the extent to which it has already begun to inform and influence practice. Most serious authors from both 'weak' and 'strong' camps recognise the significance of their work and do advocate a balanced and sensible approach to teaching which involves using a carefully chosen variety of strategies and activities with the aim of providing all individuals with the opportunity to learn in different ways. But addressing learning styles is only one part of a profoundly complex learning process. Learning for most of us most of the time is hard work and requires effort. Teaching for most of us most of the time is hard work and requires effort too. VAK is not the 'quick fix' it appears to be.

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