Towards Inclusive Teacher Education: Sensitising Individuals to How They Learn

Dr. C. Evans   University of Durham, School of Education, Leazes Road, Durham DH1 1TA, United Kingdom. (email carol.evans@durham.ac.uk)

Dr. M. Waring   Loughborough University, School of Sport and Exercise Sciences, Loughborough, LE11 3TU, United Kingdom. (email m.j.waring@lboro.ac.uk)

Individualising Teacher Education: Sensitising Individuals to How They Learn

Abstract

Higher Education has struggled to acknowledge and translate into better teaching and learning practices that sizeable literature base suggesting a link between cognitive style, learning preferences and performance. Eighty undergraduate students on a primary education degree were studied to examine the relationship between their cognitive style, learning preferences and perceived impact on their teaching practices. Significant differences were found between each of the three cognitive styles investigated: wholist, intermediate and analytic (Riding, 2000). Many of the differences reported in the literature between the different cognitive styles were not evident in this study. However, the interpersonal and intrapersonal characteristics of wholists and analytics respectively, were evident and perceived to impact on planning and delivery in the classroom. While further school-based research involving greater numbers is required, the interest in learning styles remains especially poignant if one intends to truly offer an inclusive education for all learners.
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Introduction

Higher Education has struggled to acknowledge and translate into better teaching and learning practices that sizeable literature base suggesting a link between cognitive style, learning preferences and performance (Evans, 2003; Rosenfeld, 2004). Part of this is due to confusion that abounds regarding the selection, use, validity and reliability of the various instruments to measure such things, as well as the considerable potential for misuse of the related terms and overly simplistic application of associated ideas. Within the context of this paper, cognitive style is defined as the way in which individuals process information during learning and thinking (Heinich, et.al., 1999). While the stability and consistency of style in terms of preferred ways of organising and processing information as suggested by Messick (1984) is widely accepted (Sadler-Smith, 2001), the degree to which cognitive style is, in fact, stable is being questioned (Theis, 2003).

This paper reports on a pilot initiative designed to increase the individualisation of a teacher education programme by helping to sensitise the teachers of tomorrow to how 'they' learn. Carr & Claxton (2004: 111) note "Those who lack the awareness to articulate their own learning processes and problems, the ability to communicate these to others or the inclination or the courage to do so are inevitably handicapped as learners." Therefore, trainee teachers have to be enabled as much as possible to appreciate this for themselves, that is if they are to ultimately facilitate/maximise it in others/pupils. To assist them in the process of learning to teach, an important element is the trainees awareness and ability to appreciate and manipulate the learning processes and problems of others. This project examined the relationship between the cognitive style, learning preferences and perceived impact on the teaching of student teachers. The evolution of educational policy globally and nationally continues to create a significant reforming agenda for and in higher education (Ball, 1998; Cheng et al., 2001; Hammersley, 2002; Robinson & Latchem, 2003), the widening participation portion of which demands increasing diversity/heterogeneity not only in the student composition of UK universities, but the subsequent need to adapt courses much more to suit the needs of those learners (Macdonald & Stratta, 2001). As a consequence of such policies and the failure of higher education to sufficiently adapt and refine courses to suit the needs of a more heterogeneous body, we are also witnessing high drop out rates of students in some UK universities. For example, projected drop out rates for full-time students is currently over 25% for at least ten universities in the UK (Hill, 2004). This point is reinforced by Jarvis (2002: 67) who comments: "…didactic teaching methods, including lecturing, will have to be adapted to a much less homogeneous body of learners…lectures will have to address individual learning needs and styles much more closely than in the past." In addition to this, as part of the government's Five Year Strategy for Children and Learners (DfES, 2004), personalised

learning has been highlighted as a key way in which schools can and should improve standards. However, the implementation of such strategies and interpretation of 'personalised' approaches is less clear. Unfortunately, this is coupled with a lack of understanding, inadequate training and resources (for staff and students), the model applied at the classroom level is impoverished.

Such a situation is certainly not helped by the inaccessible nature of much of the literature on cognitive and learning styles. Much attention has recently been placed on investigating the value of learning styles approaches and pupil attainment (Coffield, 2004; Hargreaves, 2004), and whether such a relationship can be assessed (Rosenfeld, 2004). Many questions need to be asked, not least, which aspects of individualised learning do we focus on and indeed how, in the first instance, do we amalgamate such approaches and how do we separate a focus on individualised instruction from other aspects of classroom learning? Learning styles approaches have been lambasted by Coffield et al (2004) as not having a great enough return on learning outcomes (as measured by effect size) to justify inclusion into teaching programmes. Such a conclusion, arriving from meta analyses undertaken by Hattie (1999) and commented on in the Coffield report, fail to take account of any of the relevant qualitative studies or acknowledge the difficulties in identifying what is actually meant by individualised instruction. The studies evaluated in the Coffield report represent a cornucopia of approaches and thus what one can take from this has to be questioned. Significantly the issues, as Coffield et. al. (2004) have also highlighted, but which have been somewhat ignored in their report, is that there have been few studies of the impact of learning styles approaches on performance and most models have not attempted to address pedagogy. Performance cannot be all we are looking at. If it were to be the case, it would represent a deficient narrow definition of performance (based on success in examinations) that is being reviewed. This is wrong as learning is about much more. Hattie (1999)

argues that approaches based on individualisation have limited effect sizes, however, as a consequence of his meta analyses argues that instructional quality and student's disposition to learn have relatively large effect sizes. Unfortunately, what is not made explicit is the size and quality of studies, which have led to such conclusions. In addition, an understanding of individual difference must surely impact on instructional quality / student motivation to learn and the like? (Riding, 2003) By advocating an approach favouring an understanding of cognitive styles, this paper contends that by being able to identify ones' own style and appreciate ones' own conceptions of learning, teachers may be more able to sensitise themselves to the needs of those around them. It is not being said that cognitive style is the only means which to do this, but that an understanding of cognitive style assists in this area.

It can also be argued that pupils benefit accordingly from a teacher who has the ability to predict, perceive and adapt however subtly to changes going on around him or her. Sensitivity to the environment is thus an important aspect of effective teaching practice and the exercise of appropriate professional judgement. (Jones: 2004:101)

Furthermore, whilst many learners are ignorant about how they learn it is also true that many teachers are unaware of their predominant teaching patterns (Wragg, 2004). A consideration of teaching style and an unpacking of the construct has to be an essential element of learning how to teach. However, the very nature of teacher training in the UK militates against teachers discovering their own style(s), for as Jones (2004:262) argues the climate of total quality control and focus on standards in Qualifying to Teach (TTA, 2002) may actually limit the extent to which mentors allow trainees flexibility in exploring different styles and additionally the volume of literature on 'good teaching' may perversely result in the opposite through a narrow and mechanistic interpretation of so called good practice.

On a similar note, Jarvis (2002) highlights the focus of teacher training courses in the UK on method to the exclusion of style. Method being defined as: "…the techniques that teachers employ; they are ways of doing it-processes, techniques…style is used here in relation to the manner of 'expression' rather than the actual process of doing." (Jarvis, 2002:23). That is not to say that method is not important. In justification of style, Jarvis goes onto argue that a teacher's style can influence the form of learning that takes place and may influence and motivate learners much more than teaching method alone can do, indeed it is the fusion of the two that is so important. Such amalgamation is what is vitally important. It is certainly not being suggested here that method is less important than style, but that there is an important place for both in teacher education.

However, within the context of this current study, trainee teachers found it very difficult to articulate their understanding of style, lacking a vocabulary to do this. This is not surprising given that they rarely, if ever, had been called upon to discuss their learning profiles whilst at school or at university. Reinforcing this is what Hargreaves (2003) argues is the overemphasis on performance standards and checklists of competencies which result in teachers neglecting the emotional aspects of teaching.

In order to look further at cognitive style in relation to teaching style and how this might translate in the classroom, Riding's (2000) 'Aspects of Teaching Style model' has been considered. Having received little attention in the literature his model has made equally limited impact on teaching in schools. In an attempt to initiate much needed dialogue to resolve this situation, Riding's categorisation of teaching style in relation to cognitive style has been summarised in Table 1. In so doing one can consider the claims made by Riding regarding the impact of cognitive style on teaching style and review the extent to which such aspects of teaching style are consistent. Riding (2000)

highlights a number of differences in teaching style relevant to each of the three cognitive styles he identifies. Looking solely at the Wholist-Analytic (WA) dimension (because of the greater reliability reported in relation to it), wholist teachers are seen to give control of the learning process to their students, whereas analytic and intermediate teachers are viewed as taking more control for themselves than their students. For example, wholist teachers are seen to be less structured, liking group and individual teaching; not being very strict; having 'disorderly' classrooms, with little or no emphasis on the need for formal learning and being happy with team and individual working. In contrast, analytics are seen to be stricter, having orderly, quiet, tidy classrooms and emphasising formal learning. Intermediate teachers are viewed as liking group and individual teaching, having orderly and quiet classrooms, emphasising formal learning and being happy with team and individual working. Many of these traits were not evident in this study and it is not known on what basis Riding's (2000, 2003) claims are founded. Notably, however, one has to bear in mind the potential discrepancy between the perception of the student teacher regarding how they think they teach and how they actually teach, something of a limitation in this study and an aspect for further research to explicating address in the future.

Choice of instruments

Riding (2003) notes that we are no close to a fuller understanding of the relationship between cognitive style and a teacher's approach in the classroom despite the literature in the field of style preferences. He also stresses further work is required to ascertain the extent to which style preferences exist. In

Table 1: Cognitive Style and Teaching Style

Teaching Style	Wholist Verbaliser	Wholist Imager	Analytic Verbaliser	Analytic Imager	Intermediate Verbaliser	Intermediate Imager
Teaching Delivery:						
Focus on student v subject	Pupil centred	Subject centred	Subject centred	Subject centred	Pupil centred	Subject centred
Control of learning	Pupil control	Pupil control	Teacher control	Teacher control	Teacher control	Teacher control
Structure	Less structured	Less structured	Structured	Structured	Moderately structured	Fairly structured
Disposition	Outgoing / lively	Interactive / wanting feedback	Outgoing / lively	Interactive / wanting feedback	Outgoing / lively	Interactive / wanting feedback
Presentation	Words	Illustrations	Words	Illustrations	Words	Illustrations
Groupings	Individual + groups	Individual + groups	Individual + groups	Individual	Individual + groups	Individual + groups
Pupil Management:						
Discipline	Not very strict	Not very strict	Strict	Strict	Moderately strict	Strict about behaviour
Relationship	Informal	Moderately formal / Keeps distance	Moderately formal / Keeps distance	Very formal / keeps distance	Relatively informal	Fairly formal
Expectations:						
Behaviour expectation	Disorderly	Disorderly	Orderly / quiet	Orderly / quiet	Orderly / quiet	Orderly / quiet
Presentation of work	No preference	Tidy / neat	Tidy / neat	Tidy / neat	No preference	Tidy / neat
Nature of learning	Don't emphasise the need for formal learning	Don't emphasise the need for formal learning	Formal learning	Formal learning	Formal learning	Formal Learning
Attitude towards Collaborative teaching	Team + individual teaching	Team + individual teaching	Team + individual teaching	Prefer individual to team teaching	Team + individual teaching	Team + individual teaching

Adapted from Riding, R. (2000) CSA Making Learning Effective. Birmingham: Learning and Training Technology.

addition to this, it is important to discuss the extent to which such preferences remain stable

and how a teacher's style affects planning, delivery and assessment.

The choice of test to assess cognitive style is therefore crucial. Riding's Cognitive Styles Analysis (1991) was selected for use in this study, despite being inaccurately criticised in recent reports (Coffield et. al. 2004). Such a selection being based on the facts that the validity of the construct of cognitive style, as assessed by the CSA, is supported by evidence that the dimensions are independent of one another, separate from intelligence, independent of, but interacting with personality, and related to behaviours such as learning performance, subject preferences and social behaviour Riding, 2000). In addition the recent criticisms of the CSA's reliability have been based on extremely short test-re-test intervals of a few days (Peterson, 2003), using atypical populations (Redmond, Mullally, & Parkinson, 2002) and small samples (Peterson, 2003; Redmond et al, 2002). Given the ease of the questions asked as part of the CSA measure (they are designed to be accessible to 7 year-olds), memorisation takes place after the first attempt, with very little processing being required to do the test subsequently, when the time interval is very short i.e. a matter of days. As Riding (2003:894) comments: " [individuals] respond more quickly to previously judged statements for some time after initial presentation, perhaps because those areas of semantic memory are in some way activated and pathways faster." Consequently a test-re-test interval of a year is suggested (Riding, 1991) that is 50 weeks longer than Peterson's (2003) research which used an interval of only 8.5 days and it is on this basis which prompted her to conclude that the test was unreliable. The significance of such an interval is reinforced by Rezaei and Katz's study (2004), where reliability increased as the interval between testing increased. In two further studies (Waring and Evans 2003; Evans and Waring 2004), where the test- re-test interval was between 6 – 9 months, the reliability of the wholist-analytic dimension was

found, in both cases, to be sound (r = .711; r = .733), that is based on Nunally's (1978) recommendation of a minimum level of 0.7. However, these studies did find low reliability for the verbaliser-imager dimension of the test, which accords with the work of Peterson (2003), Redmond and Parkinson, (2002); Coffield et al., (2004). Further research with larger and more representative samples, over longer time periods is still required to ascertain the reliability of the WA dimension. A major concern is the reliability of the VI dimension on which much less work has been carried out. Considering the concerns raised over the reliability of the verbaliser-imager dimension, the study on which this paper reports focused exclusively on the wholist-analytic dimension of style, in addition to unpacking the intermediate position along that continuum.

The Sample

The sample comprised eighty undergraduates aged between 19 to 43 yrs (75 females and 5 males) who, as part of a three-year undergraduate education degree, took part in a six-week module focusing on the topics of cognitive style and learning preferences to assist sensitising them to how 'they' learn.

Method

Designed to be developmental as part of their learning experiences (in a single university and in their placement school), the six week programme explicitly engaged students with content knowledge predominantly on a personally, but also on a collectively reflective basis, in order for them to identify how they prefer to learn. The six-week period of instruction involved lectures and seminars. Seminars were adopted to provide increasingly personalised support and more individualised exploration of each of the student's needs as learners. Students conducted a personal reflection of their experiences during

the six-week programme in the form of a summative evaluation of the module. The computer based Cognitive Styles Analysis (CSA) (Riding, 1991) and two questionnaires exploring their learning preferences and perceptions of good teaching were administered to all the students at the beginning of the programme. In addition, to this the students completed Enwistle's (1997) Approaches to Studying Inventory (ASSIST).

The Cognitive Styles Analysis (Riding, 1991) measures two dimensions of cognitive style:

- The Wholist-Analytic style of whether an individual tends to process information in wholes or parts, and

- The Verbal-Imagery style of whether an individual is inclined to represent information during thinking verbally or in mental images.

The two styles are considered to be independent of one another (Riding 1991). The CSA involves three sub-tests: one assessing Verbaliser-Imager tendencies and two assessing the Wholist-Analytic (WA) dimension. The test indicates an individual's positions on the Wholist-Analytical and Verbaliser-Imager (VI) dimensions by means of ratios that indicate performance in the verbal mode relative to the imagery mode and balance between seeing the whole and seeing the parts. The CSA works on the principle that certain style groups will take longer to carry out specific cognitive tasks. It generates two ratios for WA and VI based on the time taken to complete different tasks. It is value free in that students have to respond to a series of abstract images of phrases in order to determine their cognitive style. Each of the cognitive style dimensions is a continuum. In classifying the styles into analytic, intermediate and wholist, Riding's (1991) suggested divisions were employed (Analytic >1.35; intermediate: < 1.35 & >1.02; wholist: < 1.02).

The first of the two questionnaires to be administred comprised 4 sections (A – D): A) 11 open questions relating to preferred ways of learning; B) Likert style questions relating to approaches to learning where individuals were asked to rate themselves on a scale of 1 – 5 (for example in terms of organisational skills and impulsivity); C) a third section required student self rating of their preferred ways of learning from a choice of lecture / tutorial / discussion groups / computer assisted learning / peer tutoring / individual work / presentations to others; D) focused specifically on aspects of the learning situation such as pace of delivery / format of materials / volume of information delivered, where students were asked to comment on the extent to which they agreed with a number of statements. 79% of the students completed this questionnaire (19 wholists; 25 analytics and 19 intermediates).

Entwistle's (1997) ASSIST inventory, which the students also completed, has three sections: section 1 asks, what is learning? comprising 6 items; section 2 checks for deep, strategic and surface approaches to studying via 52 items; and section 3 comprises 8 items asking students about teaching preferences. Although fewer studies using ASSIST are available in the literature, evidence presented by Coffield et al (2004) suggest satisfactory reliability and validity with most of its scales.

After a month of tuition and following student placements in schools for a duration of a further 4 weeks, the second questionnaire on teaching was administered to the students. This comprised 5 reflective questions exploring the application of cognitive styles to teaching and a Likert style questionnaire derived from Riding's (2000) findings on cognitive style and teaching style. 81% of the students completed this questionnaire (19 wholists; 30 analytics and 16 intermediates). Finally a

summative evaluation was completed by 88% of the students (16 wholists; 31 analytics and 19 intermediates).

Results and Discussion

The CSA revealed that of the 77 students who took the test: 30% were wholists (n 23); 25% intermediates (n 19); 45% analytics (n 36). Questionnaire 1 (Sections A-D) considered student approaches to learning and their preferred forms of delivery. For example, in section A students were asked open-ended questions about their learning styles and receptivity to learn; 74% of intermediates (n = 19) thought that they had a rigid and inflexible style given that they were very likely to approach tasks in the same way even if they were made aware that this might not always be the best approach. This was in comparison to 59% and 52% of wholists (n= 19) and analytics (n = 25) respectively. This is interesting both in terms of the challenges for higher education regarding encouraging style flexibility, as well as supporting existing literature in that it clearly reinforces the rigidity of analytics compared to wholists (Riding, 1991; Riding and Rayner 1998, Evans, 2003), regardless of the fact that less is known about intermediates.

In terms of exploring the students' understandings of learning, content analysis of the students' definition of learning reveals that 63% of intermediates, 58% of wholists and 32% of analytics believed learning to be 'the gaining of knowledge.' When expressing their interpretation 58% of wholists stressed the importance of understanding and 25% of analytics stressed self–discovery as an important dimension to their definition. When asked what constituted good teaching, wholists were more likely to mention personal factors to do with the instructor/teacher, such as enthusiasm and

developing relationships with the learner (58% of wholists compared to 36% of analytics), supporting previous findings (Riding and Rayner, 1998; Riding, 2003; Evans, 2003). Thus choice of school mentor may be more critical for wholist students than for analytic ones. Analytics were seen to be likely to mention strategies and a strategic approach used in learning and teaching. In terms of frustrations, information overload was cited by 40% of analytics compared to 21% of wholists; this may be explained by the more elaborate processing that analytics are likely to undertake when assimilating information when compared to wholists, something which Riding (2003) comments on when discussing the notion of working memory capacity. Intermediates were seen to be the least concerned about information overload. The speed of delivery was mentioned by 26% of wholists and 16% of intermediates, however, none of the analytics referred to it in relation to their notions of good teaching. In developing individualised programmes for teacher training students these differences in perceived need identified by the students are critical in helping them to understand and develop their skills and to enable enhanced mentoring relationships between each and all members of the training partnership (school, university and student).

The second part of the questionnaire, Section B, revealed few significant differences between each style. However, a note of caution needs to be raised here, in terms of the potential discrepancy between what one might think one does and what one actually does. In an attempt to address this, the students were to encouraged to debate their results with other members of the group who knew them well. Through such discussion wholists felt themselves more able to 'see the bigger picture' than analytics (a frequently documented characteristic of wholists – see Riding 1991; Riding and Rayner, 1998). However, when compared to wholists, the analytics did not feel more able to analyse the specifics of a teaching\learning situation.

Using ANOVA, the following patterns were revealed in the data set. Wholists perceived themselves to be the least rational and intermediates saw themselves as the most rational (F = 3.2, p = .039, n = 19). The effect size, calculated using eta squared, was 0.1 and thus relatively large, suggesting a large difference between the two styles. This was confirmed by a Tukey HSD test, which indicated that the mean score for wholists (mean = 2.78 SD =. 86; n = 19) was significantly different from the Intermediates' score (mean = 2.05; SD = .91. n = 19). Such results corroborate previous findings by Waring & Evans (2003) and Evans & Sadler-Smith (under review) where wholists were identified as being more intuitive and analytics more rational.

The perceptions of students identified using the data from section B (wholists = 19, intermediates = 19 and analytics = 25) reveals that wholists perceive themselves to be more impulsive than the other two styles. A statistically significant difference was found between wholists and analytics (F = 3.2 p = . 047). The effect size, calculated using eta squared was 0.11, suggesting a relatively large difference between the two styles, something which was confirmed by a Tukey HSD test. This indicates that the mean score for wholists (mean = 2.21 SD= .98, n = 19) is statistically significantly different from the analytics (mean = 2.96; SD = .98, n = 19). Thus concuring with previous findings highlighting analytics to be more reflective (Riding & Rayner, 1998). It could, therefore, be expected that when asked about 'reflection' that analytics would perceive themselves to be more reflective than wholists, this was confirmed by a one way ANOVA where a statistically significant difference was found between wholists and analytics. In fact, both analytics and intermediates saw themselves as more reflective than wholists (F = 3.613 p = .033). The effect size, calculated using eta squared was 0.11, suggesting a relatively large difference between analytic and wholist scores. Post-hoc comparisons

using the Tukey HSD test indicated that the mean score for wholists (mean = 3.21 SD = .98 , n = 19) was significantly different from the analytics score (mean = 2.52; SD = .87, n = 25).

In section C of the first questionnaire, students were asked to rank in an order of preference methods of teaching they experienced from a choice of: lecture, tutorial, discussion groups, computer assisted learning, peer tutoring, individual work, presenting ideas to others. Few statistically significant differences were found between the three styles and their preferred methods of learning. Using one-way ANOVA, the only statistically significant difference identified was in their preference for computer assisted learning (CAL): (F = 4.5 p =.015 N = 63). The effect size, calculated using eta squared was 0.13 indicating a large difference. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for wholists (mean = 4.79, SD = 1.93, n = 19) and mean score of intermediates (mean = 4.8 SD = 1.89, n = 19) was significantly different from analytics (mean = 3.4; SD = 1.87, n = 25), indicating analytics' greater preference for computer assisted learning than intermediates. Riding (2003) suggests wholists do better than analytics using computer assisted learning, however, the results of this study indicate a greater preference by analytics to choose CAL compared to wholists. This may be because analytics favour independent ways of working and working alone when compared to wholists. However, if Riding is correct in his assertions that wholist can do better using CAL, such resistance to this form of learning needs to be alleviated when compared to others as demonstrated in this study.

In the final portion of the first questionnaire (Section D) students were asked about the learning process specifically in relation to the format and delivery of information. Using one way ANOVA, a statistically significant difference was identified between the three cognitive styles in relation to preferences for a sequential or tangential approach to learning: (F = 3.19 p = .048, n = 63). The effect size using eta squared was 0.1 suggesting quite a large difference between the styles. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for analytics (Mean 1.2; SD = . 58; n = 25) was significantly different to the intermediates score (mean = 1.79; SD = .92; n = 19.) Thus suggesting analytics had a preference for sequential learning, while intermediates showed a greater preference for tangential approaches. The literature would support a step-by-step approach to be more favoured by analytics (Riding & Rayner, 1998).

Little attention in the teaching styles literature has been devoted to working beyond the reinforcement of a rational/scientific model of teaching e.g. the effective teacher movement (Hay Mc Ber, 2002). Method is addressed in great detail on teacher training courses in England as a consequence of the Standards for Qualified Teacher Status (QTS) (TTA, 2002), however, the way in which these are explored and unpacked is deficient. It is our contention and of others (Jarvis, 2002) that in order to improve learning and enhance students teachers understanding of the processes in the classroom this is an area that is of fundamental importance. Therefore, in order to explore the students' understanding of teaching styles, a number of questions were devoted to it in questionnaires 1 and 2. In addition, following a two hour lecture and a further 90 minute discussion reflecting on their experience of teaching and observing in primary schools, as well as in their own learning as a pupil, all students were asked to consider their teaching style using Riding's (2000) categories. These categories incorporate teaching delivery, pupil management, teacher expectations and attitudes towards collaborative teaching

(see Table 1). 85 % (n= 68) of the students completed this survey. Differences between the three styles were found. Using ANOVA, a significant difference was found with regards to perceived use of speech in teaching: (F = 3.346; p = 0.041). The effect size using eta squared was 0.09, suggesting quite a large difference between the styles. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for analytics (2.71; SD = .86; n = 31) was statistically significantly different to the wholist score (mean = 3.32; p = .82. n = 19), suggesting a greater preference of wholists to use illustrations in their teaching, with analytics relying more on speech than illustrations. This suggests transfer of traits e.g. wholists taking on imager traits and analytics verbaliser ones, something which has been identified elsewhere (Evans & Sadler Smith (under review). The intermediates in this study followed this pattern by demonstrating a balance between the two in line with the bimodal position (Mean = 3; SD = .79 n = 19). Students t test corroborated the differences found between wholists and analytics regarding the use of speech/illustrations. With wholists using images more and analytics speech more in teaching: (t = 2.45; P = .018). The effect size using eta squared was 0.11, suggesting quite a large difference between the styles. Riding (2003, 2000) finds this difference related to VI dimension, but not the WA one. In terms of the structure of the lesson, analytics purported to be more structured than wholists in their teaching (t = 2.39; P = .021). The effect size using eta squared was 0.11 suggesting quite a large difference between the styles. Again, such a finding corroborates previous studies where analytics were more structured in the way they went about classroom tasks, intermediates reasonably structured and wholists poorly structured (Riding 2003; Evans 2003).

Responses to questionnaires 1 and 2 on teaching styles, were triangulated using content analysis procedures in order to explore further the reported differences. When asked about relationships with students, 44% of analytics, 47% of wholists and 37% of intermediates viewed themselves as being

interactive in the classroom. Riding (2000) sees this as a feature of imagers. Wholist perceived themselves to be most informal (53%), compared to 47% of intermediates and 28% of analytics. In the case of analytics and wholists this fits with Riding's (2000) claims, however, the intermediate position does not. The emphasis made by 42% of intermediates on discipline (a feature not mentioned by any of the wholists or analytics in the study when discussing relationships with pupils) also reinforces Riding's (2003) findings with respect to intermediates. However, it conflicts with his position on analytics.

In terms of organisation of lessons, 21% of intermediates compared to 5% of wholists felt that their decisions were controlled by national and school policies, feeling more constrained by this than did the other two styles. With regards to preference for structure, 96% of the analytics argued that their lessons were highly structured, compared to 63% of intermediates and wholists. Intermediates (21%) were more likely than analytics (12%) and wholists (16%) to say that they favoured informal and unstructured approaches. However, the expectation would be for wholists to be the most unstructured (Riding 2000, 2003). When asked about the learning outcomes in preparation for lessons, 26% of intermediates claimed these varied according to context, while the other two styles failed to acknowledge this in any respect in their responses. 48% of analytics stressed subject knowledge, compared to 32% of intermediates and 37% of wholists, a pattern also found by Evans (2003). Intermediates (26%) and wholists (32%) emphasised the interaction of pupils as an essential learning outcome of their lessons; this was not mentioned at all by any of the analytics; this again poses questions regarding the nature of training and preparation of teachers with respect to considering both process and content in lesson planning.

In terms of the value of the programme to begin to address individual differences, student evaluation of the programme revealed that, in terms of what they had learnt about themselves, 41% of wholists and 26% of analytics felt they had begun to learn to analyse and critique the area of style in general, adopting a more questioning approach to their own work and teaching. Analytics adopted a more intrapersonal approach looking at the CSA assessment of their own style and relating their own learning to it. Whereas 24% of wholists adopted a more interpersonal approach, feeling as though the module had enabled them to be more aware of how their own cognitive style impacted on their teaching. In terms of value of the programme in helping them to understand more about how they teach, the overriding opinion was that the course had been very useful (99%). In essence, for the intermediates it raised pragmatic questions as to how they could differentiate for a whole class of individuals with varied learning styles. Whereas for the wholists it lead to reflection on how style influenced their teaching. With regards to accessibility, 94% of students found the course accessible (analytics 94%, intermediates 89%, wholists 100%). The question here might now be why some intermediates found it less accessible. 24% of wholists mentioned that the provision of hard copy handouts at the start of the lecture had helped in their work and learning significantly; 29% of analytics felt that the relevance and practical application of the content was very useful to them. Intermediates were more concerned about teaching delivery with 47% of them citing this as a good feature of the module, compared to 41% of wholist and 29% of analytics. The question then becomes; are analytics less bothered by teaching style and more able to adapt resources to suit themselves? An advantage for the analytics (51%) was that it helped them in their understanding of other learning needs compared to 41% of wholists and 37% of intermediates. Fundamentally, the analytics felt that they required more assistance in understanding the position of others with regards to learning. Related to this is the fact

that following the programme, 71% of analytics were more likely to report that their assumptions about learning had been challenged: compared to 63% of intermediates and 59% of wholists.

Analytics and wholists were more likely to think the CSA score reflected their own perceived style compared to intermediates. 84% analytics, 76% of wholists and 42% of intermediates felt that the study of style was essential for those going into teaching; intermediates were more considered in their opinion, 63% feeling it was useful but not essential.

Given the fact that over 74% of the group had come out as strategic learners (using ASSIST), the programme had encouraged a deeper approach to learning amongst the students with 81% of analytics, 79% of intermediates and 94% of wholists wanting to go away and find out more about the subject. Similarly high figures were recorded in answer to the question, 'Did the course encourage you to consider your own experiences as a learner?' with 94% of all three styles confirming it was successful in achieving one of its main aims. In terms of impact on the students' classroom delivery, all students said it would make them more aware of individual differences in the classroom. However, students appeared confused about how the differentiation and presentation of ideas linked with their teaching style, for example whilst 47% wholists said they would vary their approach only 10% said they would alter their teaching style.

Conclusions

Analysis of discussions with students revealed that many had never discussed their learning needs in specific terms and they were unaware of the notion of cognitive style. Students welcomed the opportunities afforded to discuss their needs and in terms of face validity found

the CSA useful. Many felt limited when giving their opinion about different forms of instruction as a consequence of the narrow diet of learning experiences they themselves had received. Most demonstrated a preference for sequential step-by-step learning. Issues as to whether this was because of cognitive style preference or familiarity with this approach in schools/university is questionnable, but what is clear is that many of the group had experienced little variety in terms of the teaching approach in their post-school learning experiences.

As a group they were mindful that their understanding of individual needs was essential if they were to develop their practice in the classroom and not be shackled to preconceived narrow views about learning. HEIs need to model such variety in teaching approach if it is an expectation that teacher trainees will be able to model their in the classroom.

A number of issues have highlighted themselves, not least the timing of such interventions in the courses of education students, as the majority emphasised their wish that the programme had been part of their study earlier in their university career, many reporting frustration at not being able to adapt their learning strategies in an appropriate fashion to suit different contexts. Included in this is the need to provide students with the language to allow them to debate and interrogate their own learning and teaching preferences. Many of the differences reported in the literature between the different cognitive styles (re: learning and teaching preferences) were not evident in this study. However, the interpersonal and intrapersonal characteristics of wholists and analytics respectively were evident and perceived to impact on planning and delivery in the classroom. In addition the intermediates did appear as a distinct group, raising

the issue that they should not be neglected in future studies, something which has tended to be the case to date.

By investigating the intermediate position, many assumptions about this group of learners were tested. It is often wrongly perceived that those who have an intermediate style may exhibit less extreme views compared to those who find themselves at the ends of the wholist –analytic continuum, something which was not found to be the case. In this study, as a group, they were more likely to exhibit frustration with a learning situation that did not fulfil their perceived needs and were more critical about lack of structure to lectures, too fast a pace and being put on the spot in a learning situation, than were the other two styles. They were also more negative about their own impoverished experiences of higher education. As a group, they demonstrated more concern about differing learning needs, concentrating more on individual learning needs and how to facilitate this in a classroom situation and claimed to vary their style more in the classroom than wholist and analytic students. Further study is needed with greater numbers to gain further understanding of this particular cognitive style.

Veenman et al (2003) have questioned the extent to which self-reports truly represent actual study processes and performance in the classroom. In order to minimise this, peer review was encouraged whereby the students gave feedback to each other on their perceptions of each other's styles. In addition to this, workshop sessions tested preconceptions about learning by delivering in various styles and seeking feedback from the students, thereby enabling them to check their opinions. A recommendation is for further studies to be conducted in the classroom. However, the inherent difficulty with this is the interaction of the researcher's

cognitive style on his/her interpretation of what s/he sees. This is complicated further by the fact that cognitive style differences do present themselves in relatively subtle ways that also need to be disentangled from so many other factors affecting planning, delivery and assessment in schools and universities not least the culture of the school / university and the local / national policy agenda.

Any teacher education programme has to investigate 'the lived space of learning' (Boulton-Lewis, 2001) of each student, in terms of identifying their bias in the way in which they perceive and interpret different teaching and learning contexts. By sensitising individuals to 'how they learn' they should have a better understanding of themselves and of others. In so doing, one may also highlight the need for those tools to enable individuals to modify their style(s) and when faced with learning situations they, at first find difficult, develop strategies to cope with them. The interest in learning styles is especially poignant if one intends to truly offer an inclusive education for all learners.

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