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Teacher Educators and Learning Styles in the Learning and Skills Sector

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by

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Contents

ABSTRACT

The aims of this thesis were to describe the use of learning styles within the Learning and Skills sector; to investigate the reproduction of the conceptual confusion by teacher educators, to critically analyse the underpinning evidence in the learning styles debate and identify the reasons for the promotion of learning styles. The central research question investigated the extent to which teacher educators within the sector were aware of the debate around learning styles. The sub questions uncovered the beliefs of teacher educators towards learning styles and the rationales they used to justify their use.

A critical realist ontology was paired with a social constructionist epistemology and a qualitative design was applied. The chosen methodology was the in-depth, semi structured qualitative interview with a grounded theory approach to the data analysis. Sixteen respondents were recruited by theoretical sampling with nine of them being identified as 'supporters' of learning styles and six of them as 'detractors'.

The interviews took place outside of the interviewee's place of work and all relevant ethical guidelines were followed. The conversations were digitally taped and transcribed using a denaturalised strategy. The transcripts were coded using QSR NVivo and six major themes emerged. Two were In vitro themes 'Knowledge and Use of VAK' and 'Conceptual Confusion'. The rest were in vivo themes, 'Beliefs About Stereotyping', 'The Ofsted Hypothesis',' The Learning Styles Debate' and 'Enthusiastic Socialisation'.

The analysis of the themes provided a number of elements of interest and relevance. It was found that the VAK approach was not the most popular inventory used within the sector. That the conceptual confusion recorded in the literature, concerning learning styles, was reproduced almost identically amongst the supporters' beliefs. Both supporters and detractors believed that learning style diagnosis was unlikely to lead to the stereotyping of student approaches to learning. The belief that Ofsted supported and rewarded the use of learning styles' practice at inspection was influential amongst both groups. The supporters tended to suppress and distort the implications of the debate surrounding learning styles; they were shown to be less

willing to present the debate as a part of their teaching practice when compared to the detractors. The analysis also showed that supporters were more likely to experience an enthusiastic introduction to learning styles. This analysis provided answers for all of the research questions as it highlighted that all of the interviewees were all cognizant of the styles' debate. The beliefs of the supporters and detractors alike regarding learning styles were compared and contrasted and their rationales and justifications were highlighted.

The grounded theories that emerged from the analysis offered a number of strands of new knowledge. The most important new knowledge to emerge regarded the role of initial teacher training and/or colleagues in providing an enthusiastic socialisation into learning styles theory and practice. If such an introduction occurs it can facilitate a confirmation bias that leads to a robust and positive belief system that rejects modifies or ignores contentious research evidence. The supporters of learning styles exhibited a reliance on personal opinion and experience in preference to empirical evidence as a result of the bias.

Recommendations were proffered to modify the practice of teacher educators to ensure that the debate around learning styles was presented accurately. Directions for future research were described.

Acknowledgements

Glossary

ALI	Adult Learning inspectorate
Becta	British Educational Communication and Technology Agency
BERA	British Educational Research Association
Demos	Cross party political British think tank
CSI	Cognitive Style Index
DfES	Department for Education and Skills
ELSIN	European Learning Styles Information Network
FE	Further Education
FEI	Further Education Institute
H&M	Honey and Mumford
HE	Higher Education
HEI	Higher Education Institute
ITT	Initial Teacher Training
LSDA	Learning and Skills Development Agency
LSI	Learning Styles Inventory
LSQ	Learning Styles Questionnaire
L&SS	Learning and Skills Sector
LTSN	Learning & Teacher Support Network
MBTI	Myers Briggs Type Indicator
MI	Multiple Intelligences
Ofsted	Office for Standards in Education
PCET	Post Compulsory Education and Training
TES	Times Educational Supplement
TIP	Theories in Psychology (website)
TSI	Thinking Styles Inventory
VAK	Visual Auditory Kinaesthetic
VAKT	Visual Auditory Kinaesthetic Tactile
VARK	Visual Auditory Read/write Kinaesthetic

CHAPTER ONE

RESEARCH QUESTIONS, AIMS AND CHAPTER SUMMARIES

This thesis deals with the concept of learning styles, it will specifically investigate their use by teacher educators within the Learning and Skills Sector (L&SS). It will critically evaluate the research, theory, philosophy, policy and practice that inform the debate that surrounds their use. The views of teacher educators within the L&SS will be sought to illuminate how they use learning styles inventories (LSI). More importantly the thesis will uncover why LSI are still used within the sector despite the established and growing corpus of research evidence that cautions against their use. The evidence to support the use of learning styles is flawed and of a poor quality when compared to the evidence against their use. In short the extant supporting evidence does not justify their continued use within the L&SS. Therefore the aims of the thesis are to,

- describe the use of LSI by teacher educators within the L&SS
- investigate the reproduction of the conceptual confusion that exists within the learning styles field by teacher educators within the L&SS
- critically analyse the supporting evidence that underpins the theory and practice of learning styles.
- identify the reasons that underpin the promotion of learning styles within the sector

The main research question that this thesis aims to answer is:

> To what extent are teacher educators aware of the contested nature of learning styles within the sector?

In addition two further sub-questions will be investigated:

> What are the beliefs held by teacher educators that facilitate the continued application of learning styles within the sector?

Do specific rationales exist to justify the use of learning styles by teacher educators within the sector?

Learning styles are theoretical orientations diagnosed by various instruments, inventories or questionnaires. These instruments are designed to measure and/ or predict specific cognitive, social, biological and behavioural aspects of individuals in relation to how they might learn or think the most effectively. The diagnoses of such instruments are held to indicate which learning strategies should be pursued by individuals for optimal learning to occur. There is a fear that such diagnoses can lead to students being rigidly categorised in line with their diagnosis leading to a degradation of their educational experience.

I have chosen this topic because my role as a teacher educator within the L&SS has brought me into regular contact with the theory and practice of learning styles. As an evidence-based practitioner I have investigated the literature that sustains learning styles and found that it lacks empirical substance and rigour. The weaknesses within the theoretical underpinning have been highlighted by Coffield et al's (2004) review for the Learning and Skills Development Agency and Pashler et al's (2009) review for the Association for Psychological Science. The practical and pedagogical shortcomings are also highlighted by Hatties` (2009) meta-analysis. The evidence from these and other studies have raised the question of why are teacher educators still promoting learning styles in their practice?

The thesis will demonstrate that the negative conclusions of such research, whilst valid, are not new but have been recognised within the field for decades. Therefore the community of learning styles supporters are aware of the contradictory research evidence that has accumulated over the last few decades but have done little to address the questions raised by this research. This inertia has been reflected in the stance of teacher educators within the sector who have continued to promote learning styles as an accepted, rather than a contested facet of education within the Learning and Skills Sector. Learning styles are still seen as an accepted part of teaching theory and practice within the sector; they are promoted as good

practice for illustrating differentiation during inspection, despite the evidence against their use being well publicised within the public domain.

This situation has led me to believe many teacher educators within the sector may not be aware of, and/or have not engaged with the learning styles debate. This is leading to the dissemination of learning styles theory in an uncritical fashion which encourages the proliferation of the use of LSI throughout the sector as a whole. Thus teacher educators are encouraging the use of learning styles without acknowledging their criticisms. The theory and practice of learning styles and its attendant debate is a concept that teacher educators must be made aware of if they are to avoid being criticised for perpetuating a myth. Teacher educators are in a privileged position being able to reproduce and distribute ideas amongst new cohorts of educators therefore they must ensure their syllabi are accurate and inclusive.

To the best of my knowledge no studies have so far been undertaken into the perceptions of learning styles practice by teacher educators within the L&SS, it is the intention of this thesis to directly redress this point. In this way the thesis will directly contribute new knowledge to this area and its attendant debate. The study will gather and analyse the attitudes of sector based teacher educators; compare their personal views and attitudes against the theories that exist within the literature and ascertain to what extent these views converge and are based on reliable evidence. This thesis will also investigate the evidence for and against learning styles and assess its impact on teacher educators` practice and professional attitudes.

Chapter summaries

Chapter two provides a policy context and background for learning styles; it will examine the stance of the last New Labour government towards learning styles and the promotional activities of the DfES during their time in office. The role of personalisation and other policies in rekindling educational interest in learning styles within the L&SS is analysed and the historical influences on these policies are traced back to the end of the last century. It is proposed that all of these policies had a direct effect in

promoting style theory and suppressing their contested nature. The impacts of the personalisation policies on Ofsted, inspection and educational practice are assessed.

The conceptual framework is presented in chapters three and four. Chapter three critically assesses the role of the dominant Visual, Aural and Kinaesthetic (VAK) type learning styles on sector practice. The analysis is extended to include other learning styles' instruments with a consideration of the evidence that has created the debate over their use. The promotion of style theory by the DfES and teacher education within the sector is discussed. The confusion that exists within the styles' field regarding the matching hypothesis, cognitive styles, learning strategies, approaches to learning and personal and intellectual styles is illustrated and critically discussed,

The fourth chapter explores the established and more recent research evidence against learning styles to demonstrate that the problems associated with them are well known and understood by all involved. It also considers why much of this evidence has been marginalised or ignored. The focus for this chapter is provided by Coffield et al's (2004) review and it is substantiated by earlier and later research for the purpose of triangulating the criticisms. The problems of styles stereotyping are discussed and the intuitive appeal of learning styles and the effects of confirmation biases are explored.

In chapter five the methodological framework is identified, explained and justified. Its philosophical underpinning is explored and linked to the design of the study. A rationale and justification for the choice of a qualitative framework using grounded theory is proposed. The facilitation of validity, reliability and generalisability is explained in the terms of the study's trustworthiness.

The explanation and justification of the research approach provides the focus for chapter six. This chapter discusses the interview schedule and

provides a detailed overview of the procedure used to collect and analyse the data. It provides a justification for the selection of the semi-structured interview approach and theoretical sampling method. The sample is described, the unit of analysis is declared and the development of the codes, sub-themes, themes and grounded theories generated are documented. Ethical considerations and the strategies chosen to protect the interviewees are also outlined.

The findings are described and explored thematically in chapters seven and eight with links being made to the extant literature. Chapter seven deals with the in vitro themes and chapter eight with the in vivo themes found in the analysis of data. There is also a declaration of the new knowledge that can be added to the debate regarding the contested nature of learning styles theory and practice. This new knowledge has implications for practice discussed in the following chapters.

The ninth chapter provides a summary review of the development of the thesis, its conclusions with their rationale and justification. The contribution of this new knowledge to the styles debate by the thesis is summarised and the implications and recommendations for the professional practice of teacher educators within the sector are outlined. Some new directions for future research, prompted by the findings of the thesis are briefly discussed

The final chapter comprises of a series of personal reflections focussed on the experience of undertaking this study in the pursuance of the Ed.D.

CHAPTER TWO

THE PERSONALISATION OF LEARNING

This chapter looks at governmental policies that have driven the learning styles agenda. It argues that political and educational interest in learning styles was initially revived by the Dearing Report on HE in 1997. The report facilitated the application of style theory that influenced New Labour's personalisation policies. This in turn impacted on Ofsted inspection processes further encouraging the use of style theory in British FE. The chapter further argues that the DfES encouraged learning styles by overlooking the styles debate so as not to hinder policies that required their use.

Policies and learning styles

Governmental interest in LSI can be traced back to the Dearing Report of 1997 which promoted a radical overhaul of HE in England to facilitate its expansion during its funding crisis (Parry, 2004). The review proposed that HE policy towards mass education be expanded following the Scottish model of involving FEI's in its future provision (Parry, 2004). The expansion would form part of an equitable learning society accessible to all with talent. The report championed the role of learner centred approaches, proposed support for key skills in communication, numeracy, IT and learning how to learn. Dearing wanted all HEI's to prioritise the development and implementation of teaching and learning approaches that promoted student learning. This emphasis on widening access to continue the movement towards a mass HE system with the learner having a central role created pressures to change curriculum delivery models. It was this pressure that stimulated the renewed interest in learning styles (Smith, 2002). It appears that LSI had a role to play when the report defined effective learners as those that could '…understand their own learning styles and to manage their own learning' (Dearing, 1997:p24). Many of the responses to Dearing suggested that key skills would be best implemented in degree programmes

by the inclusion of participative teaching methods and learning styles. McLoughlin's (1999) interpretation of the review claimed it endorsed learning styles and learner centred approaches in general. She proposed that all instructional materials should consider learning style theory during development. In response to Dearing, Cartney (2000) suggested that learning styles' theory should be used to facilitate aspects of social work student's education. Thus the Dearing Report provided a platform for learning styles and their use within higher education and by extension further education

Those within the sector could be forgiven for assuming that Dearing's promotion of style theory was evidence based. At the time it may have seemed unlikely that the '…groaning din of evidence…' (The Independent, 1997: p 17) generated by the review panel would omit any contested aspects of a theory it was giving prominence to. A consequence of this raised profile was the inclusion of learning style theory within the New Labour government's personalisation policy for learning in compulsory and further education in 2003.

Personalisation of learning

Leadbeater (2003) was instrumental in promoting personalisation with a report for the think-tank, Demos. According to Campbell et al (2007: p136) he:

> …speculated that personalisation could become as powerful an organising logic for re-shaping public sector services in the coming decade as privatisation had been in the 1980s and 1990s.

Leadbeater (2003) proposed that the five most salient features of personalisation were:

1. providing more customer friendly services;
2. giving people more say in navigating their way through services;
3. giving users more say over how money is spent;
4. users becoming co-designers and co-producers of services;

5. self-organisation by individuals working with the support and advisory systems provided by the professionals.

Coverage of the first three points would lead to what Leadbeater saw as shallow personalisation whilst coverage of these and the last two would produce deep personalisation. This version of personalisation is seen as more desirable because of the direct involvement of the service users. Shallow personalisation occurs when fewer of these points are covered and thus provides fewer opportunities for users to tailor the services to their needs. However when more points are covered especially 4 and 5 the services provided are much more amenable to personal change by the users.

It was Leadbeater's view that the application of personalisation was particularly appropriate to education. He suggested that personalisation should support a basic single curriculum but that learners would engage with it in ways that made sense to them. This would allow individuals to decide what they wanted to learn and how they would like to accomplish it by encouraging '…individual interpretations of the goals and values of education…' (Leadbeater, 2003:68). Thus for deep personalised learning to work Campbell et al (2007) suggested that the government would have to encourage educational institutions to create networks with other relevant institutions and agencies. These networks would allow students access to a broad range of resources and opportunities allowing them to create personal learning pathways. The offer of a customised educational pathway chosen across different institutions could facilitate deep personalisation. It would however run contrary to the marketisation approach to education as facilitated by encouraging the parental choice of school for their children (Harris and Ranson, 2005). The choice and customisation within the New Labour policy stopped at allowing a mix of vocational and academic learning for older students (Campbell et al, 2007) facilitating only shallow personalisation. Deep personalisation would have required New Labour to relinquish control of the curriculum so that service users could have input to the design and production of a unique pathway

through the curriculum. There was nothing in their policies to indicate they were willing to deregulate their '…state-controlled, directly delivered and non-negotiable curriculum…' (Campbell et al, 2007:138).

The facilitation of personalised learning, using an open access curriculum, would require a shift towards alternative pedagogies. In this context teachers would assist in the co-production of knowledge within the classroom rather than imparting fully formed expert knowledge. They would become educational counsellors helping students engage with services, resources and pathways that met their needs and requirements. Thus deep personalisation has a social constructivist approach; it provides Vygotskian scaffolding within which learners construct their own learning (Campbell et al, 2007) this was clearly absent in the New Labour policies.

Regardless of these anomalies Tony Blair launched New Labour's vision of personalised learning at the party conference in 2003. Over the following two years the minister of State for School Standards, David Milliband, undertook the promotion of the policy. Despite this high level of ministerial involvement there remained a lack of clarity regarding the structure and implications of its application (Johnson, 2004; Bird 2006). The publication of the White Paper (DfES, 2005) did little to resolve this situation, its personalistion chapter failed to conceptualise the approach or its policy implementation (Campbell, 2007). As Burton (2007) indicated, New Labour's personalised learning was an extension of differentiated learning and as such it was an augmentation of old policy rather than the creation of a new one. Thus it is unclear whether New Labour policies were pursuing personalisation or differentiation.

Whilst learning styles never formed a major strand of the policy for personalisation, the strategy explicitly required their application.

Miliband (2003:5) claimed that personalised learning occurred when five conditions were applied

1) We recognise that each child is special;
2) We use assessment to inform and adapt teaching and learning;

3) We use teaching styles to bring out the talents of each pupil;

4) We extend curricular choice to develop individual talent;

5) We ensure pupils are able to join out-of-school endeavour in music, art and sport as well as science and English to formal learning.

Point 1 articulates the premise of all approaches to learning style, namely that student diversity requires an approach that meets individual needs. Points 2 and 3, whilst dealing with assessment and teaching style also suggest that a tutor's approach should be modified, based on assessment data, to fit the needs of individual students. Milliband (2003:5) reinforces this point claiming that the best teaching relies on the teacher's understanding of a learner's strengths and weaknesses divined from an '…assessment for learning and the use of data and dialogue to diagnose every student's learning needs'.   Where this diagnostic data and dialogue would come from had been made explicit by Miliband (2004:3) when he proposed that '…careful attention is paid to their [student] individual learning styles, motivations and needs…' This would lead to 'Decisive progress in educational standards…' (Milliband, 2004:3).

Thus learning style was to be a part of the strategy. This was confirmed by the Specialist Schools Trust when Milliband (2003:6) proposed that teaching and learning strategies should accommodate '…different paces and styles of learning…'. He also suggested that learning styles were in contemporaneous use claiming that many schools were already '…helping teachers adapt their teaching styles to individual needs'.

Thus points 2 and 3 of Milliband's creed suggest that teaching style should be assessed and matched to student learning styles to bring out pupils' talents. The overview of the summary report findings into Personalised Learning from the National College for School Leadership (NCSL) by Barnes & Harris (2006:6) indicates that this is exactly how their respondents saw the situation,

> Teachers recognised that more effective use of pupil data could inform their teaching practice. This did not just include performance data but

that accrued from attitudinal surveys, mentoring-based discussions and that relating to learning styles preferences.

Therefore learning style assessment was now an expected component of the policy approach to personalisation, at least in the compulsory sector.

With the implications of the compulsory sector policy made clear the equivalent policy construction for FE began with a DfES consultation paper (DfES 2006). Whilst this document tended to avoid direct references to learning styles, thereby avoiding engaging with the styles debate, many indirect references existed. On page 5 of the paper it was pointed out that 'Only 40% of learners gave a high rating when asked whether their teachers know how they like to learn…' The use of the term 'high' was not operationalised or qualified therefore its significance may not be apparent. However if this figure is taken at face value then 60% of learners (in the sample) claim their teachers don't know how they like to learn. This situation requires a solution that would demonstrate to the students their teachers wanted to understand how they liked to learn. The implication of this claim is inescapable and leads to one possible student centred strategy whereby a concerned teacher could diagnose the learning styles of their students and match their teaching to them. For learning styles supporters at least, this would demonstrate that they did understand how their students liked to learn.

On page 7 when discussing what personalisation actually comprises of the document claims that it '…brings together a range of hitherto disparate practices into a single, unified and powerful approach.' (DfES, 2006). It is probable that one of the disparate practices would be learning styles. The document claimed that personalisation would lead to improved achievement because 'More active learners, who are involved in making choices about how they learn their subjects best; will also learn more effectively.' (DfES, 2006:12). New Labour's approach to personalisation was so shallow that the strategies available for learners to make such choices would be limited but learning style diagnosis could be one of them.

Annex A, section e, contained a statement that was reminiscent of the strategy in the compulsory consultation document, regarding the diagnosis of student learning needs. It proposed that the policy would enable '…teachers/tutors/trainers to use diagnostic information to differentiate their pedagogy to respond to the needs of learners…' (DfES2006:26).

This is a description of learning style theory in all but name, similarly the rest of the FE consultation paper falls short of using the term of learning style. However the implication, based on equivalent policy in the compulsory sector, is clear. Confirmation of this implicit promotion is provided by one of the student case studies 'I am a very visual person so I like to learn with film clips, pictures and diagrams, and I have been supported to become better at listening to learn… '(DfES2006:16).

The vignette illustrates a student discussing their use of the VAK LSI. They have identified their primary learning style as visual and justified this claim with examples of their learning preferences. They go on to explain that they are being encouraged to develop another style to improve their learning capability. Despite the attempts to obscure the role of learning styles their use appears to be promoted within the policy for FE. As Dunn et al (2009:139) claim differentiated learning is included in '…every school system's lexicon but without learning styles as its cornerstone, no one knows how to differentiate instruction…'

So why would the role of learning styles be obscured within the FE consultation? A possible explanation from Johnson (2004) was that the introduction of personalisation was undertaken by ministers, the concept was not generated by academic research from practitioners. If this is the case it offers two explanations, either the ministers were not aware of the debate or they chose to ignore it? The former explanation seems unlikely given the high level of DfES engagement with learning styles (Revell, 2005).

There are other tensions within New Labour's approach to personalisation. Personalised learning is a part of the student centred approach to education proposed by Rogers (1980) that became popular because it increased students' self-esteem (Lawrence, 2006). The premise of this student

centred learning approach is that the closer the relationship between the teacher and the students the more effective the educational experience.

However the efficacy of student centred learning is contested. Di Napoli (2004: 3) describes student centred learning as a recognition '…that students learn in different ways and have different learning styles. Personalised/individualised responses are encouraged. This helps to foster creativity in students.'

Giles et al (2006:213) claim that much evidence that supports student centred learning is '… frequently limited to observational studies or limited in experimental design'. The results of their study, which compared the two approaches, suggested that teacher centred learning provided students with a slight advantage when compared to student centred approaches. Brabazon (2008) suggests that student centred learning's acceptance that all opinions on a topic have equal value in the classroom is flawed and that opinions supported by research are more valuable. She contends that whilst in some student centred approaches content may not matter, education requires a planned curriculum prepared in advance for it to be most effective. Elen et al (2007) claim that from a student's viewpoint both approaches have merit, student centredness provides interest and teacher centredness safeguards quality. They suggest that when the two approaches are combined effectively they both contribute to educational quality thus an interactionist approach may be a more suitable choice.

Knowles' (1990) theory of androgogy, inspired by Rogers' humanistic and individualistic commitment to his learners (Hanson, 1996) can be seen as an attempt to place adult students in a central position within learning. Knowles (1990) proposed conditions that would lead to superior learning including; learners participating actively in the learning process, accepting some of the responsibility for and committing to learning experiences and having a sense of progress towards their goals. These conditions appear to have some resonance with the rhetoric regarding personalisation. However Knowles' ideas failed because they were grounded in the abstract idea of an individual and ignored the social context of learning (Hanson, 1996).

Personalisation is not individualised learning it is a social enterprise with the onus on teaching shifting from the transfer of knowledge to the guidance of learners (National College for School Leadership, 2006). Without government and educational institutions relinquishing control of the curriculum this social context cannot be facilitated.

Past governmental attitudes

Despite the debate surrounding learning styles (Coffield et al, 2004) New Labour did have learning styles playing a role in their educational thinking. However restrained the promotion of learning styles within personalisation policies may have appeared the DfES made no secret of their support for them. Learning styles were well known to the policy makers and the term was fashionable within the DfES (Revell,2005). Evans and Sadler-Smith (2006) claimed that the VAK model was predominant inside the department at this time. This was confirmed by Geake (2005), who demonstrated that the official website of the DfES promoted and endorsed learning style' approaches. The DfES website for learning styles and brain-based learning referenced thirty-eight programmes for educational use. The resources were presented in a positive fashion and the website didn't engage with the critical aspects derived from the wider research findings (Geake (2005). A pamphlet on learning styles produced by the DfES clearly illustrates their position with the claim '…that the theory of learning styles is based on "tried and tested techniques" and draws on "academic research and the experience of practising teachers.' (Revell, 2005:1). The pamphlet was uncritical of learning styles theory, failed to mention the existing debate and avoided acknowledging Coffield at al's (2004) criticisms of the area. In a newspaper article for The Guardian, Coffield (2006:2) explained that he and his team,

> …produced two reports for the now defunct Learning and Skills Development Agency, which got cold feet and refused to launch them. It was afraid, as one of the government's "delivery partners", to back research it had itself funded, in case it upset the DfES.

It is hardly credible that the DfES were unaware of the debate surrounding the use of LSI so were they ignoring it?

Hall and Moseley (2005) pointed out the government's policy aimed to support lifelong learning amongst the workforce. It wanted to develop a workforce that was flexible and adaptable because it had learnt to learn. If the members of the workforce were able to understand their own approaches to learning they would be able to make career decisions more effectively. These policy aims were seen as '…the bedrock for social and economic survival in the twenty-first century' (Nixon et al, 2007:46). If this state was attained, Hall and Moseley suggested that learning styles would become a valuable currency. Thus the advantages for government were clear with the creation of a workforce that understood how it actually learnt. However this policy could not be applied if its central plank of learning styles was seen as contested therefore the DfES would have to avoid the debate if it was to further its policy.

In addition the application of learning styles would move the responsibility for quality improvement into the interaction between the instructional styles of tutors and the learning styles of their students (Coffield et al, 2004). If an individual failed to learn it would be because their tutor had not matched their teaching style to their student's learning style. In this way policy makers and educational management are absolved of the responsibility for enhancing quality. If learning styles were seen as contentious it would be difficult to shift the responsibility for quality onto the teacher student interaction. Thus the general acceptance of learning style theory could provide excuses for poor educational performance and attainment that wouldn't implicate government strategies.

In a broader sense, Snook (2007) suggests the ability to focus educational failure on teachers' shortcomings obscures the social causes such as poverty, finance, housing and health concerns. He claimed that social background is a far greater determinant of success or failure in education and the styles debate deflects attention from this. It could be argued that disseminating the practice of learning style measurement within education is a much cheaper option than dealing with social ills that create the inequality of opportunity in the first place.

The government then had a vested interest in not publicising both sides of the styles debate. The promotion of style theory would help the government to pursue its educational policies and would allow it to ascribe poor student attainment towards teachers failing to match their style to their students. It could also deflect criticisms of the government for not acting on social factors that promote the inequality of educational experience.

The government's promotion of style theory, its incorporation into personalisation and the claims of credible research provided pedagogical respectability for LSI. The educational community may be forgiven for assuming that the DfES had actually considered both sides of the debate before promoting styles.

Inspection and Learning Styles

Despite the change of government in 2010 the personalisation policies left an imprint on the inspection process. According to Nixon et al, (2007) the policy and practice of the DfES, Adult Learning Inspectorate (ALI) and Ofsted prior to the change, identified various models and aspects of learning style theory as good practice. This has led to teachers within the L&SS being encouraged to use them to illustrate differentiation in their teaching (Nixon et al, 2007; Tummons 2010).

Ofsted became involved with learning styles in the personalisation policy of New Labour with Milliband (2004:8) reporting that,

> …Ofsted will shortly be making proposals on inspection, which take full account of a school's self-evaluation. A critical test of the strong school will be the quality of its self-evaluation and how it is used to raise standards.

Milliband's personalisation and the DfES focus on learning styles may have made some feel that self-evaluation should include information gained from the diagnosis of learning styles. This is not a new view as prior to Oftsed inspections of FE, ALI (2002) tended to assess individualised learning through the matching of teaching and learning styles (Hall & Moseley, 2005). Perhaps in response to these pressures Harper (2013) noted that

references to learning styles, differentiation and personalisation have in recent years, been increasingly incorporated in lesson plans.

Between January 2010 and January 2014 Ofsted undertook 159 College or Learning and Skills inspections of institutions in the FE and Tertiary sector (Ofsted 2014). Of the inspection reports published 36 (23%) specifically mentioned the use of learning styles within induction, for differentiation or in teaching and learning. Of the 36 instances all reported the use of learning styles in a positive and uncritical fashion, there were no caveats that referred to the debate that surrounds their use (appendix 1). Whilst the majority of reports don't mention learning styles there are no instances of an institution being criticised for their use. However in some cases institutions are criticised for not fully utilising learning styles within their teaching and learning.

Thus institutions facing inspection visits can provide evidence of differentiation and personalisation, which is acceptable to Ofsted, by implementing a learning styles policy. This is a quick, inexpensive and often successful strategy to prepare for inspection, what Tummons (2010:99) describes as using a '…blunt instrument…' to illustrate differentiation in practice. He contends that a lesson plan identifying student's learning styles and providing teaching strategies to accommodate them will satisfy Ofsted requirements. The same view is held by Coffield (2005:28) recounting that after the publication of his critical reviews of learning styles, he and his team '…received a stream of emails from teachers complaining that inspectors and senior managers continue to recommend (i.e. insist) that they "differentiate" classes by means of learning styles.' The usefulness of such recommendations is however debatable as Kingston (2004:3) illustrates with the case of a catering course leader who provided learning styles questionnaires for his group. The results were discussed as part of one session but then,

> The matter is never raised again during the course but the course leader is able to claim in the self-assessment form for the forthcoming inspection that the college "diagnoses students' learning styles". Six months later inspectors commended this practice in their report.

Thus FEI aiming to improve or maintain their inspection grades may fuel this Ofsted hypothesis by encouraging or enforcing the use of LSI, in spite of the debate surrounding them (Martin, 2010; Tummons, 2010).

Recent comments from Ofsted however run contrary to the hypothesis when its then chief inspector Sir Michael Wilshaw spoke to the Times Educational Supplement (TES). He suggested that there is no right way to teach and that Oftsed inspectors mustn't give the impression that they favour a particular style of teaching, or that all teaching must always be matched to individual needs (Barker, 2013). The impact of this statement on teacher educators within the sector has yet to be assessed but will be investigated within the thesis.

Conclusion

This chapter reviews the drivers behind the promotion of learning styles in recent years. It demonstrates that government policies have been significant factors in the recent popularisation of style theory within the L&SS. The personalisation policy in particular would have required a large scale implementation of style theory across the relevant sectors. To facilitate this and other policies the government appear to have ignored the existence of the styles debate and promoted them positively to further their own policy ambitions. The DfES are also implicated in this situation in that their media appeared to promote learning styles without reference to their contested nature. This level of promotion has led to the hypothesis that learning styles were viewed as good practice within Ofsted observations. Thus learning style theory was perceived as being recognised and rewarded as a marker for differentiation in inspections. However this Ofsted Hypothesis has been refuted by its chief inspector's recent comments. The thesis will assess the impact of the governmental promotion of styles theory and investigate to what extent the Ofsted hypothesis is accepted, or not.

The next chapter critically analyses the impact of the Visual Aural and Kinaesthetic (VAK) type learning style models on education. These approaches were promoted by government as a model of good practice despite an absence of any compelling support from the available literature.

This is followed by a description of the conceptual confusion within the learning styles field in general that considers the quality of its supporting evidence.

CHAPTER THREE

LEARNING STYLES' THEORIES

This, and the next chapter will present the conceptual framework for the thesis. It will discuss the influence of the Visual Aural Kinaesthetic (VAK) type family of learning style models whilst critically analysing their underpinning evidence. Three representative models have been selected these are Smith's (1996) VAK, Fleming and Mill's (2006) VARK and Dunn and Dunn's (1999) VAKT. They have been chosen because of their influence and well documented claims, allowing them to be analysed and evaluated. The VAK-type models have been promoted by the DfES under New Labour, their effect is discussed and links are made to the role of Teacher Education. The conceptual confusion that exists within the learning styles field in general is considered with a critical discussion of the structure of learning style, the matching hypothesis, cognitive styles, learning strategies, approaches to learning and personal and intellectual styles.

Visual, aural and kinaesthetic type learning styles

Policy makers and researchers have conceptualised learning styles as being dominated by the VAK-type models which claim that learning takes place through activity in preferred sensory modalities. The VAK approach suggests that some individuals prefer to learn by using their visual systems; whilst others may prefer aural or kinaesthetic channels, or a mixture of styles. Using an LSI provides tutors with a diagnosis of their students' sensory preferences allowing them to present learning materials in ways that will appeal to their learning style. Thus visual learners will receive visual strategies such as diagrams, maps and visual presentations, aural learners will prefer listening strategies whilst kinaesthetic learners appreciate being able to move around and handle objects (Smith, 1996; Dunn et al 2009). Knowledge of these preference leads to the label of visual, aural or kinaesthetic learner. Sternberg and Zhang (2003:245) suggest that 'Learning styles are generally viewed as dealing with preferred

ways of learning material (e.g. orally, visually, kinesthetically).' Whilst this approach is not universally accepted, Burton (2007:8) sees this view as '…dangerously inaccurate…', although many involved in education do accept it (Leite et al, 2010). It is one of the most popular theories within the L&SS in the last few decades (Harper, 2013). The dominance of the approach is illustrated by Nixon et al's (2007) claim that they are familiar to most L&SS tutors. This dominance of the sector by VAK approaches will be assessed by this thesis.

There are variants to this basic VAK approach, Fleming and Baume (2006:6) proposed a VARK model with the extra category representing read/write strategies, they claim this model is '…heavily used…' within education. Whilst Dunn et al (2009) added a tactile category to create a VAKT approach.

All of these models propose that learners possess a preference for learning via one dominant sensory modality or a mixture of some or all of them. Evans and Sadler-Smith (2006) state that a lot of British schools have been using these models whilst Sharp et al (2008) see this approach as endemic in primary schools in England and Wales.

The DfES endorsed these models on their website (Geake, 2005; Hastings, 2005; Henry, 2007; Burton, 2007). Hastings (2005) suggested that the VAK system was the most widely promoted of all LSI by the DfES marginalising potentially more valid LSI (Hastings and Jenkins, 2005). These endorsements helped to popularise the model creating a situation where learning styles have become synonymous with VAK-type models.

It should be expected that VAK-type models would have a considerable and supportive literature; however Coffield (2008) suggested that the opposite is true. Sharp et al (2008) attribute the model's popularity and spread to word of mouth rather than weight of evidence. Whilst Reiner & Willingham (2010) claim its uptake is due to its widespread use and popularity rather than empirical effectiveness.

The paucity of empirical support for VAK approaches has led to attempts to link VAK-type models with other theories, notably Gardner's (1983) Multiple Intelligences (MI). At first glance there are similarities in that the VAK-type models and MI appear to be categorising approaches to learning based on individual preferences. The accelerated learning specialist Smith (1996) attempted to validate his version of VAK by linking it to MI theory. He claimed that VAK could be used to appeal to an individual's balance of multiple intelligences to accelerate learning. A point of view that Gardner (1993:44) disputed when comparing his approach to learning styles claiming that 'MI theory begins from a different point and ends up in a different place from most schemes that emphasise stylistic approaches…'

Similarly Rogers (2009) claimed that Fleming's (1995) VARK categories related well to Gardner's 8 intelligences. However in an interview with Passmore (2006:20) Gardner distanced MI from VAK-type models dismissing the assumption that modality specific processing improved learning 'What matters is the operations they [students] perform on the material they are absorbing, not how it got into the system.'

Gardner (1999) claimed that his theory should empower and develop learners not restrict them to mono-modality learning (McKenzie, 2005). He strongly opposed the idea of using single intelligences to label people, claiming that individuals possess a unique mix of them (Smith, 2002). Gardner (1999) stated there is no satisfactory way to measure the various intelligences empirically, thus attempts to approximate MI with VAK-type approaches become redundant.

Amongst VAK-type models there are three major traditions that have identifiable theorists associated with them. The first is the VAK system as popularised by Smith (1996) as part of his accelerated learning approach. The second is the VARK model of Fleming and Mills (1992) and finally there is Dunn and Dunn's (1978, 2009) VAKT.

Sharp et al (2008) documented the popularisation of VAK within primary schools that was undertaken by Alistair Smith in the late nineties. Smith promoted a model of Accelerated Learning in Primary Schools (ALPS) that

involved the VAK LSI. He published a number of influential books (Smith, 1996, 1998, Smith & Call, 1999, 2001) that outlined his ideas. The DfES (2002) recommended Smith's (1996) book '*Accelerated Learning in the Classroom'* in the National Strategy for Key Stage 3 English.

Whilst acknowledging he wasn't the originator of VAK or accelerated learning Smith claimed to be the first to use these and other brain based strategies in a package to increase the speed of learning. Sharp et al take care to show that much of what Smith proposes is based on sound pedagogical thinking; their critique is selective and focusses on the application of VAK.   Whilst Smith and Call (1991) did point out that students don't use one sensory style to the exclusion of others and shouldn't be labelled as such, it appears that many teachers didn't read the book for themselves and applied labelling as a consequence (Sharp et al, 2008). The points that Sharp et al make is that one, through popularising VAK Smith promoted student stereotyping. Some schools took labelling to worrying extremes with children wearing V, A or K shirts (Geake, 2008) or having desks labelled to indicate their diagnosed style (Henry, 2007). Secondly, Smith has no evidence base for his claims regarding VAK. Sharp et al, (2008:91) claim that to the best of their knowledge there is no independent research, '…producing conclusive evidence pointing unequivocally to such a close relationship between VAK and children's academic performance…'

Smith made links between VAK and neuroscience suggesting that an individual's preferred hemispheric learning activities could be improved using his theories. However Geake (2008) contended that this selective focus for learning on limited sensory modalities goes against the interconnected nature of neural processing; and may harm the academic prospects of those using it Karakas, et al (2014) see learning styles as neuro-myths, products of the gap between education and neuroscience and thus lacking an evidential base

In 2002 Smith retracted his support for VAK learning styles. He explained that his first book on ALPS was written quickly and given the chance to start

again he would approach it differently. Whilst affirming his continued support for an accelerated learning cycle itself he removed all reference to VAK from his approach to accelerated learning. He has since attempted to stop the continued sale of his early works that involved VAK (Revell, 2005).

The second tradition is represented by Fleming & Mill's (1992) VARK model, its mechanics are identical to those of VAK but include a Read/write category. This approach was developed by Neil Fleming and was based on personal observations that took place during his career as a school's inspector and member of staff at Lincoln University in New Zealand.   His evidence base (p4) was '… prior experiences and observations, and working with students and teachers at Lincoln University who provided my laboratory and practicum.' (Fleming & Baume, 2006:4).

Fleming claimed that people responded in different ways to questions such as asking for directions. He reflected on how people might prefer to receive directions, via a map, verbal instructions, written instructions or being accompanied to their destination? This process informed the first VARK inventory of thirteen questions, increasing to sixteen by version seven. The supporting evidence offered by Fleming is supplied by visitors to the VARK online questionnaire (www.vark-learn.com). Over 180,000 visitors undertook this LSI from March to September 2006 (Fleming & Baume, 2006). Individuals were asked if the results they received matched their own perceptions of their modal learning preferences, or didn't match them or they didn't know. The results were 58%, 37% and 5% respectively (Fleming & Baume, 2006). The accuracy of such results is debatable as Merrill (2000) and Rogers (2009) suggest that most students are unaware of their learning styles. Testimonials are provided from anonymous professionals and students identified as 'One teacher in the USA…', 'A French professor…' and 'Some students…' (Fleming & Baume, 2006:5). There is no robust evidence to support the claims made for the model. There is a validation paper by Leite et al (2010) subjecting the model to factorial analysis. The results indicated that the reliability estimates of the VARK were adequate. However the authors stated the results were preliminary and not conclusive without further evidence being collected. They

suggested that some of the test items were difficult for some respondents to interpret (p335), they '…seem to be more a reflection of the preferences of the audience the respondent is hypothetically addressing than the respondent himself…' They cite item number fifteen which proposes that,

> "You are planning a vacation for a group. You want some feedback from them about the plan. You would,
>
> - give them a copy of the printed itinerary
> - use a map to show them the places
> - phone, text or email them
> - describe some of the highlights they will experience"
> (VARK a guide to learning styles, online)

Leite et al suggest this could be seen as requiring an answer based on the respondent's view of what the holiday makers would prefer, rather than the holiday planner's preferences.

The analysis supported the use of VARK as a '…low-stakes diagnostic tool by students and teachers.' (Leite et al, 2010:336) but not as a research tool unless other sources of evidence could be found to support its validity. In summary Leite et al, (2010: p337) cautioned that '…researchers using the VARK should proceed with caution because the use and proposed interpretations of VARK scores have not yet received a comprehensive validation.'

The third tradition is the Dunn's VAKT model which claims to be supported by many studies from the USA and beyond. Although some of the studies are correlational many are claimed to be experimental (Dunn and Honigsfeld, 2013). However the available evidence to support this model is the subject of much debate (Kavale and Le Fever, 2007). Lovelace (2005) undertook a meta-analysis of the experimental research that used the Dunn and Dunn model between 1980 and 2000. She claimed her analysis found evidence that supported the model's validity and demonstrated the effectiveness of matching teaching to learning style. According to Dunn and Honigsfeld (2013) the effect sizes for Lovelace's analysis were medium to large when based on Cohen's (1992) definitions. However in their analysis of Lovelace's review Kavale and LeFever (2007) disputed the accuracy of

some of the statistical inferences and questioned the methods used to select studies. They pointed out that Lovelace, a student of Rita Dunn (one of the model's authors) had introduced a sampling bias into her study. Of the studies analysed 96% were dissertations and of these 70% were undertaken with the Dunn's as their supervisors.

The meta-analyses of Dunn et al (1995) have been similarly criticised. Landrum and McDuffie (2010) claimed they used 35 dissertations but only 1 peer reviewed study in the final analysis of their data. The computer based search by Dunn et al used the 'Dissertation Abstracts International', the 'Annotated Bibliography of Research' (1992, 1995) and 'Research on the Dunn and Dunn Model' (1992). Landrum and McDuffie point out that the last two sources are produced by the Center for the Study of Learning and Teaching Styles at St. John's University of which Rita Dunn was a professor of Education. Of the final thirty-five dissertations used, twenty of them were from St. Johns University leading Landrum and McDuffie to declare that the literature search was not full or comprehensive. Landrum and McDuffie (2010:13) concluded that the only reviews that provided support for learning styles came from Carbo (1983), Dunn et al (1995) and Lovelace (2005), they described these as relying '…heavily on unpublished reports (which lack the check point of peer-review), and too often include a preponderance of unpublished dissertations from a single university.'

In a test of the VAK-type approach Kratzig and Arbuthnott (2006) measured the learning styles of sixty-five students. Two measures of learning style were used, a self-report and the results from the Barsch Learning Styles Inventory which provides a measure of VAK modalities. The participants were given standardised tests of visual, aural and kinaesthetic memory; all participants were matched and mismatched against their dominant learning style.   No significant relationships were found between the perceptual learning style and its associated memory test. If the VAK approach had been supported strong correlations would have been observed between learning styles and their matched test of memory.

However VAK-type models are only one approach to learning styles with many models existing. This variety leads to conceptual confusion as Provost (1984:182) suggests '…learning style can mean anything from hemisphericity to one's method of sharpening a pencil.'

In trying to define styles Armstrong et al (2011) asked sixty-five members of the European Learning Styles Information Network (ELSIN) to provide definitions of cognitive and learning styles. The researchers analysed the definitions, extracted themes and constructed four new definitions of each. In the second phase respondents compared their original definitions with the researchers and rated them. Forty-seven responses were returned in this phase and these respondents voted in phase three on two definitions and provided reasons for their choices. Armstrong et al (2011:453) summarised the views and votes of the thirty-six who responded in phase four to determine the final definition,

> Learning styles are individuals' ways of responding (cognitively and behaviourally) to learning tasks which change depending on the environment or context. They can affect a person's motivation and attitude to learning, and shape their performance.

One problem with this definition is that not everyone see learning styles as being changeable, Bartlett and Burton (2007) claim they aren't liable to change. Hall and Moseley (2005) suggest a fixed/fluid dichotomy exists and the following models see learning style as a relatively fixed characteristic; Sheehan (1967), Paivio (1969), Marks (1972), Dunn & Dunn (1978), Gregorc (1982), Torrance (1982), Bartlett (1985), Gordon & Bull (2004) and Richardson (2005). This view is not universal but is influential with regard to the matching hypothesis and is one of the aspects that will be investigated in this thesis.

The matching hypothesis

Student motivation and achievement are claimed to improve when students' learning styles are matched by their tutor's teaching style (Dunn, 1993, 2009; Curry, 1999; Dunn and Griggs, 2000; Stitt-Gohdes, 2005; Favre, 2009; Pitts, 2010; Rogers, 2009;Tulbure, 2011). Although Deckinger (2000)

suggested that within any group being taught by matching there could always be some learners whose styles weren't reflected by the instructional approaches.

Presland (1994) was sceptical of the claims for matching, stating that there was no scientific evidence to support it. When Cronbach and Snow (1997) reviewed the area they concluded that matching instructional strategies to student preferences didn't improve performance and could be detrimental. In 2002 Stahl analysed five reviews of ninety studies on matching over a fourteen year period. He found no evidence that matching led to improvements in learning. More recent research bears this view out, The Association for Psychological Science commissioned Pashler et al (2009) to investigate matching. Pashler et al suggested an experimental paradigm for what they considered an adequate investigation of learning styles. Participants whose learning styles are known are randomly allocated into different groups. Each group is taught using a specified style that either matches or mismatches their learning style. When the students are tested at the end of the learning those who have been matched to their learning style would be expected to perform more effectively in comparison to those who have been mismatched. A review of the field found that this paradigm was rarely reported and of those examples that existed only the results of one experiment supported the predictions of the matching hypothesis. Discussing their review Rohrer and Pashler (2012) stated that they found about twenty studies that applied their suggested approach. Of these, three produced results to support the matching hypothesis although there were problems with two. In one study no measures of the data were provided whilst in another no measures of variability or effect size were given.

Alternatively some models identified by Hall and Moseley (2005:246) see learning style as a fluid characteristic; Kirton (1976), McCarthy (1981), Kolb (1984), Felder & Silverman (1988), Honey & Mumford (1992), Allinson & Hayes (1996), Herrmann (1999) and Hermanussen, Wierstra, de Jong & Thijssen (2000). This is problematic for matching as there is a logical requirement for the learning style to be a relatively fixed characteristic to enable matching. This dichotomy divides opinion with Pheiffer et al, (2005)

suggesting that there is not enough evidence to support matching. They suggest that career demands cause changes to learning styles over time so acquisition is developmental or staged. In support Charlesworth (2008) claimed that cultural background affected learning styles suggesting they were mediated by an individual's initial educational system, a view supported by Nielson (2008). Charlesworth proposed that learning style preferences changed within higher education. Longitudinal work by Vermunt and Sternberg claims that the learning styles of HE students are acquired over time via a socialisation process (Nielson, 2005). Mainemellis et al, (2002) suggested that to become a balanced learner an individual's learning style develops through a process of change and development.

It can be seen that these mutually exclusive approaches equate to either side of the nature/nurture debate. The nativists represented by those that see style as an innate characteristic, such as Dunn and Griggs (2000). Whilst nurturists like Honey and Mumford (2006) see style being acquired through environmental/developmental processes. Other theorists take an interactionist stance proposing that learning styles are relatively stable over time whilst being amenable to change due to various factors (Riding and Raynor, 1998; Pheiffer et al, 2005). This view is articulated by Cassidy (2004) who suggests that learning style has a structure that persists over time (trait) but that is capable of adaptation and change in response to the environment (state). The existence of this debate is divisive and Zhang and Sternberg (2005) admit it has yet to be resolved.

Cognitive styles

Learning styles are seen as a broad concept that include various cognitive, affective, psychological, biological, and social processes (Schmeck, 1998; Fatt, 2000; Knowles et al, 2005) and are indicative of different preferences for learning (Tickle, 2001). However Riding and Cheema (1991), Cassidy (2004) and Salvisberg (2005) propose that a learning style is a cognitive style applied in a learning context. The two terms are often used interchangeably (Schmeck, 1998; Kyprianidou et al, 2011) with Bartlett and Burton (2007) using the same definition to describe both concepts.

However Riding and Sadler-Smith (1997) see cognitive style as more enduring and pervasive than learning style. Similarly Knowles et al, (2005) claim there is an important distinction to be made between both concepts. They suggest cognitive style is a narrower concept than learning style; it is fixed or stable, acquired early in life (Sadler-Smith et al, 2000) and used to receive and process information. It is seen as being independent of intelligence (Riding & Pearson, 1994; Riding and Sadler-Smith, 1997; Sadler-Smith, 2001). Johnson (2009:2) defines cognitive style as '…a natural ability over which the learner has no influence…' Similarly Peterson et al, (2009) describe them as innate and stable with close links to the mechanisms that process information. Cognitive style is claimed to influence creativity, communication, problem solving, learning, interpersonal functioning (Cools and Van Den Broeck, 2008) and interpersonal cooperation (Armstrong and Priola, 2001). Peterson et al's (2009) survey showed that the majority of their sample of 94 style researchers made a meaningful distinction between the 2 concepts. They found that 64% of their sample agreed or strongly agreed that cognitive style was fixed and unchangeable whilst only 33% indicated similarly for learning style.

Many theorists question the view that cognitive style is fixed (see Driver, 2000; Sitko-Lutek et al, 2000; Armstrong, 2002; Thies, 2003). Rush and Moore (1991) suggest that individuals with a field dependent cognitive style could with the correct training gain access to skills exhibited by field independent learners. Whilst the degree of cognitive style malleability due to the effects of individual differences (Evans, 2004), culture, education and social environment (Cools, 2009) is not clear the fixed/fluid debate within the field of cognitive style will remain unresolved.

Learning strategies

Learning strategies can be action plans created to help acquire knowledge through study (Sadler-Smith, 1996). They are the methods consciously chosen (Curry, 1999) and used by students to facilitate learning and include strategies to improve memory, such as the method of loci, mind mapping and exam revision techniques amongst others (TIP, 2009). Sadler-Smith

(1996) Hartley (1998) and Burton (2007) suggested that learning style choice may be automatic and habitual whilst learning strategy choice is optional.

However Bostrom and Lassen (2006:179) don't agree that the choice of a learning strategy is wholly optional, they describe learning strategies as,

> …conscious or unconscious choices made by teachers or students as to how to process given information and demands of a learning activity … They include learning style, but are broader concepts with various methods (for example: memory strategies, note-taking techniques, and emotional and cognitive strategies).

Thus learning style may be seen as a component of a learning strategy. Adding to this view Sadler-Smith (1996:31) claims that strategies are '…derived in part from the draw-backs of the style.' However Ekwensi et al (2006:76) claim that the strategies should be based on many learning styles and claim that the learning strategy will '…determine the approach for achieving the learning outcome…' rather than the influence of the learning style. It appears that the difference between a learning style and learning strategy is not well understood or has not been well articulated.

Learning approaches

Approaches to learning occupy a school of their own according to Cuthbert (2005) who claims they are differentiated from learning styles in three ways. Firstly, learners exhibit different levels of engagement, some will learn for understanding, others for reproduction and some for achievement. Secondly the approach is consciously chosen by the learner and is based on prior experience but is task specific and thus free to vary.   Finally it is thought that if the learner's intentions are understood than manipulation of the given task may cause the learner to respond more effectively.

Approaches to learning were first introduced by Marton and Saljo in 1976 (Cuthbert, 2005) they proposed that learners could learn using a deep or surface approach. Whilst this theory has been explored and extended by Biggs (1987), Entwhistle (1981), Schmeck (1983) and Marton & Booth (1997) its main proposition is of a simple dichotomy.   According to

Entwistle (2001) learners can undertake their tasks using a deep approach requiring an active engagement facilitating expansion and elaboration of the material. The aim of this strategy is to create a personal understanding of the material. In contrast surface learning uses routine memorisation strategies to meet assessment requirements.

Pask (1976) also introduced a dichotomous model when he distinguished between holist and serialist learners. However despite similarities with Marton and Saljo's categories Pask saw his model as representing a learning style not an approach. The holist learner is characterised by a preference to impose their own organisation on new material, building a broad view of the topic making links with other ideas and theories. These approaches are identical to the elaboration techniques of 'deep' learning. The serialist style describes a learner who prefers a structured step by step approach to learning that focuses on the subject matter in isolation (Entwistle, 2001).

Another dichotomous model developed by Witkin et al (1977) proposed that an individuals' cognitive style could manifest in one of two ways, namely field-dependent or independent. The field-dependent learner is likely to perceive objects as a whole and will be more likely to approach a given task holistically. However the field-independent learner tend to perceive figures as separate from their background and take a more analytic approach (Chen et al, 2004).

Marton and Saljo (1976) saw their model as an approach, Pask (1976) described his as a learning style and Witkin et al (1977) saw theirs as a cognitive style. The similarities between the models and their three dichotomies are striking. For example deep learners, holists and field-dependent learners all appear to use elaboration strategies and try to understand the area as a whole rather than employing a piecemeal approach to learning. Other dichotomous models exist that display these characteristics such as the Global versus Analytical approach. A global learner attempts to take in a whole concept before acquiring the details. In contrast the analytical learner (like the serialist and field independent

learner) acquires and processes information one step at a time (Arthurs, 2007). To further extend this comparison Knowles et al (2005) claim that the global versus analytical dichotomy equates to the intuitive versus sensing scale of the MBTI. Other dichotomous measures include Impulsive-Reflective (Kagan et al, 1964) and Diverger - Converger (Hudson, 1966). Riding and Sadler-Smith (1992) claimed that field dependence or independence was measuring the same concept as Kagan's reflective - impulsive cognitive style.

The similarity of the characteristics these models measured allowed Riding and Cheema (1991) to develop a super-ordinate model of cognitive style based on two statistically unrelated characteristics, verbaliser–imager and wholist–analytic. The verbal–imagery scale measures a preference for acquiring information using images or words. Whilst the wholistic–analytic dimension indicates a learner's preference to acquire a concept as a whole or broken down into smaller pieces. Riding and Cheema surveyed thirty models of style (Peterson et al, 2009) and claimed that all of these measures could be collapsed into their model.

Personal styles

Some researchers have attempted to reduce conceptual confusion by developing overarching constructs that contain learning styles, cognitive styles, approaches and strategies within them.   Sadler-Smith (2001:292) suggested the confusion surrounding the term learning style originates when it '…is used as a portmanteau term for a range of individual difference constructs encompassing, among other things, learning preferences, learning strategies, approaches to studying and cognitive style.'

In 1996 he suggested the term personal style could be used rather than learning style to help end the confusion surrounding it. Personal style was envisaged as a framework that would consist of learning preferences, learning style and cognitive style that Sadler-Smith claimed were distinct but complementary components. This approach has not become popular as the amalgamation of so many concepts does nothing to help simplify the field or ameliorate criticisms of LSI.

Thinking and intellectual styles

Another attempt to create a single styles framework came from Sternberg and Zhang (2003) who describe a thinking style as a preferred way of thinking about a topic. They define them as an individual's preferences for using their cognitive and psychological abilities. These hypothesised thinking styles are used to govern the individual's mental activities, hence the Theory of Mental Self-Government (Grigorenko & Sternberg, 1995; Sternberg & Zhang, 2003). This approach has led to what Zhang and Sternberg have labelled an Intellectual Style (2005). This is a label to describe all of the style constructs not just learning and cognitive styles but also problem solving, decision making, thinking style etc. Intellectual style represents an individual's preferred approaches to using their abilities for information processing tasks (Clarke et al, 2010: Zhang et al, 2012).

The Thinking Styles Inventory (TSI) has proved somewhat heuristic but results from reliability and validity testing studies has been very similar to those experienced by standard learning styles models and suggest that thinking styles suffer from the same conceptual and psychometric issues. Although Sternberg (1997) has claimed the model to be reliable and valid these claims have received little empirical support. A study by Yun Dai & Feldhusen (1999) found evidence to support the external discriminant validity of the inventory but couldn't fully support its internal validity. Factorial analysis of the TSI failed to confirm the five factor structure and also indicated psychometric weaknesses in 64 of the scale's 104 items (Black and McCoach, 2008). The TSI failed to meet all of the minimum requirements for reliability and validity in the Learning and Skills development Agency (LSDA,2004) review: in general the empirical support for Sternberg's TSI appears weak; the validity and reliability scores are lower than those claimed by the author (Coffield et al, 2004). The TSI '…should not be used as the theoretical justification for changing practice.' (Coffield et al 2004: p 56).

Conclusion

This chapter has demonstrated that the VAK type approach to learning styles is contested, flawed and not supported by the available evidence. Its popularity has been helped by DfES support and claims by various theorists that are strongly contested. The chapter has shown that such claims do not stand up to close investigation. The conceptual confusion that is apparent throughout the field demonstrates that there is no one accepted concept, definition or description of what a learning style truly is. The suggested differences between learning and cognitive styles are not accepted globally and some theorists don't differentiate between the two concepts. Other related concepts such as learning strategies and approaches also suffer from the field's inability to provide useful and acceptable descriptions. Thus the field lacks a paradigm that holds it together producing competing style models with little in common. The lack of consensus on the nature/nurture debate within the field highlights its disparate and fragmented structure. This thesis will investigate the instability and conceptual confusion within the field to assess how this is reproduced, rationalised or ignored by teacher educators in the L&SS.

The next chapter reviews the evidence that has aggregated against learning styles over the last few decades. This evidence highlights the unstable nature of the field and its other failings which are often ignored. Although the focus is driven by the LSDA review of Coffield et al (2004) the next chapter demonstrates that the same criticisms have been made by others in the field both before and after the review's publication. The role of confirmation biases are discussed in an attempt to explain why these criticisms continue to be ignored by the styles community.

CHAPTER FOUR

CONTEMPORAY AND HISTORICAL CRITICISMS

This chapter reviews the evidence against the use of learning styles and shows that the problems highlighted by more recent studies have been acknowledged by the styles community for some years now. The focus is provided by Coffield et al's (2004) review and is augmented by earlier and later research to triangulate the criticisms. The psychometric rigour of learning styles is critically analysed, the lack of a paradigm for research is highlighted, the field's conceptual confusion is revisited and the use of stereotyping is explored. The chapter ends with a discussion of the effects of confirmation bias on the role of teacher educators within the sector.

Coffield et al (2004)

This chronic inconsistency within the styles field has led to criticism from reviews of the evidence by both supporters and detractors (see Curry, 1990; DeBello,1990; Reynolds,1997; Hattie, 2009; Pashler et al, 2009). However the highest profile critique was the systematic review by Coffield et al (2004) for the LSDA. It gathered three thousand eight hundred references, of these 631 were used to represent seventy one LSI. Thirteen were then chosen for in-depth analysis because they had a high profile in the field, were based on explicit theory, seen as heuristic and widely used in practice (Cofffield et al, 2004). Psychometric status was assessed by investigating internal consistency, test-retest reliability, construct and predictive validity (table 4.1 appendix 4) with the key sources being the LSI authors.

Both Riding and Sternberg failed to meet any of the criteria, whilst Jackson's model was too new to have been evaluated. Models meeting one criterion were Dunn and Dunn, Gregorc, Honey and Mumford and Kolb. Those meeting two were Entwistle, Herrmann and Myers-Briggs, whilst Apter and Vermunt met three, only Allinson and Hayes met all four criteria.

After publication Ashwin (2005) conceded that Coffield et al's *review* raised concerns that were not new or surprising, in 1990 and 1991 Curry expressed similar concerns and doubts about the validity of learning styles a theme taken up by Reynolds in 1997. Snider's (1992) contention that there was a lack of convincing research to support the claims made for learning styles was echoed by the LSDA report describing styles' research as small scale, unstructured, lacking criticality and inward looking. Styles theorists have been aware of these concerns which Coffield et al (2004:53) referred to as 'Continuing problems within the research field …'

Conceptual confusion

That a field of research can be shown to be confused, theoretically conflicting and disorganised yet still exert a strong influence on tutors within the L&SS is puzzling. The review indicated that style research suffered from a lack of consensual or coherent theory, a widely accepted criticism (Anderson & Adam's, 1992). In his review DeBello (1990:203) claimed, 'There are nearly as many definitions of learning styles as there are theorists'. The field has been criticised for theoretical confusion, disputed and overlapping definitions, inappropriate measurement and the poor validity of many of the instruments developed (Messick, 1984; Tiedermann, 1989; Curry,1990; Furnham,1992; Sadler-Smith, 2001; Entwistle & Peterson, 2004; Pitts, 2010). The area is seen as disjointed, disparate and '…littered with a confusing array of terms, definitions, models and measures' (Cassidy, 2004:425). Swailes and Senior (2001) proposed that the field would benefit from a unifying theory, Evans and Sadler Smith (2006:78) claim that the area is '…a field of study which lacks a broad and unified explanatory theoretical underpinning.'

Adding to the confusion Dunn et al (1981) claimed to have developed a paradigmatic model yet as Dunn (1984) herself admitted her model wasn't the only one available. Throughout the seventies Canfield and Lafferty (1970), Gregorc (1979), Hunt (1979), Kolb (1976), Ramirez and Castaneda(1974) and Schmeck et al (1977) developed models, thus Dunn's paradigm was one amongst many. This led Dunn (1984:11) to claim that

although these models differed from one another '…their many strands revealed essential similarities and were mutually supportive…' She proposed that these models described different aspects of the same concept. When Ferrell (1983) undertook factorial analysis on the Dunn's and Kolb's LSI along with other inventories he concluded that they did not measure the same thing. If as Dunn claimed a paradigm existed, then as Willingham (online) proposed its isolation and observation would be apparent in experimental work and as Pashler et al (2009) have demonstrated this is not the case.

Prior to the report Curry (1999) and since then Kyprianidou (2011) observed there was no standardisation of terminology across different models; different researchers described the same constructs using different terms. According to Duff (2003:29) the ability of learning styles to aid learning is restricted '…by the variety of conceptualizations, constructs and instruments.' Part of the reason for this diversity is the composition of the field, Coffield's review (2004, p 34) stated it, '…consists of a wide variety of approaches that stem from different perspectives which have some underlying similarities and some conceptual overlap. There are numerous groups working in isolation from each other…' Bishka (2010) identified the perspectives as psychology, sociology, business, education and management amongst others. Yet styles research is isolated from mainstream psychology and cognitive science (Shipman & Shipman, 1985; Kozhevnikov, 2007). The field's links with neuroscience are also tenuous; Greenfield (interviewed by Henry, 2007) dismissed learning styles as nonsense from a neuroscientific perspective claiming that thirty years of research by educators had failed to find supporting evidence. Geake (2008:124) states that the evidential claims for LSI lie with '…various enthusiastic promotors…' within style research not neuroscience. He observed that the bonafide evidence from neuroscience often contradicts the claims of LSI. However as Pickering and Howard-Jones (2007) suggest neuroscientific knowledge may require translation to be of use for educators. Geake (2008:124) highlighted the '…critical necessity for a

mutually comprehensible language with which neuroscientists and educators can engage in a genuine interdisciplinary dialogue.'

Coffield et al (2004:10) described the relationships between style researchers as a form of '…intellectual trench warfare…' where established models are defended against differing perspectives. Whilst Coffield et al (2004) concede this situation is common in many academic areas it is a prominent feature of the styles field. As a consequence of this situation Riding and Cheema (1991) observed that many researchers present a limited account of the number and variety of instruments and theories that are available to measure style. The thesis will investigate the level of confusion by assessing the application of knowledge by LSI users.

Financial considerations

The educational think tank Demos (2004:11) claim that some authors of LSI are '…not by any means always frank about the evidence for their work, and secondary sources…may ignore the evidence altogether, leaving the impression that there is no problem here.' This situation is common because as Burton (2007) states the financial rewards for the authors of popular LSI are considerable, especially when a fee is required to use them (Hill, 2008). The production of learning style tests, handbooks, textbooks and instructional seminars is a thriving commercial endeavour (Dembo & Howard, 2007; Pashler et al 2009; Kappe et al; 2009 Vorhaus, 2010) an '…industry of expensive seminars and guidebooks…' (Wilson Quarterly, 2010:74). Commentators like Snook (2007) suggest that the beneficiaries of these activities include academics' careers, publishers' profits and private training schools and private trainers' marketing strategies. In 2003 the cost of a week's training course from the Dunns was $950 per delegate excluding accommodation. Thus some authors don't welcome '…critical engagement with the theoretical and empirical bases of their claims…' (Coffield et al, 2004:10). Rohrer and Pashler (2012:634) state that because of its wide acceptance within education the field is a '…prevalent and profitable enterprise.' When interviewed Pashler described this situation as leading to people '…selling tests and packages and workshops without

having any remote idea whether the methods they promote provide any real educational benefits.*' (Holden, 2010:129).

Peterson et al (2009:520) reported that many style supporters are worried about this situation's impact on academic research "Respondents commented that commercial interests were 'infecting style research' because tests were kept 'in house' leading to a 'lack of independent testing' with 'test evaluations carried out by supporters'." It appears clear that the status and financial rewards of commercial engagement with styles theory is leading to a tempering of the information that is made available by relevant stakeholders.

Lack of psychometric rigour

This is a perennial criticism identified by Coffield et al (2004). This point is accepted by style researchers (Tiedermann, 1989; Curry, 1990; Furnham, 2001; Peterson et al, 2009). According to Leite et al (2010:325) the one property that most LSI share '…is a lack of solid research on their psychometric properties.' Likewise Novack et al (2006) claimed that the majority of LSI suffered from weaknesses in reliability and validity. Honey and Mumford's LSQ (1986) has been criticised By Duff and Duffy (2002) who failed to find the four learning styles claimed by the authors when they subjected the instrument to factorial analysis. They also claimed that their tests found no evidence supporting its generalisability or stability and its internal consistency was not of a satisfactory level, this was confirmed by Coffield et al (2004). Martin (2010) claimed that Honey and Mumford's LSQ and Kolb's LSI lacked reasonable internal consistency, also confirmed by Coffield et al. In contrast Kappe et al (2009:464) reported good test-retest reliability for the LSQ but claimed that it had no predictive validity, thus '…using the LSQ to stimulate learning in college students is debatable.' Similarly Klein et al (2007) claimed that the 40 item version of the Honey and Mumford had poor reliability and validity.

There are different versions of validity, Dembo and Howard (2007) and Martin (2010) suggest that one of them, face validity, is often claimed for LSI. It is concerned with whether or not an instrument reflects the content

of the concept being measured (Bryman, 2012). It is an intuitive, common-sense appraisal not a psychometric measurement, Dembo and Howard suggest this form of validity is used by authors of LSI when making claims for their instruments. When Kolb's LSI was investigated by Pigg et al (1980) they concluded that it was successful in capturing personal learning behaviours and tendencies and so had high levels of face validity. Yet Kolb's LSI is often criticised for oversimplifying the nature of the learning process (Jarvis, 1995) which challenges its face validity. So how can one theorist claim face validity whilst another doubts it? If any measure appears to correspond with what it purports to measure it can claim face validity. It is derived by asking the opinion of experts (or untrained observers (Dembo and Howard, 2007)) it is a subjective estimate not a statistical measure. As such face validity is opinion rather than evidence based.

Face validity however should not be underestimated; it can be responsible for the undeserved trust that is placed in these basic inventories (Coffield et al, 2004). Martin (2010) found that it was an important factor in the use of LSI. He described how some teachers held the common sense view that if students learn in different ways then they should be taught in different ways. Others felt as the LSI authors were academics supported by publishing companies 'If they were no good they would have gone out of business years ago' (Martin, 2010:1588). Yet on close inspection many questions used on various LSI are so general as to be irrelevant to education (Sharp & Murphy, 2006) they lack face validity. An examination of Fleming and Mills (1992) VARK shows that it contains items that don't relate to learning. Some relate to cooking, giving directions, choosing food at a restaurant and vacation planning. Thus the face validity of such items is tenuous and as Coffield et al (2004:45) claim '…if a few items of an LSI are risible, then the instrument may be treated with scorn.' The thesis will investigate the teacher educators' knowledge of this area to evaluate the impact of the available contradictory evidence..

Style stereotyping

Perhaps the most concerning aspect of styles theory is its alleged ability to stereotype or label students by the narrow categorisations of LSI diagnoses. Although the evidence base for this is conceptual and observational it is growing. Demos (2004) were concerned that students could be provided with an educational experience to exclusively match their diagnosed learning style. This could lead them to internalise that diagnosis and ignore other approaches to learning creating a restricted experience (Burton, 2007). Echoing this concern Becta (2005) suggested that with the poor evidence base for learning styles it was safer to label strategies not learners. Style supporters Evans and Sadler-Smith (2006:78) support the condemnation of these '…narrow categories…' suggesting that such generalisations, '…may not only misrepresent theory and research, but might also fly in the face of common sense.'

In 1997 Reynolds (128) called for '…learning style labelling to be discontinued…' due to the negative effects of assigning learners to a particular style. Scott (2010:10) highlighted the contradictory nature of labelling students in this way,

> It is perhaps ironic that those who promote learning styles as a way to personalise learning and overcome supposed prejudices about students are providing practitioners with yet another way to stereotype and to form damaging expectations of students.

This thesis will pay close attention to the attitudes of respondents towards style stereotyping and their beliefs about how it might affect students.

A meta-analysis by Hattie (2009) based on results from 411 learning styles studies echoed the LSDA findings. He found that many studies suffered from conceptual confusion, defective methodology and flawed measurement. The results showed a mean effect size of .41 for all strategies used to increase learner attainment, whilst the effect size for individualised instruction was .23. He concluded that the emphasis of learning styles within lessons was noted for lacking in impact (2009).

This thesis will investigate the impact of these criticisms; it will assess the knowledge about and attitudes towards the debate by those who work within the sector. It will attempt to answer a number of possible questions this situation raises. If staff are aware of the debate why are they still engaging with LSI or if they unaware of its existence, what are the reasons for this ignorance?

Why are LSI popular?

Coffield et al (2004) suggest that there are two explanations for the popularity of learning styles; evidence of effectiveness and intuitive appeal. Educational practice in general doesn't have a history of demanding the rigour that would be required by other disciplines such as medicine (Gurney-Read, 2014). The Institute of Educational Sciences sees educational research as being on a par with medieval medical practices based on superstition (Erickson & Gutierrez, 2002). The US Department of Education (2002) propose that education works on ideology and professional consensus, rather than empirical evidence and as such is subject to fads without applying them to scientific scrutiny. Burton (2007:6) suggests that '…the impact of fashion and trends is as keenly felt in education as on the high street.' It would appear that Sharp et al (2008) and Coffield et al's (2004) view that LSI are popular because they are popular, holds water. This popular appeal has led to them becoming '…common knowledge…' (Reiner & Willingham (2010: p35). In this context many users are introduced to learning styles by other teaching staff who already use them. A survey by Schoolzone and the Wellcome Trust stated that 68% of their respondents were introduced to learning styles by colleagues at work rather than the 8% who got the information from academic journals (Gurney-Read, 2014). Nixon et al (2007) suggest that learning styles make a metaphysical appeal to the imagination; they possess the form of an empirical hypothesis but are in fact immune to empirical testing. They display the characteristics and status of a total belief system (Coffield et al, 2004) and are promoted with evangelical zeal. This situation has facilitated the dissemination of style theories largely without the need for empirical evidence. The associated pedagogical research has become self-

referencing and based on common-sense assumptions (Burton, 2007) that are not scientifically verified (Scott, 2010). This study will be investigating the content and structure of such common-sense beliefs.

Whilst learning styles may lack effective empirical evidence they do have logical and intuitive appeal (Coffield et al, 2004; Landrum and McDuffie, 2010). Their underpinning theory sounds plausible, it appears as common sense that instruction should reflect how a student learns the most effectively (Bishka, 2010: Rohrer and Pashler, 2012). They have an ideological appeal in that they encapsulate the individualistic philosophy of Western culture and thus appear to reflect our nature (Scott, 2010). Nixon et al's (2007) description of the appeal of the Dunn and Dunn model can be extrapolated to learning styles in general. They promise a way to improve student performance, suggest that this promise is underpinned by research, use models that are easy to understand and apply and appear to offer solutions within the classroom. This ease of use and utility is appealing for the stressed and often casualised workforce within PCET (Nixon et al, 2007).   The extent that L&SS staff use style theory based on intuitive rather than evidence based considerations will be an important strand of this thesis.

Confirmation bias

This acceptance is facilitated by a confirmation bias (Reiner & Willingham, 2010) that motivates the selection of evidence that is consistent with a belief and ignores that which is not (Wason, 1960; Koriat et al,1980; Nickerson 1998; Hernandez and Preston, 2013). Schwind and Buder (2012) claimed that when a number of viewpoints on controversial issues are available individuals prefer information that is consistent with their existing preferences. Schwind et al (2012) stated that searching the internet would lead to confirmation biases because of the many conflicting opinions that are available on a given topic. They claimed that '…the different opinions often remain unexploited: Learners prefer preference-consistent over preference-inconsistent information.' (Schwind et al, 2012:787). In short confirmatory evidence will be privileged over dis-confirmatory data and

whilst the confirmation bias facilitates an efficient search for information it is analysed in a shallow fashion (Hernandez and Preston, 2013). The thesis will investigate the empirical evidence it gathers to see if there are any illustrations of the impact of confirmation biases.

The concept can be illustrated at work with regard to Coffield et al's review which despite the publicity it generated is still not acknowledged by some style supporters. Some ignored the results, Rogers (2009) produced a paper supporting LSI that cited Coffield et al nine times without engaging with their findings and conclusions. Hadfield (2006) claimed that the review found that seven LSI of the original seventy one had demonstrated better reliability and validity than the others. She stated that Coffield et al had recommended six of them; although she didn't explain what the recommendation was actually for. In a brief review of the area Guterl (2013) suggested that three LSI met the review's criteria for reliability and validity when only one did. Certainly Coffield et al (2004) claimed that the LSI of Entwistle and Vermunt could be used with HE students to discuss changes in learning and teaching. However before they could be used in other post 16 contexts they would need redesigning and revalidating. Coffield (2006) suggested that Allinson and Hayes CSI and Entwistle's Assist could be used in meta learning but the LSDA report was not uncritical of these models. It concluded that the benefits of learning styles, where they existed, were not large. It suggested it would be wise to focus limited resources within the sector on more successful interventions 'We therefore advise against pedagogical intervention based solely on any of the learning style instruments.' (Coffield et al, 2004:58).

As there is a large literature associated with styles, and much of it being of a supportive nature it is not difficult to see that this bias could account for some of the durability of style theory. Lilienfield et al (2010) estimated that up to 2008 style research accounted for 1,984 journal articles, 919 conference papers and 701 books or chapters. An internet search using the term learning styles produced 2,160,000 hits (Scott, 2010:8), with supporters' sites outnumbering protractors by '…a considerable margin.' Bearing this in mind Landrum & McDuffie's (2010:7) claim that, '…learning

styles and modality-based instruction continue to work their way into the parlance of teacher education, particularly in practitioner-orientated journals that might be presumed to have greater impact on practice.' acquires real importance.

The role of teacher education

Therefore we should expect Teacher Education in this country to play a prominent role in popularising style theory, it does elsewhere. The American Association of Colleges for Teacher Education includes learning style theory as one of their thirteen essential knowledge bases (Dunn et al, 2009). Honigsfeld and Schiering (2004:497) suggest that the exploration of style theory is a '…cornerstone experience…' for trainee educationalists' development as reflective practitioners in the US. The Nordic nations, with political and commercial support, promote style theory as '…a pedagogical platform for recognising and responding to individual differences.' (Dunn et al, 2009:139).

In the UK Hadfield (2006) suggests that learning style theory should be used as a framework for task design within Teacher Education. Sloan et al (2004) agree, suggesting that pre-service learners should be made aware of their own style as a part of their training program.

Students cannot be implicated for the popularity of LSI, the evidence suggests that they are largely unaware of their own learning style preferences (Honey and Mumford, 1992; Merrill, 2000; Rogers, 2009: Graf, et al 2009). So it is safe to assume that there is little or no pressure from the student body to use them. Can we then be sure that the learning styles' diagnosed by student self-reports are accurate? Bishka (2010: p 12) suggests such results could be '…inaccurate, self-deluding, or influenced by what the respondent thinks the instructor wants to hear.'

The role of teacher education appears to be of importance in the dissemination of style theory and that is why the sample for the research, within this thesis, will consist of only teacher educators. The identification of

their roles and responsibilities within this situation will be given a close and critical analysis.

Conclusion

This chapter has demonstrated that the popularity of styles within the sector cannot be sustained by the available evidence. Despite the criticisms of Coffield et al being taken up by other theorists both before and after them the styles concept has remained remarkably durable. Financial considerations are cited as drivers for the continued development of LSI and a possible reason as to why the contradictory evidence has not always been accepted. It is also suggested that learning style popularity has been maintained because LSI have become common knowledge. Their transmission isn't through traditional academic channels but informally from initial training and tutor to tutor thus avoiding public testing. When the poor evidence base is encountered it can be ignored for the greater amounts of more supportive, but less rigorous literature due to the effects of confirmation biases. All of these factors will be investigated by the analysis of the study's data.

The next chapter presents a review of the philosophy, design and methods chosen for undertaking the research component of the thesis. A rationale to provide a justification for the choices taken is presented after their descriptions.

CHAPTER FIVE

METHODOLOGICAL FRAMEWORK

This chapter provides a review of the research perspective and its associated design. It offers descriptions, explanations and justifications for the ontological, epistemological and methodological decisions that have been taken. There is also a consideration of validity, reliability and generalisability against the qualitative criteria that compose trustworthiness.

Ontology

The chosen ontological approach will be realist, it will seek to investigate and describe phenomena that are not physical or chemical. The phenomena that provide the focus of this research exist because we believe them to exist, they are ideas and as such generate research. Like money, property, government and marriage, learning styles are not objective facts but what Searle (1996) terms as institutional facts. These are facts that exist solely due to human agreement unlike brute or non-institutional facts which have their own existence. Brute facts can be objectively agreed upon, they possess physical and measurable phenomena that are publically verifiable e.g. the height of a mountain. Thus institutional facts are not amenable to an objectivist approach (as their form is not uniformly accepted) which would seek to apply positivist methods to the research (Crotty 1998). Objectivism promotes a single brute or uniform reality that exists independently of external observation. The material objects within it have a meaningful existence of their own that is available to observation and not dependent on the consciousness of others to provide meaning. Knowledge of reality is built cumulatively through the application of the scientific method before the structure is revealed. Thus theories that propose that reality exists independently of subjective perception and is amenable to structured analysis can be seen as objectivist (Mautner, 2005). This approach suggests that reality can correspond directly with sensory input. It requires methods that provide a mirror image of reality that are not

distorted by subjective considerations; what Putnam (1990) describes as the God's eye view.   Scientific objectivists claim, '…that there is only one fully correct way in which reality can be divided up into objects, properties and relations.' (Lakoff, 1987:265) and this is positivism.

Positivism has been in decline for many years and Archer (1991) proposed to unify social science and human reasoning by replacing it with ontological realism. Hammersley (1998) claims that realism is arguably the dominant approach in social science. This view may not be universal because as Leplin (1984:1) suggests '…scientific realism is a majority position whose advocates are so divided as to appear a minority.'

Even if positivism was dominant it would face difficulties with the subject matter of this thesis. Learning styles culture is socially constructed, without society it would not exist. This culture and its counter culture are not value-free they are socially influenced and emotionally situated therefore an objectivist approach is not compatible. Styles are outside the scope of an objectivist analysis because they don't have an objective, non-institutional existence in their own right, they are not consistent and stable over time. The area is broad and contains a number of competing theories and models such as Cognitive Styles, Thinking Styles, Learning Strategies and Learning Approaches. This diversity creates a problem as to how to identify, describe or explain a learning style consistently. So for the purposes of this thesis (and in line with Coffield et al, 2004 and Hall and Moseley, 2005) the term styles should be taken to represent the field of theory and practice of instruments designed to measure and/ or predict specific cognitive, social, biological and behavioural aspects of individuals in relation to how they might learn or think the most effectively.

If learning styles are seen as only possessed of institutional or subjective existence an idealist analysis could be relevant. In Plato's philosophy the only entities that have a real existence are ideas (Mautner, 2005). Learning styles can be seen to have an ideated substance rather than a material existence. This idealist stance suggests that reality is nothing more than mental constructions projected by minds, there is no material reality. Thus

any systematic measurement or observation of these mental representations of reality would produce illusory data because observations would only be valid for their observer. If reality is relative to the mind that produces it there is no way of evaluating its truth content. This leads Searle (2006) to describe idealism's relativist view as the ultimate bad faith of philosophy. Mautner (2005) proposed it encouraged religious explanations of the world; Warburton (2012) warned it could lead to solipsism and Russell (2008) described it as an absurd doctrine,

If objectivism demands the observation of one reality and idealism proposes the description of infinite realities, a middle way is required. A view that accepts reality can be represented idiosyncratically but aspects of it can be shared even if they are mediated by distorting social processes. Realism like objectivism admits to the existence of a material world but claims this world is viewed through a social lens, so like idealism some aspects of reality exist only in the mind. Critical realism accepts the existence of both objective and subjective realities and that some entities exist independently of conscious perception. Mental and physical objects are seen as being equally real although they are conceptualised differently (Putnam, 1999). They exist whether or not we can perceive them and whilst some are created by social interaction (Bryman, 2012) they are all grounded in specific contexts and world views (Maxwell, 2002). Social reality is generated by mechanisms that are not always amenable to direct observation and when they are their origins are unclear (Gbrich, 2013). These generative mechanisms are amenable to social scientific research and theoretical conjecture but the results are provisional (Bhaskar, 1989). Thus generative mechanisms provide causality for critical realists, such a mechanism is according to Pawson & Tilley (1997:67) '…not a variable but an account of the makeup, behaviour and interrelationship of those processes which are responsible for the regularity.'

Although generative mechanisms may be linked to regularities this relationship is not fixed as all knowledge is incomplete. It is contingent on the social, historical and cultural contexts within which the regularities

occur. Therefore critical realists accept that descriptions of regularities that arise from research don't provide a mirror image of reality.

The reality to be investigated by this study is the beliefs surrounding learning styles. The objective is to identify the generative mechanisms that encourage adherence to styles theory in spite of the evidence ranged against it. It is intended that the identification of these will provide a rationale for reflecting on the value of learning styles. This is in line with Pawson's (2006:20) view that criticism '…is warranted on the basis of the analyst's privileged understanding of the oppressive aspects of the social condition and those responsible for it.' Thus a critical realist approach is being used to facilitate a transformation of the status quo (Bryman, 2012).

Epistemology

If it is accepted that the human mind is active in the acquisition of knowledge, that knowing is not a passive imprint left by experience as the behavioural approach would suggest (Skinner, 1971) then to some extent meaning must be created. This means that knowledge is not found or discovered but it is constructed and this provides the basis of constructionism which deals with the nature of knowledge and how it is made through social interactions (Schwandt, 2003). It is not concerned with issues of causation or ontological issues (Berger & Luckman, 1991; Andrews, 2012), it is instead concerned with making sense of human experience (Steedman, 2000).

The constructivist approach, related to constructionism and often associated with realism (Frazer & Lacey, 1993), focuses on individual's constructions of reality and the social influences that shape them (Gergen, 1999). The emphasis of constructivist approaches is on mental processes, which are observed indirectly. The focus of constructionist approaches is on linguistic and social processes (Andrews, 2012) which can be captured more readily. Gergen (1999) saw discourse as the major influence in articulating the self and the world: and discourse as communication is always a two way (at least) process between individuals sharing a conversation space. Thus constructionism assumes that the parameters of

social knowledge are set by linguistic interactions (Talja et al, 2005). Thus social reality can be shared and as such allows the investigation of communal rather than individual social reality (Young and Colin, 2004). Constructivism rejects the existence of a unilateral reality through its focus on what Crotty (1998) describes as the meaning making of an individual mind. This claims that all such interpretations are, "…as valid and worthy of respect as any other…" (Crotty, 1998:58) this denies any chance of the critical comparison of individual perceptions. Thus constructivist research leads to multiple interpretations of reality creating circular arguments (Bury, 1986). The usefulness of a constructivist approach can be questioned here as it may not make a useful contribution to knowledge (Murphy et al, 1998). As social constructionism deals with the collective generation of meaning it can facilitate the critical comparison of one meaning against another (Crotty, 1998). Therefore a social constructionist rather than a social constructivist epistemology will be applied to investigate the shared realities of learning styles' culture within the L&SS.

As social constructionism has been described as anti-realist (Hammersley, 1992) it may seem strange to use it with critical realism. Whilst this pairing may not be seen as conventional (Bryman, 2012) the two concepts are compatible, '…constructionism in epistemology is perfectly compatible with a realism in ontology…' (Crotty, 1998:63). Schwandt (2003) proposes that realism and constructionism are not incompatible. It is possible for an object to be constructed rather than discovered and for that object to correspond to something real (Berger and Luckman, 1991). For example quarks are subatomic particles that have not been directly observed. Their existence is constructed by theoretical predictions that have been confirmed experimentally. Hammersley (1992) supports this view suggesting that if reality is socially constructed then the investigation of the subjective experience of daily living allows us to investigate how the world is understood. Therefore realism and constructionism can be seen as compatible for the purposes of this research.

The extent that social reality can be accurately constructed has led to a division within constructionist thinking producing two variegations. The

strong or radical approach follows a relativist view whilst the weak or social constructionism follows a realist orientation. Strong constructionism like constructivism hold that reality is individually constructed and cannot be experienced by others (Craib, 1997). Whilst social or mild constructionism, accepts that some aspects of reality can be communicated and shared (Schwandt, 2003). To take either view is hazardous, a realist approach may ignore the researcher's influence on the construction of the data: whilst the relativist view is unable to assess the validity of one subjective reality against another. Hammersley (1992) offers a solution advising that neither extreme is desirable, he suggests taking the middle way, a position termed as subtle realism. This position allows a world with an existence independent of our perception of it. This world however can be represented by research even if it cannot be reproduced in the positivist sense of the word (Hammersley, 1992). Therefore the social world is accessible to investigation negating traditional objections to the use of a social constructionist epistemology with realist ontology. Sismondo (1993) believes the objections are misguided, claiming that they are aimed at radical constructionism rather than social. Like Burningham and Cooper (1999), Sismondo (1993) claims that most social constructionist studies apply a mild form of analysis. They allow for a distinction between the participants beliefs and claims and reality, allowing their results to attain validity not available with a radical approach.

If social reality is negotiated how does one discourse take precedence above another? Burr (2003) suggests that it is the powerful that are most successful in producing dominant discourse. This indicates that social constructionism allows for change through human agency. Therefore it may be possible to change or criticise a powerful discourse (such as styles theory) by using research findings that challenge it. This can be seen as strengthening the relationship between social constructionism and critical realism as both can be used to threaten the status quo.

An interpretivist approach could have been used in this study as it shares a number of features with constructionism and is compatible with realism (Frazer & Lacey, 1993). It has a common focus with constructionism on the

processes by which meaning is created, negotiated and modified (Schwandt, 2003).   Both views strive to understand the social world from the perspective of those who directly experience it, and both are products of post-modernity.

Interpretivism is associated with Max Weber who proposed that both natural and social sciences should use the same methods (Crotty, 1998). He proposed that although natural science would focus on nomothetic methods and social science on ideographic approaches, both could use either method. Thus the foundations of interpretivism can be seen as having an empiricist influence (Crotty, 1998). In this attempt to create an objective or natural science of subjective experience interpretivists can be seen as applying a logical empiricst methodology (Andrews, 2012). Schwandt (2003:194) claimed   '…in interpretive traditions, the interpreter objectifies (i.e., stands over and against) that which is to be interpreted. And in that sense, the interpreter remains unaffected by and external to the interpretive process.' This provides a rationale for not applying an interpretivist approach: it disregards the constructionist view that the researcher is as culpable as the researched in the construction of an observed situation. The researcher's influence cannot be removed from the interpretive process, it is indeed an integral part of it. Therefore the use of an interpretivist approach to investigate the generative mechanisms associated with the continued use of learning styles is philosophically incompatible.

Design

Although a qualitative approach has been chosen for this study it should not be seen as a rejection of other stances. It is rather the stance of a bricoleur in using the most appropriate tools for the job (Gbrich, 2013). The qualitative approach varies because each user makes sense of the field in socially constructed ways (Merriam, 2009). Its data sources are often textual and/or verbal that are processed with the goal of understanding socially constructed realities. Newton-Suter (2011:384) claims this process is facilitated by the use of iterative and non-linear data analysis that is '…accomplished by coding, category formation, and theme extraction using

techniques such as pattern matching (linking observations and theory). Analysis continues until saturation (diminishing returns). The goal is insight…'

Both Raynor (2006) and Cools and Van Den Broeck (2008) have proposed that qualitative methods (according to Newton-Suter (2011) these methods include interviews, observations and document analysis) are well suited for researching learning styles and feel such approaches will inevitably provide further support for their use. They claim that the dominance of the positivist approach within the styles field has led to a deficit of qualitative studies in the area. In response Raynor (2006:105) has called for more, '… research that takes practitioner awareness and applications of cognitive styles into account', thus this study's design is a conscious response to Raynor's call.

The use of critical realist approaches with qualitative designs can be seen as problematic with realism being derided as a variant of positivism (Mark et al, 2000) and as such not appropriate to a positive approach. However this combination has an established precedent that has been supported by Huberman & Miles (1985): Hammersley (1992) and Miles & Huberman (1994)

Bergman et al (2010) see the qualitative approach as superior for studying how individuals make sense of their world and experiences. Patton (2002) proposed that qualitative methods lead to a deeper and richer understanding of the meaning under investigation. The reason for this is the methods allow participants to actively contribute to the making of meaning rather than taking a passive and subordinate role (DiCicco-Bloom & Crabtree, 2006). In so doing qualitative researchers become the instrument of their research and become subjectively immersed in the process (Miles and Huberman,1994). Such observations have led to the criticism that qualitative methods produce subjective interpretations of reality leading to the charge that it is non-scientific (Carlson et al, 2000). However Onwuegbuzie (2002) claims humans view the world from individual perspectives therefore they are influenced differentially by their unique interpretations of their environment. Thus subjectivity is a human

attribute not a methodological corollary and as such does not make qualitative methodologies redundant.

Strauss and Corbin (1990) claimed that a qualitative analysis should not involve any numbers or counting, a position supported by many qualitative researchers (Maxwell, 2010). The numerical representation of qualitative data is seen as philosophical anathema because of the belief that this data represents '…a single objective reality…' (Maxwell, 2010:475). Thus a qualitative approach is incompatible with the use of numbers. However a tradition exists that suggests the use of a limited quantitative representation of qualitative data is both acceptable and desirable (Becker, 1970; Miles & Huberman, 1984; Hammersley, 1992; Erickson, 2007). Therefore this study will use what Becker (1970) has termed as quasi-statistics. Qualitative researchers often make quantitative claims verbally such as often, some, many etc. These descriptions can be given more clarity and made more precise by using simple counts to illustrate and define them (Becker, 1970). Sandelowski et al (2009) have supported this point claiming that such figures when quantiticised facilitate pattern recognition within data. Therefore the inclusion of numbers is a '…legitimate and valuable strategy for qualitative researchers…' (Maxwell, 2010:479).

Grounded theory is the chosen analytic approach for this study; it will facilitate a qualitative analysis and is compatible with constructionism (Charmaz, 2008; Andrews, 2012). It focusses on the development of a set of integrated concepts gathered from the descriptions of social interactions and subjective experiences with the aim of explaining them theoretically (Crooks, 2001). Its structure is simple and starts with the identification of an area of interest with as few theoretical preconceptions as possible (Lingard, 2014); it progresses through concurrent sampling and analytic procedures and stops when theoretical saturation is attained (Dey, 1999). As an inductive approach it moves from '…local worlds to a more general conceptual level.' (Charmaz, 2008:398). It produces theoretical explanations that describe a usual or typical situation. Lingard, (2014) terms this as theory with a small 't' as grounded theories always relate to the specific topic under analysis (Bryman, 2012).

Charmaz (2008) proposes that a constructionist approach used in conjunction with grounded theory enhances the analysis without reducing the complexity of the social situation they are dealing with. This is because constructionism deals with *what* people construct and *how* they accomplish this whilst the addition of grounded theory allows insight into *why* they do it. Such an approach encourages innovation, the development of new understandings and novel interpretations of social research findings (Charmaz, 2006, 2008).

Grounded Theory is also suited to a critical realist approach where the researcher's influence on the construction of reality, whilst acknowledged, is kept to a minimum (Gbrich, 2013). Therefore the researcher must be reflexive and strive to recognise the impact of their biases, methods and personality as they contribute to the situation under co-construction (Charmaz, 2008). The researcher must examine their own contribution to the research relationship to recognise how their conceptual background co-constructs patterns in their interpretation of their participants' data. Marshall and Rossman (2011:96) suggest that '…research design should include reflection on one's own identity and one's sense of voice and perspectives, assumptions, and sensitivities.'

The research should begin with as few predetermined ideas as possible. However this does not mean that the research should start with a blank slate (Lingard, 2014). Dey (1999) claims that how prior knowledge is used is important, it should inform the analysis but not direct it. Charmaz (2008) views prior knowledge of the research situation and theoretical preconceptions as perfectly admissible as long as their extent is recognised and scrutinised. And as Glaser (1992) suggested literature can be seen as data and compared with the emerging categories that are integrated in the theory, as such prior knowledge can enhance and aid the analysis. Therefore the chapters detailing the styles' debate would not be seen as threatening theoretical sensitivity.

A potential problem is that there appear to be many versions of grounded theory (Dey, 1999), whilst true this situation can be explained. Glaser and

Strauss's (1967) original model was developed when social science was dominated by the quantitative, experimental traditions. Glaser's background was in quantitative methods and this influenced the development of grounded theory. Kennedy & Lingard, 2006:102) argued:

> Thus their intention, in part, in describing the grounded theory method was to try and provide a systematic approach to the analysis of qualitative data that would live up to the standards of 'rigour' imposed by the quantitative paradigm.

Their approach emphasised generality and objectivity rather than relativity and reflexivity which along with their realist ontology led to it being attacked by post-modern writers. Charmaz (2008) saw this model, rooted in mid twentieth century positivism, following a naive empiricism. She claimed that the problem with objectivist grounded theory was the assumption that data were self-evident and not open to different interpretations. It assumed that a single observable reality could be discovered through impartial investigation. This led to new models being introduced in the 1980s by Glaser and Strauss before their schism led to further variants from Strauss and Corbin (1990) and Glaser (1992). There is some debate as to what extent these new variants were actually different from earlier versions (Melia, 1996). They were unable to lose their objectivist association and grounded theory was labelled as the most positivistic of modernist qualitative methods (Van Maanen, 1988).

As a consequence Charmaz (2008) formulated a social constructionist approach. This allowed for more than one reality being constructed under specific conditions, and takes into account both the researchers and the respondents' positionality. This facilitates co-construction that views data as products of the research process not passive items observed from within it. As Charmaz (2008:402) claims 'Researchers are part of the research situation, and their positions, privileges, perspectives, and interactions affect it…'

To clarify Charmaz (2006) proposed that all grounded theories shared a number of common features, firstly they all involved the simultaneous collection and analysis of data known as iteration. Without iterative data

collection and analysis the research cannot claim to be real grounded theory (Kennedy & Lingard, 2006). Secondly, the subsequent development of codes and categories from the analysis of this data is facilitated by the comparative method. Thirdly, the discovery of basic social processes occurs within the data, not outside of it. Finally, theoretical sampling is applied to refine the categories facilitating the creation of codes and analytical memos prior to writing up. In 2003 Glaser reaffirmed his objectivist approach claiming that the constant comparison of data rendered it as objective. However Charmaz (2008) suggested that the comparative method merely helped the researcher scrutinise and conceptualise the data. Thus divorcing her account of grounded theory from any lingering objectivist orthodoxy, for Charmaz (2008:397) grounded theories are:

> …strategies for creating and interrogating our data, not routes to knowing an objective external reality

This study's design will follow the formula identified by Charmaz (2008) and use constructionist grounded theory.

Method

Grounded theory approaches require the use of open-ended non-judgemental questions, these serve as a focus for a detailed discussion and encourage the interviewee's stories to emerge (Charmaz, 2008). Although an open ended questionnaire approach could have been used for this study it would lack the flexibility of semi-structured interviews and could pigeon hole respondents (Bryman, 2102). As this is one of the criticisms of learning styles raised by this thesis, it was important to avoid this situation arising.

In-depth Interview

The method to be used in the research is the in-depth interview although it is acknowledged that some theorists see interviewing and qualitative research as incompatible. Hammersley (2007) cites Dingwall (1997), Silverman (1997), and Atkinson & Coffey (2002) who challenge the view that interviews are windows into minds. They claim they are not suitable;

they do not tap and record participants' world views, provide insight only into unstable attitudes and perspectives that don't routinely guide the participants' behaviour. This critique of interviews (Murphy et al, 1998) is aimed primarily at the ethnographic use of discourse analysis where the validity of the inferences made from the data may go beyond what is observable (Hammersley, 2003a). Interviews are still however used by many qualitative researchers (Hammersley, 2003b) as they are claimed to provide access to the interviewees' subjective world (Charmaz, 2008). Likewise Miller and Glassner, (2011:131) claim the method provides '…a meaningful opportunity to study and theorize about the social world'. It also allows the interviewee to participate in the making of meaning rather than being: '…a conduit from which information is retrieved.' (DiCicco-Bloom & Crabtree, 2006:314). In describing the advantages of interviewing Tewksbury (2009:44) proposes that '…interview data provides the answers that quantitative surveys questions produces,[sic] but qualitative interview based data also provides the answer in an unlimited range of possibilities and with an accompanying context.'

A further advantage associated with the use of in-depth interviews, according to Charmaz (2008:26), is that they provide the opportunity to, '…respect the participant and express appreciation for participating.' This is an important factor in helping to establish a rapport with the interviewees.

The in-depth interview can be unstructured or semi-structured (Bryman, 2012) although the unstructured approach was considered there is no intention to gather supporting observational data in conjunction: therefore a semi-structured approach is seen as more appropriate (DiCicco-Bloom & Crabtree, 2006). Whilst observational techniques can yield useful data when applied in the correct context there are issues that are resistant to the method. As Bryman (2012) suggests there may be a broad range of issues not suited to observation thus asking questions about them is the most viable method to obtain accurate data. The advantage of a semi-structured approach according to Harris and Brown (2010:2) is that such '…interviews provide contexts where participants can ask for clarification, elaborate on ideas, and explain perspectives in their own words.'

Face to face interviews were chosen over telephone interviews because of their suitability for maintaining conversations over long periods of time. It is much easier for an interviewee to close a telephone conversation compared to one undertaken in person and face to face interviews avoid technical problems and break down (Bryman, 2012). Web based interviews were also disregarded to circumvent the technical problems associated with them. It was felt that the advantages of having the interviewer physically present outweighed the savings of time and travel that would be made by using technological means.

Although the in-depth interview can be used for group interviews and focus groups these methods were discarded for two reasons; they do not fit in with the iterative approach demanded by grounded theory; the public nature of the process is not conducive to the deep questioning of individuals (DiCicco-Bloom & Crabtree, 2006).

Therefore the semi-structured approach was used due to its ability to; illuminate participants' world views (DiCicco-Bloom & Crabtree, 2006; Bryman, 2012) and the freedom it allows to follow new issues as they arise. Despite objections interviews remain one of the most common methods of research for grounded theory studies (Kennedy& Lingard, 2006) allowing the method to be selected and used successfully within this study.

Reliability, validity, trustworthiness and generalisability

Hammersley (1987:69) suggested that 'An account is valid or true if it represents accurately those features of the phenomena, that it is intended to describe, explain or theorise.' Thus validity is concerned with the accuracy of the correspondence between research results and the observed situation. Whilst Joppe (2000:1) defined reliability as '…the extent to which results are consistent over time and an accurate representation of the total population under study…' Validity and reliability are concepts traditionally associated with a positivist stance that assumes the existence of a unitary reality, amenable to objective investigation. Therefore if the design of the measuring process is appropriate a truthful picture of reality will be apprehended. If other researchers use the same processes they will

replicate the study and attain reliable results. Quantitative validity can be assessed by the application of various concepts such as a priori, face, construct and predictive validity. Qualitative theorists have been ambivalent towards these concepts, because of their positivist bearing and some have dispensed with the concepts completely.

This thesis accepts that reality is more complex than the positivists' viewpoint so a 'God's eye view' of the area is not possible and will use alternative criteria.

Lincoln & Guba (1985) suggested that qualitative research should apply the criterion of trustworthiness, comprising of credibility, transferability, dependability and confirmability. If a qualitative study produces data that has consistency, rigour and truthfulness it can be said to possess trustworthiness. Shenton (2004) sees trustworthiness as a set of techniques used by qualitative researchers to approximate or replace the positivist concepts of reliability, validity and generalisability. These techniques have been labelled as 'interpretivist criteriology' (Seale, 1999:42) and transactional validity (Cho & Trent, 2006). The suggestion is that qualitative data are trustworthy if these techniques are applied.

Credibility reflects the extent that data from a study is credible from the respondents' standpoint. This can be assessed by member checking or respondent validation, allowing participants access to the data to check the accuracy of the researcher's interpretation of their contributions. Copies of the interview transcripts will be provided for all interviewees so they can judge the accuracy of their reported contributions and feed back to the researcher. This will ensure that the results of the interview are congruent with the views of the interviewees (Shenton, 2004; Scott & Morrison, 2005).

Transferability deals with the extent that results of qualitative research can be generalised to other contexts and situations. Whilst qualitative data provides deep, richly detailed and contextualised information it is not seen as widely generalisable (Tewksbury, 2009). This is because of its typically small sample sizes and subject matter (Earlandson et al, 1993). Denzin (1983:133) rejects the need for qualitative theorists to generalise, claiming

human behaviour is characterised by an 'inherent indeterminateness' making it too variable for generalisations. Whilst Guba and Lincoln (1982:238) insist that the aim of qualitative inquiry '…is to develop an idiographic body of knowledge'. They see transferability as being the responsibility of the readers of research rather than the originators.

In view of these attitudes, to help to facilitate transferability as Lincoln & Guba (1985) view it, the descriptions of the research context and central assumptions will be illustrated in some detail. This will allow readers to reach their own decisions regarding transferability (Shenton, 2004).

A view offered by Gobo (2011) suggests that much research on non-probablity samples with few cases does in fact draw generalisations from data. It is claimed that in-depth interview research particularly produces such generalisations (Lucas, 2014). Williams (2000:215) claims that there is a case for what he terms as moderatum generalisability. He suggests this is when, '…aspects of S [the research findings] can be seen to be instances of a broader recognisable set of features'.

Williams argues that total generalisations, outside of chemistry and physics, are impossible and statistical generalisations are not relevant in qualitative research. Moderatum generalisations are described as everyday generalisations based on culturally consistent behaviours that occur within a specified social milieu. Therefore moderatum generalisations will be used when they are appropriate and relevant to the analysis. Such generalisations can be drawn from qualitative data in different ways. Lewis and Ritchie (2003) suggest that representational generalisations can be made that relate to the samples' parent population; whilst inferential generalisations are concerned with settings outside of the study where similar conditions exist; finally theoretical generalisations focus on the extent that findings from a study may support extant theories. However as Seale (1999) argues such generalisations require their relevance to be assessed by further empirical study.

Dependability requires an account of the changes of context that appear within the research. If these are reported in detail they will help other

researchers to replicate the study (albeit with differing results) by providing what Shenton (2004) terms as a prototype model. To meet this criterion the reporting of the method and interpretation will be detailed and fully contextualised.

For a qualitative study to have confirmability depends on the degree the results can be corroborated by others. Triangulation is the classic transactional strategy to attain this, with the use of more than one method or researcher (Shenton, 2004). As these types of triangulation are not possible within this study a number of colleagues will be asked to assess the results in a critical fashion so that confirmability can be negotiated.

Conclusion

This chapter has identified, described and provided rationales and justifications for the philosophical, methodological and design decisions taken to construct a framework for the study. Critical realist ontology has been matched with a social constructionist epistemology. A qualitative design was chosen that consisted of the in-depth interview method using grounded theory to analyse the resultant data. Staying faithful to the qualitative design traditional conceptions of reliability and validity have been rejected in favour of the application of trustworthiness. Strategies to maximise credibility, transferability, dependability and confirmabilty were discussed to ensure the study's data's trustworthiness. Moderatum generalisations will replace statistical generalisations or other similar quantitative concepts. The discussion of these decisions has demonstrated their suitability to be used in conjunction with each other in providing a robust framework for the study.

The next chapter will deal with the study's empirical aspects, it reviews the research question and describes the sample and the sampling strategy applied. Descriptions and rationales are provided for design considerations and ethical safeguards.

CHAPTER SIX

EMPRICAL CONSIDERATIONS

This chapter reviews the questions to be asked within the study and provides a detailed description of the procedure used to facilitate the data collection and its analysis. It also justifies the choice of a semi-structured in-depth interview approach and sampling methods. There is a description of the sample, a declaration of the unit of analysis and description of the development of the codes, concepts, categories and grounded theories generated by the analysis. The application of ethical considerations to protect the interviewees is also detailed within the chapter.

The major research question asks:

> To what extent are teacher educators aware of the contested nature of learning styles within the sector?

Whilst the sub-questions to be investigated ask:

> What are the beliefs held by teacher educators that facilitate the continued application of learning styles within the sector?

> Do specific rationales exist to justify the use of learning styles by teacher educators within the sector?

The participants

All interviewees were employed in teacher education within the L&SS for at least seven years and were users of learning styles in their practice (appendix 5). This ensured that the sample was aware of the relevant theory and practice so the questions asked would fit the interviewee's experience whilst exploring the topic (Charmaz, 2008). They were all employed in FE colleges from sites across the North of England. Two (David and Roger) indicated their teacher education classes accounted for around 50% of their timetable whilst the remainder claimed their practice was greater than 75%. Only Bridgit, Yasmin and Eric had 100% teacher

education timetables. David, Roger and Lucy's teacher education classes were at levels 3 and 4, the rest of the sample taught levels 3 to 6. Potential interviewees who didn't use learning styles were discounted from the study. All interviewees held a Certificate/ Post Graduate Certificate in Education and a Bachelor's degree as minimum qualifications for inclusion in the study. This was to ensure that all interviewees were qualified to a level that should allow them to provide informed views.

Theoretical sampling was used to facilitate authentic grounded theory (Charmaz, 2006); this meant that the size of the sample was not set prior to the start of data collection. The interviewees were sampled purposefully to shed light on and challenge emergent themes as the analysis proceeded. The role of theoretical sampling is to provide further information to illuminate and develop the themes that emerge in the analysis of the data (Charmaz, 2006). As these themes emerged further sampling took place with interviewees being snowball selected for their ability to '…confirm, challenge or expand' emerging theories (Kennedy & Lingard, 2006:104). The sampling continued until the iterative analysis failed to produce new insights that related to the emergent codes and themes, thus at saturation sampling was completed (Charmaz, 2006; Lingard, 2014). In this study the data were judged to be saturated after fifteen participants were interviewed with no new insights or challenges to the data being produced at that point.

Recruitment of participants

Potential interviewees were contacted by telephone and/or e-mail and asked if in principle they would be willing to take part in the study. The aims, method and procedure of the study were explained along with the central research question to ensure that their role in the research was transparent and any consent given at this stage was informed. Mutually acceptable dates and times were arranged for the interviews to take place outside of the interviewee's place of work to enhance anonymity. Removing the interviews from the workplace also reduced the possibility, of what Charmaz (2008:27) termed, as the recital of 'public relations rhetoric' rather than their own experiences. This approach provided an initial pool of eight

potential interviewees with the remainder being recruited on a snowball basis acting on recommendations from the original group. Table 6.1 (appendix 5) gives an overview of the participants; column 1 shows the pseudonym applied, column 2 details the participant's years in teaching with their teacher education service in parentheses. Gender and age are followed by the highest qualification attained by that participant whilst column 6 indicates if the participant supported learning styles or not.

Prior to the commencement of the interview, time was taken to develop a rapport with the interviewee; Partington (2001) and Charmaz (2008) feel this is ethically and methodologically sound practice. This constituted of introductions, small talk and discussions of professional backgrounds and reassuring the interviewees that the research was of a confidential and ethically robust nature. The prospective interviewees were then asked to describe their careers and background in teaching. This helped to relax the prospective interviewees and provided some contextual data for the study. The interviewees were asked if they had any questions about the research and their involvement which were answered truthfully. This was followed by an ethical declaration and a formal request for them to take part in the research if they were still willing to do so. Each person was asked if they were comfortable and ready to begin before answering any research related questions. This preamble was designed to help provide a secure environment to facilitate the sharing of the interviewees' thoughts and attitudes (DiCicco-Bloom & Crabtree, 2006) and to demonstrate respect to them (Charmaz, 2008).

With the interviewee's permission the exchange was digitally recorded to provide a record for transcription, all agreed to this. Despite Glaser's (1998) objections to this strategy, it was used because the researcher does not have to rely solely on memory and it allows repeated examinations of what is said (Heritage, 1984). Each interview lasted from forty minutes to one and a half hours each.

The questioning was guided by a schedule of predetermined open–ended questions (table 6.2 appendix 6). These provided a flexible structure for the

interviews (Bryman, 2012) and allowed other questions to emerge from the dialogue created by the process (DiCicco-Bloom & Crabtree, 2006).

If the questioning led to new insights than questions would be generated spontaneously to investigate them. The questions were designed to provide interviewees with the ability to answer in ways that they felt were appropriate to their own experience to minimise the influence of the researcher's beliefs, knowledge and attitudes (Charmaz, 1991).

Some variants of grounded theory proscribe a pre-research literature review; Glaser (1998) suggests that studying the literature provides biases and should not take place until theoretical sorting takes place. Although prior knowledge of the subject matter is permissible within other grounded theory approaches (Dey, 1999; Charmaz, 2008; Gbrich, 2013; Lingard, 2014), a reflective and reflexive stance must be assumed to maintain theoretical sensitivity. The interviewer is there to observe and encourage responses; it is the interviewee who should do most of the talking (Charmaz, 2008). This stance can be aided and maintained by the adoption of strategies that promote a non-judgemental and interested stance (Kvale and Brinkmann, 2009) encouraging the interviewee to provide truthful, accurate and full responses. During interviews this was facilitated by using active listening techniques such as; the communication of genuine interest by paying attention, making appropriate eye contact, nodding of head and using vocalisations such as 'mm', 'okay' and 'I see' (Thornberg et al, 2013). Non-directive probes such as *Can you clarify that*? *What do you think about that? Could you expand your answer?* Etc. were applied when required to help interviewees focus and expand their responses. As these probes were to be used spontaneously it was reflexively important that they were non-directive. The following extract is from interview 1 with David and illustrates the non-directive approach taken.

David   *So matching teaching and learning styles creates a learning approach…is that what you mean?*

Interviewer   I'm interested in what you think so that's fine thank

	*you. **Have you heard about personal, intellectual or thinking styles?***
David	*Not really, I think I read about…no I don't know about those, not in any depth. I think I read about intellectual styles at some point but I would just be guessing.*
Interviewer	***Feel free to guess if you want to?***
David	*I think…but I'm not sure…that they are like a bigger measure of learning style…*
Interviewer	***Go on***
David	*They measure learning style and other factors, other psychological measures that relate to learning and intelligence. That's it I'm just guessing now but they are like an extended measure of learning style.*

This strategy was augmented by the application of the counselling skills of respect, empathy and genuineness (Nelson-Jones, 1982) in all dealings with interviewees throughout the research process. As Charmaz (1991) suggested, in-depth interviewing should be used to explore not interrogate.

Ethical considerations

The study followed the regulations required by the University of Hull's ethical guidelines and permission to proceed was granted (see appendix 2). The work conforms to the British Educational Research Association's (BERA) (2011) guidelines. Diener and Crandall (1978) suggest that ethical concerns can be broken down into four major areas of concern, whether there is; harm to participants; lack of informed consent, invasion of privacy and whether deception is involved.

Avoidance of harm to participants

This could cover any of a number of facets such as physical, social or psychological harm (Bryman, 2012). As there were no mechanisms within the study that would lead to physical harm psychological mechanisms were controlled for. The first concept dealt with was that of stress caused by perceived status inequality within the interview situation (Gubrium & Holstein, 2001). It was stressed within the preamble to the interview that the

relationship between the researcher and interviewee was equitable and collaborative (Charmaz, 2008). It was explained to each interviewee that they were free to withdraw themselves and their data from the research at any point for any reason without explaining their motivations (Adler & Adler, 2001).

To further protect self-esteem the interviewees were informed that there were no right or wrong answers to the questions being asked. All that was being collected was the interviewee's opinions and attitudes (Briggs, 2001); they were not involved in an assessment of specialist knowledge regarding learning styles.

Several of the interviewees expressed concerns about their views being made public and their institutions becoming aware of the content. They were told that they could refuse to answer any questions for any reason and reassured that only the researcher would have access to the transcripts and that they would be destroyed after analysis had ceased. Interviewees were informed that descriptions of their identity beyond their teacher education role would not be required or published and all records would be anonymised (Bryman, 2012). To ensure that any unanticipated harm from the interviews (DiCicco-Bloom & Crabtree, 2006; Bryman, 2012) could be dealt with all interviewees were provided with the researchers contact details.

Maintenance of participant's privacy

To ensure that the interviewees' identities remained unknown beyond the researcher each individual was assigned a pseudonym and all information provided by them was associated to this name only (Bryman, 2012). Thus if the interviewee expressed any views that could jeopardise their position within their institution they could not be traced back to them. The interviewees were all informed that their anonymity would take precedence over all other considerations unless this strategy created a dangerous or unlawful situation (DiCicco-Bloom & Crabtree, 2006).

The interviews were held outside of the interviewees' place of work to ensure that their involvement with the research was not made public knowledge. The choice of venue was negotiated between the researcher and interviewee at times that were mutually convenient. All other forms of contact were kept outside of the interviewee's work context with telephone and e-mail contact being undertaken on personal rather than professional means.

The demands of the UK Data Protection Act (1988) were followed to ensure that all data was acquired and stored legally. Digital confidentiality was facilitated by not saving personal information or correspondence on a hard drive: identifier codes were stored and used individually and kept away from personal information which was under lock and key (Munro et al, 2005).

Ensuring informed consent

During initial contact the prospective interviewee's were provided with a detailed verbal explanation of the study and then asked if, in principle, they were willing to take part in the study. If they indicated they were, a mutually acceptable date, time and place was arranged to undertake the interview. Prior to the start; permission was asked to record the conversation (Bryman, 2012) and following an orientating conversation, that explained the aims and objectives of the study and encouraged questions from the interviewees, they were formally invited to take part in the study. They were also asked at the close of the interview if they were willing to allow their contribution to be used in the study and to sign a Participant Information Sheet (appendix 3) agreeing that they had given fully informed consent.

When respondent validation of individual transcripts was requested the interviewees were also asked for permission by the researcher to use them in writing up the study. Thus the interviewees had multiple opportunities to terminate their participation in the study.

Lack of Deception

No deception was used in the study, the research questions were made known to the participants and the researchers views were articulated in the

preamble to the interview. The interviewees were encouraged to ask questions about the research and the researcher's stance so that they were comfortable with taking part and understood their role and the context of the study. This approach led to four initial refusals to take part in the research and three after the preamble to the interview; however those who took part in the research itself made no adverse comments about ethical concerns.

The in-depth interviews were conducted only once for each individual with the responses constituting the sole source of data to ensure theoretical sensitivity (DiCicco-Bloom & Crabtree, 2006).

Data analysis

All recordings were subsequently transcribed by the interviewer to create an immersive experience that allowed a deep engagement with the data prior to coding it. This also allowed the identification of sections of the interview that were not relevant to the analysis and could be omitted from the transcript (Bryman, 2012). Extraneous information makes a transcript more difficult to read and can obscure the research purpose, "A more useful transcript is a more selective one…" (Ochs,1979:44). A denaturalised approach to transcription was taken so that idiosyncratic features of oral language such as "er" and "umm" etc would be retained. This approach was taken as it is suited to a grounded theory methodology because it suggests that "within speech are meanings and perceptions that construct our reality." (Oliver et al, 2005:1274). It will allow the participants' voices to be heard more clearly than a naturalised approach. However Bucholtz (2000) claimed that denaturalised transcription may lead to odd looking transcripts that are difficult to read. To ameliorate this situation the digital recordings were played in conjunction with reading and re-reading of the transcripts to help to focus on the identification and meaning of the units of analysis. This multi-channel approach is useful in the development of both eyes and ears for identifying appropriate units for analysis (Chenail, 2012).

Once the interviews had undergone denaturalised transcription, copies of them were sent to the relevant interviewees for member checking. This was to help to establish the credibility of the study by establishing

respondent validation. Of the fifteen transcripts sent to interviewees four (of the detractors group) returned briefly annotated copies of their transcripts with instructions for minor changes. In all cases they indicated that after the changes had been made the transcripts would provide an accurate representation of their views. Of the other interviewees, six (four supporters and two detractors) sent e-mails indicating that the transcripts were accurate. The remaining five supporters responded affirmatively to texts seeking permission for the transcripts to be used in the research. Bearing in mind the positive nature of the returns it was assumed that the interviewees felt the transcripts were accurate and honest portrayals of their constructions.

Qualitative analysis

An iterative approach was taken with data being gathered and analysed concurrently to facilitate the emergence of theory grounded within it.

The interview responses were analysed using an editing process whereby the data was subjected to coding via constant comparison (Charmaz, 2004; DiCicco-Bloom & Crabtree, 2006). Constant comparison works by comparing instances of value to the analysis against any and all other confirmatory or dis-confirmatory instances to illuminate the themes within the data (Fram, 2013). Thornberg et al (2013:313) describe this as:-

> …comparing data with data, data with codes, codes with codes, data with categories and so on…

Unit of Analysis

Charmaz (2006), Bradley et al, (2007) and Chenail, (2012) suggest that data should be initially coded on a line by line basis. This is a commonly used technique that is useful for the initial assessment of data prior to deciding on the size of the unit of analysis. The advantage of this strategy is that the analyst gains a thorough understanding of their data Charmaz (2004). However the amount of codes that this process produced indicated the need to establish a more useful unit of analysis for the study to make the data more manageable. The unit of analysis for qualitative research can

vary from single words to whole passages of data, Chenail (2012:266) defines it as '…a single undivided entity upon which you direct your analysis and express the qualities you perceive in that element.'

Continuing with the use of each line of data as the unit of analysis runs the risk of the units of becoming over or undersized (Chenail, 2012) and will result in '…a proliferation of codes.' (Bryman, 2012:577). An alternative is word by word analysis but again there is no guarantee that single words will constitute appropriate units of analysis. The solution is to use a unit that provides '…meaningful qualitative elements…' regardless of their physical representation on a data sheet (Chenail, 2012). This allows for codes to be of varying sizes provided they are coherent and logical representations of the relevant point of focus. Therefore the unit of analysis used in this study to create codes comprised of segments of data that equated to meaningful qualitative elements, regardless of the number of words or lines that they straddled. Therefore some codes could be a single word or sentence whilst others were represented by passages of data.

The coding and comparison process was undertaken using QSR NVivo version 10. Software programs such as this are well suited to grounded theory methods as most are designed to facilitate it (Lonkila, 1995).

During the first level of analysis or initial coding (Charmaz, 2006) instances of interest were identified and given meaningful labels to describe their content. This allows them to be logically compared and contrasted with other instances of interest according to their meaning. In this process the data was being broken down or fractured for ease of analysis (Holton, 2010). The data were fractured by asking analytical questions such as 'What are this data a study of?', 'What category does this incident indicate?', 'What is actually happening in the data?', 'What is the main concern being faced by the participants?', and 'What accounts for the continual resolving of this concern? (Glaser, 1998:140). Such questions help maintain theoretical sensitivity and assist in the recognition of the patterns that produce codes (Holton, 2010). This strategy used with constant comparison facilitated the emergence of forty nine codes from the

data. This early coding suggested that the differences that were emerging between the supporters and detractors required further clarification thus more detractors were recruited to illuminate these differences. The influence of management in the use of learning styles was also emerging and appeared to be associated or influenced by beliefs regarding the role of Ofsted. Ofsted was also positively associated with style theory especially by the style's supporters. These insights provided the direction for further collection and analysis of the data. As patterns were recognised tentative memos were created to help in the establishment of initial categories.

Development of codes, sub-themes and themes

For Charmaz (2006) coding shapes the analytic frame and produces the basic structure for the analysis; it is the link between the data and the development of theory and a link between the researcher's views and the constructed reality of the interviewees. Whilst the initial coding produced a wide variety of labels they were significantly reduced by axial or focussed coding. Focussed coding allows the emerging themes to be grouped together in a logical fashion to facilitate the development of concepts and categories (Cresswell, 2008) or sub-themes and themes. Concepts or sub-themes are defined as collections of codes that are semantically similar and categories or themes are a collection of similar concepts that are important components for theory building. During the focussed coding the data fractured in the initial coding was re-assembled to provide a more abstracted sense of the interview data. This was achieved by reflecting on the codes and concepts and undertaking a close comparison of their context to identify linkages and interconnections (Charmaz, 2006). This part of the analysis allowed the large number of codes that had emerged to be contracted into larger logically connected sub-themes and themes.

This approach to focussed coding differs to that proposed by Strauss and Corbin (1998) who suggest it should be used to analyse situations described in the interview and the actions and consequences associated with them. To facilitate this, the properties and dimensions of the emerging categories or themes have to be identified and described. A property can

be seen as an explicit or general characteristic that can be scaled along a dimension. For example the emerging category Stereotyping could contain the property of 'concern over use' with dimensions representing a scale from 'no concerns' to 'many concerns'. This version of grounded theory emphasises such considerations rather than the comparative method. Charmaz (2006) sees this strategy as providing an analytic frame that is too rigid and formalised and that ignores the process of co-construction.

Although memo writing was undertaken alongside all levels of the coding process, their creation was particularly prolific during this phase. Memos can be seen as abstract ideas about the relationship between instances of interest. They can be used as tentative hypotheses about the data that can be tested by further questioning. They provide the framework of the theoretical explanation of what is being observed and why it is occurring. If the memos are supported by the data they contribute to the emergence of the theory if not they are discarded. For example one memo proposed that management interest in style theory was motivated by the belief that Oftsed supported their use and observation grades could be improved by their demonstration. This led to further questioning which showed that this was indeed the view being articulated within the sample. The memos allowed the codes and sub-themes to be elaborated, contextualised and compared.

As the sub-themes developed and amalgamated they were formed into larger themes, logically associated collections of sub-themes. Along with the memos that had been created to investigate, describe and define their structure they began to ease the emergence of theory from the data (Charmaz, 2004; DiCicco-Bloom & Crabtree, 2006). It is from this interactive process that the grounded theory will emerge, writing memos roots the researcher in the data and encourages abstraction (Charmaz, 2006).

These themes were then subjected to theoretical coding; this is the most abstract level of coding and explores the relationships between the emergent themes. In essence this process is simply treating the themes as codes and comparing them against the data again to see if it still supports

the theme's content. It is where themes are merged if any overlapping relationships between them are recognised. This facilitates the emergence of the theories grounded in the data by constantly testing how they fit within the data. Therefore the themes that had emerged were once again compared to each other and the data they were drawn from to see if they were supported or challenged by it. For example it was becoming apparent that learning style use was associated with ITT experiences for the supporters. However a review of the data showed that not all supporters were introduced to styles as a part of their initial training, thus the data did not fully fit. However the review revealed that those same supporters were introduced to style theory by colleagues. Thus initial socialisation was expanded to include the influence of ITT and colleagues to explain why individuals became supporters of learning styles. A problem with this view was that some of the detractors had recorded the same experiences, thus once more the data did not fit. So the data were reviewed again and a difference was found between the two groups in that the socialisation reported by supporters was of an enthusiastic and positive nature. This was not reported by the detractors whose socialisation experiences appeared mundane in contrast. Thus theoretical coding led to the final construction of the theme 'enthusiastic socialisation' containing the sub-themes ITT experiences and influence of colleagues

In classic grounded theory a core or central category or theme is expected to emerge that relates to all other categories and can account for much of the observed variation in behavioural patterns (Holton, 2010). This representation of a single reality is however absent from a constructionist approach (Charmaz, 2004, 2006) instead a number of themes representing different constructions emerged from the constant comparison of the data with none of them being privileged compared to the others. At this point in the research no new data or questions were coming from further analysis so it was decided that the codes were saturated.

The grounded theories emerged from the theoretical sorting of the themes generated during coding (table 6.3 appendix7). To ensure that the theories did emerge and were not forced each code, sub-theme and theme was

based on underpinning narrative evidence from the interviewees. In this way theoretical sensitivity was preserved and the impact of prior knowledge was minimised as no codes or sub-themes were based solely on prior knowledge. Thus the codes, themes and theories that were constructed came from the data provided by the interviewees and could be traced back to them. Until the theories were well formed there was no attempt to link them to prior knowledge. This strategy kept the analysis sensitive to emergent themes ensuring that they were not forced by external considerations.

Once the grounded theories underpinned by the themes had been written up their confirmability was reviewed. This was undertaken by two colleagues with extensive experience within the L&SS. Both have been teachers for over twenty years and both hold Ph.Ds. One has a background in educational management and organisational behaviour and has held a number of senior posts at various educational institutions across the region. The other has taught qualitative research in creative arts and both are confident in the use of grounded theory. The views of both reviewers provided broad support for the study's conclusions helping to facilitate its confirmability; although one expressed concern with the choice of a constructionist approach as opposed to the use of Glaserian grounded theory and the subsequent lack of a core category. A constructionist approach must however reject the existence of a core category on the grounds that such a category is emblematic of a unitary reality. The core category is chosen by the researcher who attempts to objectively justify the decision. This may be on the grounds of the frequency that evidence accrues for it or an argument that it is centrally placed in relation to the other concepts. However this approach ignores the co-constructional process of the observed social reality therefore the choice of a core category can only be subjective. Thus on philosophical grounds no action was taken with regard to this criticism.

Conclusion

This chapter has dealt with the empirical considerations of this thesis and provided a focus on the research methodologies and how they were used to gather and analyse the data. The participants and their recruitment has been described in some detail. Consideration of the ethical safeguards, to ensure interviewee safety regarding informed consent, privacy, deception and the avoidance of harm applied was discussed. The construction of the unit of analysis was declared along with a description and rationale of the iterative approach taken ensuring that data analysis and collection took place concurrently. The grounded theory process of analysis from line by line coding up to the creation of sub-themes and themes has been detailed although the themes and theories themselves are not described.

The next chapter identifies, describes and discusses the sub-themes and themes that have emerged and provides a tentative explanation of the theory grounded within them. To emphasise the co-constructive nature of the theories it uses interviewee narrative, researcher memos and data abstracted from them to construct a holistic overview of the findings.

CHAPTER SEVEN

IN VITRO FINDINGS FROM THE DATA

This chapter describes and discusses the in vitro themes constructed through the analysis of the data and where relevant, briefly introduces the grounded theories that have emerged from the process. In vitro themes are what Strauss (1987) would term as sociologically constructed codes that emerge using the analyst's terms. Knowledge of the origins of these codes helps in the reflexive analysis of the data associated with them. An emphasis has been placed on the co-constructive nature of this process with the findings resting on the analysis of interviewee narrative, researcher abstraction and links to the literature. The views of the supporters are presented separately to those of the detractors.

Supporters and detractors

It became clear during the interviewing that not all the interviewees supported the use of LSI, rather than discarding the views of this group they were kept to provide comparisons on key points. Two groups emerged from this, the supporters (n=9) and the detractors (n=6). This strategy follows Charmaz's (1997) approach in her research into the identity dilemmas of males with chronic illness. In this grounded theory study she collected the views of women to allow comparisons to be made on selected points. This sample then can be seen, within the qualitative tradition, as an example of heterogeneity sampling that will facilitate the variation of the data (Patton, 2002). In this case the variation is the time available to apply, utilise and reflect on the utility of LSI in teaching practice.

Emergent themes

As the sub-themes and themes emerged and agglomerated their number reduced and increased the richness of the data to start producing what Geertz (1973) terms as thick description. This thick description is achieved by the attainment of data that are detailed, full and well-focussed; they should illuminate interviewee's attitudes, behaviours and provide insights

into the structure and context of their lives (Charmaz, 2006). Six fully formed themes emerged from the theoretical coding however 'Knowledge and use of VAK' and 'Conceptual confusion' being in vitro codes are discussed below along with a number of constitutionally important sub-themes (Table 7.1 appendix 8). The remaining in vivo codes are described and discussed in chapter eight.

Theme 1: knowledge and use of VAK

As predicted by the work of Nixon et al (2007), Leite et al, (2010), and Harper, (2013) all fifteen interviewees were familiar with the VAK-type approach. All agreed that it was the best known model within the sector, Lucy's comments that it had …*flooded* … the sector and that the …*web is teeming with them…* were typical of the views held. Six of the sample used a VAK-type model and six used the Honey and Mumford (H&M) LSQ with three using both (Table 7.2 appendix 9). Although all interviewees were aware of other models none of them reported using any. Thus the VAK-type approach whilst popular is not the only model used. Overall, the use of both models was evenly distributed between the interviewees as a whole and within the supporters and detractors' groups.

Supporters

Of the supporters Lily, Phil and Yasmin used VAK-type LSI whilst Lucy, Peter, Thea, and Linda used the H&M LSI with Emma and David using both models.

The dominance of these two models amongst the interviewee's is difficult to explain if the research evidence is consulted as both models lack robust supporting evidence (see chapters 3 and 4). Their popularity, at least in part, appears to stem from their free availability which, according to the interviewees, appeals to management. Emma who uses both models explained that:

> …*my manager says we should use the H&M and gave us the website to get a copy but I like the VARK and students can do it*

*online and get feedback immediately without me being involved.
(Emma)*

That there is no cost associated with these models (outside of Peter Honey's website) makes them attractive as Emma underlined when asked if her college paid for the H&M LSQ:

You're having a laugh aren't you, they wouldn't pay for them. No I just go to the website and print them off so the students can do them in class (Emma).

This was substantiated by David who used the free (on the web) eighty item version of the H&M. Fleming's VARK appears in a self-contained website that allows full access to the model at no cost, as Yasmin described:

It's easier to handle, just go to the website get them [students] *to do the test, print the results out and place them in the course file (Yasmin).*

It appears that the VAK-type approach and the H&M owe much of their popularity, not to empirical support but to their online availability, lack of cost and ease of use. Nixon et al's (2007) cited ease of use as being especially appealing to staff in the L&SS and this is borne out by the narratives.

The supporters had an extensive understanding of VAK-type models although Lucy, had reservations about its use compared to the H&M:

I …think it's a superior measure to VAK which is a little simplistic; I think that Honey and Mumford are more suited to HE and teacher education courses. (Lucy)

Linda appeared to endorse this view when explaining the role of Teacher education at her college in choosing the H&M:

They [management] *wanted us to look into the most appropriate learning styles inventory to use at the college. VAK was one option but a little too crude in some ways, I don't like it much…there's no depth to its measure. We didn't want to use the other similar inventories like Fleming either. There're lots of versions of the basic VAK inventory and we wanted to avoid them…I know that they are popular but that doesn't make them the right choice. (Linda)*

Detractors

All the detractors admitted to using LSI at times within their practice. Alfred and Mike used the VAK at induction; Bridgit used both VARK and the H&M to illustrate the concept of learning styles for her education students, William and Eric used the H&M for similar reasons and Roger used the VARK to comply with college inspection policy.

The detractors offered no support for LSI use with Bridgit's description of the VAK-type model constituting a representative view:

> *…it's a supposed measure of a student's supposed preferences for using one of their sensory systems in the process of learning. It's totally meaningless and its results are in my opinion a waste of time for both tutors and students. (Bridgit)*

Like the supporters all of the detractors were able to accurately explain and clearly describe the VAK-type model.

Summary

It may be inaccurate, in light of these views to foster the belief that the L&SS is totally dominated by VAK-type approaches. Its popularity is equalled by the H&M LSI with some individuals and institutions using both models. Some of the supporters felt that the VAK model was inferior to the H&M LSI thus it cannot be described as dominant within this sample. However as no other models were used by these teacher educators it may indicate that they hold a favoured position within the sector? However this may be due to their free availability on the internet rather than a considered approach to their selection.

Sub-theme: VAK doesn't underpin all LSI
Supporters

The supporters' views on this topic were split with Thea, Lucy and Peter rejecting the VAK type approach as underpinning all learning style models.

They claimed that the H&M categories were not the same as the VAK categories, Peter stated:

> *It's very different to VAK as it's not based on gross sensory preferences (Peter)*

Thea supported this suggesting the H&M's focus was on:

> *…psychology not biology (Thea)*

The remainder of this group appeared to support the view articulated by Dunn (1984) that although there were differences in the categories and items used by different models they were all tapping into the same concept. Emma stated:

> *…What I am saying is that whilst many use these* [VAK type categories] *as their basis not all of them do i.e. Honey and Mumford for one. But if you compare the categories from the different models you will find that they are measuring the same things but in a slightly different way. (Emma)*

Lily confirmed this claiming:

> *Most learning styles seem to be based on this idea, I mean they all measure similar ideas don't they? I don't think that Honey and Mumford use VAK they have things like reflector and pragmatist and these will be similar to VAK and Gardner because they all measure the same thing they just use different terms to describe it. (Lily)*

Although Lily is in error to include Gardner's MI as a learning style (a charge he has refuted on a number of occasions) a number of theorists have included it within the field such as Smith (1996), Milliband (2003) and Rogers (2009).

Continuing this theme Phil claimed that the differences between most LSI measurements were phonetic rather than semantic; he felt that all LSI were measuring the same thing but used different labels. This was illustrated by Lily who proposed that:

> *They* [LSI] *are just using different words to explain it…like you know…the blind men and the elephant. Each man touched a different part of the elephant and thought it was different…They all*

described different bits of the same thing as though it was several different things…I think that's what's happened with learning styles. (Lily)

Detractors

This group were clear that the sensory approach to learning, utilised by VAK-type models, was not the basis of all learning style models. Mike's views were representative of this group when he stated

No they're only part of it…most learning styles are not based on VAK. (Mike)

Thus for the detractors the sensory approach used by VAK types was seen as qualitatively different to the approaches used by other learning styles thus denying them the possibility of a paradigmatic union. As Eric concluded;

VAK is just one attempt at measuring individual's alleged learning styles amongst a fractured field full of competing models. (Eric)

Summary

Three of the supporters agreed with the six detractors that the VAK-type approach was qualitatively different to other learning styles models whilst the remaining six felt that the VAK-type approach was measuring the same basic constructs as all other LSI. This challenges Sternberg and Zhang's (2003) claim that learning styles are generally seen as being based on modality specific processing approaches and supports Burton's (2007) refutation of this claim. That the supporters were split on whether or not VAK underpins all learning styles suggests that students within the sector are in danger of receiving differential information regarding VAK and other models. Thus they are reproducing the conceptual confusion that exists within the styles' field.

Theme 2: conceptual confusion

This theme revealed that the confusion reported in the literature was clearly identifiable within the participants' thinking. This theme was constructed from six sub-themes namely; 'Structure and form of learning styles', 'The

matching hypothesis', 'Cognitive styles', Learning strategies', 'Learning approaches' and 'Intellectual/ thinking styles'.

Sub-theme: structure and form of learning styles

Both supporters and detractors appeared to hold well informed views on the structure of learning styles. Despite this there was only limited consensus to be found within the supporters' group with diversity rather than uniformity being the rule.

Supporters

The supporters were split in ways that reflect the divisions within the contemporary styles' field. Four of them viewed the nature of learning styles as flexible or changeable, whilst four more saw them as more or less fixed with one taking an inter-actionist approach.

The inter-actionist Yasmin claimed that styles would change after their initial acquisition until they developed fully and became permanent. When asked if learning styles changed over time she stated:

> *I think they do until we find our real style, the one that suits us perfectly then it remains more or less the same. (Yasmin)*

Mainemellis et al, (2002) represented this type of interactionist view when they suggested that an individual's learning style develops through a process of change and development prior to them becoming a balanced learner. Yasmin likewise saw learning style as being initially fluid as an individual tried different aspects of style, searching for those that suit them best. Claiming that once the individual finds the style that facilitates their learning the most effectively it will solidify and become permanent, hence Yasmin's view is one of interaction. Her view reflects the interactionist theories of Riding and Raynor, 1998; Cassidy (2004) and Pfeiffer et al, (2005) who conceptualise styles as being relatively stable over time but amenable to change under various conditions.

In contrast to Yasmin, Peter saw learning style as inherently unstable claiming:

> *…you should view any diagnosis of learning style as provisional.*
> *(Peter)*

Similarly Thea viewed learning style as:

> *…almost totally fluid (Thea)*

claiming that if a student was able to develop strengths in more than one style they couldn't be fixed. She also had an expectation that her initial teacher training (ITT) students' styles would change as a result of undertaking a teaching course, claiming it is:

> *…to be expected because teaching is a new skill for most of them and for some this creates changes in their approach to learning and these have to be accommodated. (Thea)*

This is in common with Charlesworth (2008) and Nielson (2005, 2008) who claim that career and academic changes have an impact that causes changes in styles. Lucy suggested that style changes in response to environmental demands. She illustrated this with a scenario concerning some of her ITT students, who have gained employment in the sector:

> *…when they start as teachers and they are responsible for imparting knowledge rather than receiving it their environment has become unpredictable and their style will change to help cope with it. (Lucy)*

Whilst Lily agreed that style was flexible and cited instances of students getting differing diagnoses from later testing; she had no explanation as to why this may occur and was not aware of the supporting research. These views coincide with the models of Allinson & Hayes (1996), Herrmann (1999), Honey & Mumford (1992), Kolb (1984), Felder & Silverman (1988), Hermanussen, Wierstra, de Jong & Thijssen (2000) , Kirton (1976) and McCarthy (1981)

In contrast other supporters saw style as fixed and generally unchanging. Linda's claim was broadly representative of this:

> *The proportions of your constituent learning styles can alter sometimes, people tend to have one, maybe two major styles, say*

theorist or reflector or both and these usually stay the same but the minor ones may grow or shrink in comparison. (Linda)

David suggested a similar view claiming that style was fixed from birth and whilst new styles could agglomerate as the individual develops, the first style is always:

…the most influential. (David)

Emma's view echoed David's whilst Phil took a stricter view. He saw no reason for style to change overtime as he felt that the individual's learning process itself remained stable. He did however accept that a student could develop new styles with practice:

However these won't displace their initial style… (Phil)

These attitudes coincide with Stitt-Gohdes, 2005; Lovelace (2005); Favre, 2009; Pitts, 2010; Dunn and Honigsfeld (2013). It should be borne in mind that Honey and Mumford (2006) have claimed that learning style can change over time for a variety of reasons. It is therefore surprising to find that users of this LSI (Linda, David and Emma) should view learning style as fixed.

Detractors

The level of theoretical knowledge, regarding learning styles' structure, held by the detractors was good and they articulated it effectively. To illustrate their stances they qualified their descriptions of styles with the use of terms such as *..it is held that…* (William) …*so the claim goes.* (Eric) and …*fraudulent…* (Roger) etc. Bridgit provided a representative description that indicated the detractors' position by reviewing the problems that surround styles research:

> *…they are supposed to be unconscious or conscious ways of approaching learning, that are fixed or free to vary, depending on whose theory it is. The difficulty in describing them is that there are so many variations you can't be sure that they are measuring the same thing. One questionnaire may focus on sensory modalities that are permanent whilst another may look at strategies for learning that are changeable in response to the environment. (Bridgit)*

This view reflects the conceptual confusion within styles research (see chapters 3 & 4) and was cited as the major reason for the detractors not engaging with the concept,

> *It's because there are so many learning styles and all of them seem to work differently that I have as little to do with them as is possible! (Alfred)*

Amongst the detractors the theoretical inconsistencies caused the fixed or fluid structure of learning styles was cited as a reason for not using them.

Summary

This dichotomy didn't appear to concern the supporters, their mixed views regarding the structure of learning styles are entirely consistent with the literature where there is still no consensus on the matter (Coffield et al, 2004; Zhang and Sternberg, 2005). None of the supporters referred to any research evidence to support their views on the fixed or flexible structure of styles. Instead they based their attitudes on their interpretations of their own experience. This will have a bearing on teacher education with some students being taught that learning styles are flexible and others that they are fixed. Therefore these teacher educators can be seen as reproducing and sustaining the divisions within the styles field due to differing personal belief systems regarding learning styles. These views support Coffield et al's (2004) claim that the appeal of learning styles is intuitive, or meta-physical (Nixon et al 2007), rather than evidential.

Sub theme: matching hypothesis
The discussion of the matching hypothesis led to a predictable split between the supporters and detractors. The latter denied using matching whilst all the former claimed it was an important part of their practice.

Supporters

Usage of matching amongst the supporters was global with some appearing very committed, claiming they used it:

> *…in every session (Emma)*

> *…all the time, for all of my lessons (Lily),*
>
> *All the time… (David)*
>
> *…in all of my classes (Lucy)*
>
> *…for every class that I take (Thea).*

When asked to explain how they might apply the matching hypothesis they provided detailed and credible responses such as this from David:

> *…if we're in the workshop and I want a student who's got a visual style to, say change a brake pad. I'll demonstrate by pointing to where he needs to be or make him watch whilst I start the job then let him finish. With an aural learner I can just explain it, tell them what to do, I still point at things for them as I always point, its just natural. For a kinaesthetic learner I tell them how to do a little bit at a time and watch them do it then tell them the next part, its just simple behaviour shaping but it works. (David)*

Phil's overview of the use of matching articulates the advantages claimed by all of the supporters:

> *…it's pointless not to as it works so well you're disadvantaging the students if you don't. So I make sure that I get everyone's learning style tested in the first session ideally, it makes a great icebreaker gets everyone talking. It gives me the data I need to start effective planning of resources and approaches for the rest of the course. All of the results go in to a class folder, very useful for me, very useful for inspection, very useful for the students, everyone benefits, (Phil)*

Detractors

These scorned the use of matching in the classroom; Alfred described the concept as being:

> *…all bollocks (Alfred)*

However he admitted to using the technique when facing inspection. He justified his use of matching, despite his beliefs, as being due to managerial pressure to use evidence of learning styles for inspections:

I have the results from induction so I'll attach them to my files so the inspector can see I've done that. I teach using lots of different methods anyway and will claim that PowerPoint, video etc is for visuals, talking, discussing in small groups is for auditorys and I'll chuck in a role play for kinaesthetics or get them to stand in a line across the room that shows their views for or against a topic. (Alfred)

The rest of this group denied using matching, but they did concede that like Alfred's example they structured their sessions in a similar way to the supporters. Eric's view echoed those of William and Mike:

I don't use the matching strategy I don't need to; my lessons already contain sufficient variety. I have always included a mix of teaching techniques; it's a very basic consideration and one that I thought all tutors followed. (Eric)

Alfred confirmed this approach claiming that:

…being a good teacher means that I cover all of the styles but for variety and interest for the whole group. (Alfred)

Confirmation of this approach came from Roger who, like Eric explained that he didn't need to use the matching hypothesis:

Because I use all of the techniques anyway, you have to if you don't want to lose the learners. In any class you have to have …um variety there has to be a mix of methods to engage them. Otherwise its just talk and chalk. (Roger)

Thus the detractors claim that their approach uses a similar lesson structure as that used by supporters to ensure variety and interest.

Summary

It can be seen from these commentaries that the matching hypothesis is a central strategy for all of the supporters' implementation of learning style practice. This is despite the views expressed by four of them who see learning style as unstable or fluid, these four supporters claimed to diagnose student's styles more regularly than those who saw style as fixed. This extensive use of matching by the supporters is at odds with the existing research into matching which suggests that matching is ineffective (Pheiffer et al, 2005; Pashler et al, 2009).

The comments from the detractors mean that to all intents and purposes the lessons of both groups will have identical structures. Therefore the use of learning styles will have no immediate impact on the structure of a session; they will neither enhance nor degrade the quality per se. The difference between the teaching approaches of both groups is not in the teaching and learning strategies used but in their intent. The detractors will aim to use enough strategies to create and maintain interest for the group as a whole whilst the supporters will aim their equivalent strategies to reach diagnosed groups of learners. The problem for the supporters is that this matching approach may stereotype learners.

Sub-theme: cognitive styles

Detractors

The detractors saw the differences between the two measures as small to non-existent. All six claimed that both style constructs were measuring the same or a similar thing, coinciding with the views of Schmeck, 1998; Bartlett and Burton, 2007 and Kyprianidou et al, 2011. Alfred's suggested that:

> *They* [Style theorists] *claim that cognitive styles deal with how you approach learning whilst learning styles are when these approaches are put into action in the learning process, some claim they are opposite sides of the same coin. I personally don't think that the difference between the two is meaningful in any way. (Alfred)*

Bridgit shared this view stating that learning style could be:

> *…expressed behaviourally whilst cognitive styles are measures of different thinking strategies. (Bridgit)*

However despite being aware of this difference and referring to the literature she still felt that cognitive and learning styles

> *…appear to be exactly the same thing…(Bridgit)*

This cognitive behavioural description was echoed by Roger, Mike and William who also felt that the measures were similar. The distinction between the two styles according to Eric came from their different research areas. He proposed that cognitive style research was informed by psychology and neuroscience with learning styles being influenced more by

business and educational research. In his opinion it was this research background that was responsible for the subtle distinction between the two.

Supporters

Similar ideas were expressed by the supporters, Phil suggested that cognitive style was used:

> *…more for psychological research than educational purposes it's not really applicable to the kind of students I teach. (Phil)*

Yasmin and Lucy proffered similar views regarding the role of psychology. Yasmin believed that cognitive and learning styles comprised a unitary process that began with cognition, ended with behaviour and that both were associated with the acquisition of knowledge. She explained that:

> *…the psychologists have studied the thinking part of the process, the beginning cognitions, as is their wont. Educationalists however have studied the learning behaviours that are a consequence of the cognition. (Yasmin)*

This coincides to some extent with Shipman & Shipman, (1985) and Kozhevnikov, (2007) who see learning styles as isolated from psychological research although Bishka (2010) saw psychology as feeding into styles research. Yasmin further suggested that if the research into the two areas was unified it would produce a single cognitive-behavioural process, citing 'Sternberg's Thinking Styles' as an example. The views of Lucy were similar, she viewed style differences as being the end product of a narrow research focus:

> *Psychologists tend to deal with cognitive style and they like to mystify everything…makes them feel like proper scientists. Peel the err psycho-babble away and you have the same thing a learning style, the one and only. (Lucy)*

Other differences amongst the supporters involved the plasticity of cognitive style. Whilst Emma saw both measures as similar she described learning style as behavioural, fixed and unconscious whilst cognitive style could be chosen or ignored.   Similarly Peter indicated that shallow or deep processing might be chosen depending on whether the learning was for

mastery or merely by rote. The discussion within this theme provided some evidence that some of the supporters were engaging with styles research.

Summary

Both groups saw learning and cognitive style as being similar or identical echoing the views of Schmeck (1998), Bartlett & Burton (2007) and Kyprianidou et al (2007). There was an acceptance that cognitive and learning styles measured related points of the learning process. These points lay at either end of a continuum with cognitive style measuring intellectual orientations towards learning and learning style measuring actual learning behaviour. This reflects the contemporary distinctions between the two measures (see Riding and Sadler-Smith, 1997; Sadler-Smith et al, 2000; Knowles et al, 2005 and Johnson, 2009). It was suggested by members of both groups that psychological research foci could be responsible for perceived differences between cognitive and learning styles.

Sub-theme: learning strategies
Detractors

This group claimed there was a distinct difference between a learning style and a learning strategy:

> *…I don't think that learning strategies have anything to do with learning style (Roger)*

Whilst this group rejected the existence of styles in general they were willing to accept learning strategies

> *…we've been using them independently of learning styles for years… (Eric)*

They saw strategies as freely chosen by the users, capable of being taught and only applied over the short term. They saw them as a part of mainstream pedagogy, Alfred claimed:

> *…our students use learning strategies all day every day, we teach them to do so. A learning strategy might just be used for one task or*

a part of it but a learning style or cognitive style is supposed to influence a whole approach to learning. (Alfred)

For the detractors learning strategies were task related, with students being able to:

…choose a learning strategy in relation to a task or goal they have. (Bridgit)

They included skimming, scanning, reading for meaning (Bridgit, William), and mnemonics (Eric).

Supporters

All the supporters accepted that learning styles and learning strategies were separate entities however all, bar two, agreed with (but didn't cite) Bostrom and Lassen's (2006) claim that there was a level of association between the two concepts, with learning style predicting the type of strategy chosen. As David explained:

Well if I asked a class of students to research a topic they might choose strategies that reflect their learning styles. Visuals might search the web, there're a lot of images in websites, readers might go to the library, aurals might discuss the topic with others whilst kinaesthetics might do a bit of all of these strategies. (David)

Peter explained his views similarly:

Well take a theorist, one of Honey and Mumford's types, if they are given a task their style dictates that they will use a strategy that makes sense to them in terms of their learning style but how they actually go about selecting the strategy is up to them. So strategies are different…but related to styles. (Peter)

Yasmin continued this theme claiming that visual learners will favour visual strategies because of their style and the same will apply to the other categories of learning style. However the strongest association between the two concepts came from Linda who postulated that:

…learning strategies are extensions of learning style; your learning strategy will be a consequence of your style. If you think about it they have to be because learning style is demonstrated by the strategies that a person uses. (Linda)

Exceptions to this view amongst the supporters were Thea and Phil who saw the difference between style and strategy in a light similar to that of the detractors. Phil described strategies as being:

> *…like a short term fix and can be used by any learning style. For example if I set my class a library based task they would all go and read and make notes, it wouldn't just be the readers and writers the visuals and others can do it as well. I think that we are able to teach learning strategies like the method of loci for remembering lists, skim reading to see if an article is relevant and advanced searches on Google they are all things that can be taught and learned. Learning style is natural and fixed but strategies are learned and can be used by all of the styles. (Phil)*

Thea reasoned that this difference between the two constructs is reflected in some of the available LSI with some measuring strategy not style. She suggested that the H&M LSQ measured learning style whilst the VAK-type LSI measured learning strategies. For her this situation explained why she had observed activists and theorists etc. applying visual, aural and kinaesthetic strategies. She explained the situation thus:

> *If the PowerPoint breaks down do your visual learners switch off? No and that's because they're not using styles they're employing strategies and that's why the H&M is a better measure than VAK because it is measuring pure learning style… whereas VAK is merely measuring a strategy that can be chosen by any learner. (Thea)*

This view is not represented in the extant research field instead it represents another example of the teacher educators using their own views to explain aspects of their practice environment.

Summary

There were no attempts by either group to cite research to support their views regarding learning strategies. Both groups accepted the existence of learning strategies however the detractors conceived them as having no association with learning styles. This view was shared by two of the supporters but the remainder saw learning strategy as being reflections or extensions of an individual's learning style

Sub-theme: learning approaches

Detractors

The detractors' descriptions of learning approaches lacked commonality and diverse explanations were provided. Alfred and Mike viewed them as simply longer term learning strategies. They emphasised the flexibility of the concept as a salient factor to differentiate it from what they saw as the fixed nature of a learning style. Bridgit (citing the criticisms of DeBello, 1990; Cassidy, 2004 and Coffield et al, 2004) claimed that learning approach was just another name for learning style, claiming that this flexible labelling was:

> *…part of the problem with the learning styles field, lots of different labels for the same thing. (Bridgit)*

Eric, William and Roger discussed learning approaches using the deep and shallow dichotomy but without reference to Marton and Saljo (1976). Roger provided an explanation of the dichotomy that had no recourse to style theories:

> *Well it seems to me that a shallow approach is what you get from students who aren't interested; they put in just enough effort so they can pass their assessment. A deep approach where someone really understands a topic is because they are interested in it, it motivates them. (Roger)*

He proposed transformative learning as an explanation, in that students need to be interested in a topic for it to change their perception. Those who are changed by new learning are likely to appreciate it at a deeper level than those who are not thus the mechanism that dictates the level of learning is the student's level of interest.

Supporters

For the supporters, Yasmin viewed approaches as distinct from learning style offering a similar explanation to Rogers:

> *If an individual enjoys a topic, makes a link to it and finds it relevant to their life they will learn about it, take it in, apply it and understand it, deep learning will occur…simple humanist principle. If it isn't*

relevant and they don't enjoy it and are made to learn it only, uh oh shallow learning will occur. (Yasmin)

David was not sure what an approach was but felt it differed from a learning style. He suggested a common-sense explanation that an approach was an amalgamation of the students' learning styles with the tutor's teaching style. Thus he saw approach as being representative of the teacher/student interaction, it was:

The sum of the two styles it's the approach to learning of the class, so obviously learning style is a part of it but not all of it so yes there is a difference as one reflects the other… (David)

Phil felt a learning approach was a learning strategy, which he had earlier described as being distinct from a learning style. The rest of the supporters viewed learning styles and approaches as being identical. Emma stated that:

…they're just the same thing but called by a different label… (Emma)

Thea claimed that:

...the difference is in what the words sound like not what they mean. (Thea)

Lucy however felt that for her the difference between style and approach approximated the difference she perceived between learning and cognitive style; a function of psychological theory building, any differences were due to:

…the psychologists again inventing new concepts to try and make a new theory when perfectly acceptable ones exist already. (Lucy)

Summary

Learning approaches appear to be poorly understood as a concept, few of either group were able to link them convincingly to any extant theory. One detractor saw approaches as learning styles whilst most conceived approaches as a reflection of student interest in a topic with those interested in it appearing to have attained deep as opposed to shallow

learning. Six of the supporters saw approaches as being the same as learning styles.

Sub-theme: intellectual or thinking styles

Detractors

Although the detractors were able to describe intellectual styles as an attempt to measure a group of constructs that relate to intellectual activities, their understanding was limited. Eric associated this theory with Sternberg's theory of Mental Self Government and the remainder provided a composite description of the approach. Alfred saw it as:

> *A bit like profiling…*

where learning styles are seen as:

> *…parts of a larger construct… (Bridgit)*

> *…where all your intellectual abilities are measured… (Roger)*

No member of the detractors group provided a detailed description of the concept. William was only vaguely aware of the theory and Mike admitted to no knowledge at all.

Supporters

These were equally vague with Emma, Lily, Linda, Peter, Phil and Thea exhibiting little or no knowledge about intellectual style. Lucy had a vague recollection of the model:

> *I can't really comment on them I don't know anything about personal or intellectual styles I don't think I've ever heard of them. I do remember that a Thinking Styles Inventory was one of Coffield et al's chosen models but that's it I'm afraid. (Lucy)*

David claimed little knowledge of the concept saying that he had read about intellectual styles but would be guessing if he attempted to discuss them. However when invited to guess he provided a reasonable description of the concept:

> *They measure learning style and other factors, other psychological measures that relate to learning and intelligence. That's it I'm just guessing now but they are like an extended measure of learning style. (David)*

Finally Yasmin provided an accurate and confident overview of the topic:

> *I have just come across the idea but I think they* [Sternberg and Zhang] *are doing what I talked about a little earlier. They are linking cognitive and learning styles and…other concepts like strategies and approaches into a single process that they see as an intellectual style. They see our intellectual style as being governed by what they call mental self-government. (Yasmin)*

Summary

Intellectual styles were not well understood by the majority of the participants. Although two of the supporters did demonstrate some understanding with a third showing a sophisticated grasp of the theory and literature.

Conclusion

This chapter has presented and described the in vitro themes that have emerged from the analysis of the data namely; Knowledge and use of VAK and Conceptual confusion. Both groups were knowledgeable about VAK and the H&M LSI and didn't report using any other models. Whilst both groups appeared confident in their individual interpretations of learning styles per se the overall view was that their knowledge of the associated concepts was fragmented with a diverse set of opinions showing no unifying strands shared by the majority. This is a mirror reflection of the state of the contemporary styles field (Swailes & Senior, 2001; Cassidy, 2004: Evans and Sadler-Smith, 2006). It illustrates that DeBello's (1990) claim that the multiple definitions of learning style that were obscuring the field then, is still true today. Whilst the detractors eschewed using the matching hypothesis they did accept that their lesson planning used a similar structure. Although this structure did not rely on diagnoses of learning style it merely used different teaching strategies to add variety to a session. Knowledge about cognitive styles, learning strategies, approaches and intellectual styles was

limited in all the teacher educators. There was a marked absence of empirical evidence being used to support the views of the supporters who tended to give primacy to their own experiences of LSI usage.

CHAPTER EIGHT

IN VIVO FINDINGS FROM THE DATA

This chapter discusses the in vivo themes from the analysis, those that are made up of codes that reflect the interviewee's terminology. These comprise of 'Beliefs about stereotyping', 'The Ofsted hypothesis', The learning styles debate' and 'Enthusiastic socialisation'. When required their important constitutional sub-themes have been identified and discussed.

Theme 3: beliefs about stereotyping

Supporters

None of the supporters believed that using learning styles could stereotype individuals. This is at odds with many theorists, even learning style proponents such as Curry (1990) and Evans and Sadler-Smith (2006) accept that stereotyping can occur. This group held a common sense view of learning styles being benign rather than detrimental. Lily's response when asked if she had been professionally trained in psychometric assessment illustrates this:

> *No, it's only learning styles, students can go on the internet and do it themselves if they want, they aren't harmful. (Lily)*

Linda agreed claiming that the use of learning styles:

> *…improves the student's experience, it helps engage them because they are learning in ways they enjoy…it motivates them and they join in, they start to take ownership, they become enthusiastic. (Linda)*

Peter rejected the possibility of stereotyping:

> *I don't believe the scaremongering about stereotyping, in fact I think it's not possible to stereotype learners if you assess students regularly because learning styles change over time…Therefore if you measure your students regularly you will be aware of any changes and they can modify their approach. (Peter)*

For Peter stereotyping occurs when tutors who don't understand the flexible nature of styles neglect to measure students regularly so they follow an out of date diagnosis. As Peter viewed learning style as fluid he claimed to diagnose his students at least four times in each academic tear. He felt that his approach of encouraging students to use more than one learning style would also guard against stereotyping,

> *You should … help your students develop their secondary styles the ones that they are not strong in...for instance if you encourage an activist to develop their reflective abilities that's the opposite of stereotyping. (Peter)*

Phil also dismissed stereotyping claiming that it wasn't a real danger and despite his belief in the fixed nature of learning styles offered a similar solution:

> *As I said earlier you should always encourage your students to develop their other styles this will help them to learn in other situations so they know they are not completely reliant on one style of learning. I encourage all of my students to develop and consider styles outside of their own. Visuals need to be able to use reader writer abilities because they need to record what they see. Kinaesthetic learners need to engage with other styles so they don't get bored. So my students know that they can use the other learning styles so there is no chance of them becoming reliant on just one type of learning style. Its crap all this about stereotyping you wouldn't be asking about it if you understood learning styles properly. (Phil)*

The view of the supporters that the nature of learning styles was benign and didn't lead to stereotyping was offered without any research backing. Such views appear to be underpinned by the belief that the students themselves have engaged with learning style practice and this is used to legitimise their continued use. This is illustrated by Lucy's response to being asked if her students supported the use of learning styles:

> *Most of the time, there are some who don't see the point all of the time but they're comparatively rare. The vast majority are appreciative of what you can achieve with style theory. (Lucy)*

Detractors

Whilst accepting that style stereotyping had an empirical base, this group were not unduly concerned by it. They suggested that there was only a very small chance of students being negatively affected by such a situation. They suggested that students were not interested in learning styles and were thus not affected by any diagnoses they may receive. This view is represented by Roger's response when asked if stereotyping was harmful to students:

> *It might be if they took any notice of their, you know… learning styles diagnosis, most just aren't interested…some pay lip service at best…there are a small number who could be adversely influenced by it. (Roger)*

Bridgit also believed that her students were not engaged by learning styles suggesting:

> *They soon see that their learning needs are far more complex than a limited questionnaire could work out… The majority are not impressed with the accuracy of the measures but there are always one or two who claim the result is a fair picture. (Bridgit)*

Mike held a similar view proposing:

> *No, no no… few students take learning styles seriously enough to be affected by them anyway. You hear about this sort of thing, or read about it but I haven't come across it yet, students are able to think for themselves and take little if any notice of learning style. (Mike)*

There is some support from the literature for the detractor's views of student attitudes to LSI, with Honey and Mumford (1992) Merrill (2000), Rogers (2009) and Graf, et al (2009) suggesting that students are generally unaware of their learning style.

Summary

Neither detractors nor supporters appeared unduly concerned by the possibility of stereotyping students through LSI use. This stance, amongst detractors, is at odds with the literature and constitutes a new contribution to existing knowledge. Although the stereotyping literature is conceptual rather than empirical, many authors have cited this as a problem of learning styles (Reynolds, 1997; Demos, 2004;Coffield et al, 2004; Becta, 2005;

Evans & Sadler-Smith, 2006; Burton 2007; Scott, 2010). The detractors lack of concern was because they didn't feel that their students were interested enough to take their diagnosis of learning style seriously. They felt that their students' views on style theory coincided with their own thus they wouldn't be influenced by such diagnoses. The supporters believe that learning styles are beneficial and natural and as such are harmless. Thus neither group accepts that learning styles will lead to the stereotyping of students. This belief allows for the beginning of answer to the sub-question *'What are the beliefs held by teacher educators that facilitate the continued application of learning styles within the sector?'*

It is a salient feature of this analysis that both groups describe their students' attitudes towards learning style as coinciding with their own. The responses of both groups gave precedence to personal experience and opinion rather than the literature.

Sub-theme: learning styles as natural mechanisms

One component of the supporters' belief system was the view that learning styles represent a natural way of acquiring information, thus they are not harmful, don't lead to stereotyping and students will be drawn to engage with them. They felt this 'natural' approach to learning made LSI more effective than traditional approaches. The responses throughout their descriptions of learning styles were peppered with comments such as:

> …*effectively and naturally*…(Peter),

> …*more natural*…(Thea)

> …*naturally effective*…(David)

Emma's comment typifies this attitude:

> …*people have a way of learning that they prefer and this is their natural learning style (Emma)*

Lucy qualified the natural approach of styles by comparing it to the traditional methods experienced by students describing it as:

> *The way they would learn if they weren't in a large scale factory education system. (Lucy)*

Yasmin took this further claiming that style theory would aid self-actualisation:

> *By recognising our learning style and acting on it we are recognising part of our real selves, so we start to live more authentically…we are learning in a way that suits us not in a way that suits others we are freed from the demands of a system that enforces a one size fits all approach. We get away from the conditions of worth that traditional educational philosophies impose. (Yasmin)*

Whilst all of the supporters identified learning style practice as a natural approach their stance was not evangelistic (with the exception of Yasmin). It appears that this is a taken for granted assumption amongst the supporters that requires no empirical substantiation. Phil's claim is emblematic of the supporters' attitudes:

> *All learning styles are measuring how people like to learn naturally, what's the best way for them, at the end of the day that's what a learning style is all about. (Phil)*

Detractors

This group saw learning styles as:

> *Manufactured for a market… an invention. (Bridgit)*

> *Not representing anything that is umm real or that err is really there. (Mike)*

There was no mention of learning styles being natural entities or abilities in any of their comments. Styles were perceived as an unnecessary encumbrance to their practice and their student's experience:

> *They complicate a situation that is complex enough to start with, they* [students] *don't need anything else to deal with…learning is enough on its own. (Eric)*

There is no need for them [learning styles] *they just get in the way they distract them*[students] *from what they really need to know…* *(Alfred)*

These views can be represented by William's claim that:

…they are just another unnecessary hoop for students to jump through. (William)

Summary

Thus the supporters see learning style as an essentially natural expression of an individual's need to learn, something that exists and that expresses itself under favourable circumstances. Therefore identifying and supporting an individual's approach to learning is desirable and harmless. These beliefs expand the answer provided by the thesis to the sub-question, *'What are the beliefs held by teacher educators that facilitate the continued application of learning styles within the sector?'*

In direct opposition the detractors describe styles as products made for a specific purpose that hinder the student's educational experience. Although the focus of this hindrance is not directed at stereotyping but at what this group perceive as an unnecessary complication of their students' learning experiences.

Theme 4: the Ofsted hypothesis

In total thirteen of the teacher educators believed that the use of learning styles within an Ofsted observed lesson would improve the subsequent grading.

Supporters

Yasmin presented the representative logic of what, within this study, is termed as the Ofsted hypothesis:

… if you compare two observations where one has used learning styles and the other hasn't if all other things are equal the one using

learning styles would attain the best grade because it will meet more of the required criteria. (Yasmin)

All of the supporters expressed the opinion that LSI usage improved the quality of Ofsted grades. Peter and Thea provided the mildest level of support; Thea claimed that whilst Ofsted did look for the use of learning styles within an observation it was not the only criteria:

That would depend on any number of other considerations but it would improve the session regardless of the final grading. If the observation didn't go well because the students had decided to play up then the final grade may depend on how well the tutor dealt with the disruptive behaviour rather than learning style considerations. (Thea)

Peter also felt that the general planning and execution of an observed session had to reach a certain standard before the inclusion of learning styles would:

…gain extra credit… (Peter)

More support for the hypothesis came from David, Emma, Lily, Phil and Linda who claimed they had been praised by Ofsted inspectors for their use of learning styles. David and Emma suggested that their 'outstanding' grade awarded during Ofsted inspections were for using learning styles. David claimed his Ofsted inspector informed him that his use of learning styles to differentiate contributed directly to his outstanding grade. He stated that Ofsted inspectors:

…are looking to see that you use differentiation… (David)

As far as he was concerned:

The best way to show that you have differentiated is to have measured your students on a relevant measure and that you have reflected this in your teaching approach and highlighted it in your planning. The simplest way of showing this, as I said the best ideas are always the errr simplest, ohh is by a learning styles diagnosis. (David)

This approach was endorsed by Phil who believed that LSI improved Ofsted grades:

…because you are adding value by including differentiation that is documented in your lesson plan, you are matching your teaching to each individual in the class and presenting evidence of how you are doing it. (Phil)

This was confirmed by Linda (who also claimed receipt of an 'outstanding' grade from Ofsted):

The last inspector told me that my tourism group was one of the most enthusiastic he had ever observed and he had really enjoyed the session. He said that he enjoyed observing sessions like mine and that he had noticed that I had devised differentiated activities to fit my students learning styles. (Linda)

Lily's Ofsted report also mentioned the use of learning styles:

…when I was observed my use of learning styles with the students received praise from the inspector. Her report said that it demonstrated a commitment to differentiation and added variety to the teaching. (Lily)

However Emma's Ofsted inspector awarded an 'outstanding' grade for her use of learning styles to facilitate inclusivity:

The last Ofsted one [inspector] was really interested she asked me a few questions about learning styles afterwards. I think she wanted to make sure I knew about them but she gave me an outstanding as well. She said that it showed that I took my classes seriously and she seemed very impressed. (Emma)

The comments from Lucy illustrated the benefits of styles and differentiation for students and inspectors:

…it lets you organise them in meaningful ways by logical differentiation. It allows you to show your learners that you understand them and to offer them an improved way of approaching inspection and attain…a high grade. (Lucy)

Yasmin accepted that:

…whilst it's possible to show differentiation in ways that don't involve learning styles it's difficult to show personalisation in other ways. (Yasmin)

Whilst Yasmin didn't expand on personalisation, Linda showed some awareness of its political origins believing New Labour had intended to make the use of learning styles compulsory in the L&SS:

> *…the last government were in the process of doing just that with their personalisation bill but they were voted out before it got to parliament. (Linda)*

Phil agreed:

> *Their personalisation policy required teachers in secondary and FE to measure student's styles and match teaching to it. They carried out the consultation but lost power before it was passed. I can't think of a better way of making learning fit the individual than to personalise it by learning style diagnosis. (Phil)*

The supporters belief that learning styles were to be made compulsory within the L&SS via personalisation policies reflects a specific interpretation of the policy that, whilst not shared by the detractors, is not unique to this group of supporters. Similar conclusions were reached by the Specialist Schools Trust (Barnes & Harris, 2006).

Detractors

The detractors were split in half by the Ofsted hypothesis with Alfred, Mike and Eric accepting it whilst Bridgit, Roger and William rejected it. Eric explained his attitude thus:

> *…matching student learning styles is often mentioned as a strength in Oftsed reports. It shouldn't be but I think it happens…someone using learning styles will get a better grade because of it. (Eric)*

He continued:

> *If the inspector wants to see them then you'll get credit for showing them, it is wrong because you can show differentiation in lots of other ways but it makes life easier for the inspectors. If they see you using learning style theory they may simply assume that you are differentiating and not look all that closely but if you aren't using them they're going to start looking deeper, they may not simply assume that you are differentiating effectively by your use of other strategies. (Eric)*

This view is common in the literature and represents a belief that Ofsted view LSI as effective differentiation strategies (Kingston, 2004; Coffield, 2005; Nixon et al, 2007 and Tummons, 2010). Alfred felt that:

> *Ofsted, they like to see learning styles used in a lesson it shows that you've differentiated your approach. (Alfred)*

However Bridgit contested this arguing:

> *What Ofsted want is evidence of differentiation not evidence of learning style so the argument that you have to use learning styles for Ofsted isn't valid. Even if an inspector supports learning style theory and you don't use them in your lesson when you're observed if you show differentiation you'll get credit for it, they can't ignore it because you didn't include H&M. Ofsted might have some problems but it's not staffed by idiots… they know about Coffield and the other reports, they know about the debate, they can't penalise you for not using learning styles. (Bridgit)*

Roger added:

> *So when I am observed I would be disgusted if an inspector told me that I could improve my grade by including learning styles openly…you know making an obvious statement about using them to telegraph it. I am doing everything I should be and my last two observations have been graded as good and outstanding. (Roger)*

Bridgit pointed out that differentiation could be demonstrated by other strategies that would be acceptable to Ofsted:

> *…you can differentiate by ability, progress, level…lots of other ways as well. You can have stronger students sat with less able to mentor them in class. If you've set differentiated outcomes you can group students around them, if you set extension activities then that's differentiation. I have done this… and got outstanding despite not using…learning styles. (Bridgit)*

Summary

The belief that Ofsted supports style theory and its demonstration within teaching will result in a superior grade is accepted by the majority of teacher educators within this study. This provides a partial of the answer to sub question 1 *'What are the beliefs held by teacher educators that facilitate the*

continued application of learning styles within the sector?' This belief focusses on the alleged ability of style theory to demonstrate differentiation when applied within an observed session. This rationale for the use of LSI helps to answer sub question 2 *'Do specific rationales exist to justify the use of learning styles by teacher educators within the sector?'*

None of the teacher educators were aware of Wilshaw's comments that explicitly rebuff the Ofsted hypothesis (Barker, 2013). Therefore these teacher educator's may reproduce the Ofsted hypothesis in their practice, wrongly advising students that Ofsted expect the use of learning styles within lessons. This situation illustrates Landrum et al's (2010) assertion that it is teacher educators who are sustaining the assimilation of learning styles into educational practice

Sub-theme: Management involvement

It emerged that sector managers, often influenced by the Ofsted hypothesis, played an important role in supporting or enforcing the application of style theory in their respective institutions.

Supporters

Seven of these worked in colleges where LSI usage was, or had been, driven by management influenced by the hypothesis. Lucy indicated why LSI were part of her institution's policy:

> *Our management can see the sense in styles training because they want to raise our grades across the board… (Lucy)*

The experience for Linda was similar:

> *… they don't really understand about learning styles but feel they might help us at inspection.*

At Phil's college, staff were expected to:

> *…keep records for inspection purposes, to show personalisation, management insist on it. (Phil)*

In some cases Teacher Education departments are responsible, on the management's behalf for the implementation of learning styles. Linda reported that her management:

> *…consulted the teacher education team…* because they *…wanted us to look into the most appropriate learning styles inventory to use at the college. (Linda)*

Yasmin explained that in her college:

> *…management agreed that we could use the VARK… (Yasmin)*

Here management had already paid for a licence for the H&M but listened to the Teacher Education staff who had argued that in their opinion and in line with the student voice VARK would suit the college's inspection purposes better.

This situation was repeated at Peter's institution with management consulting with Teacher Education to decide which LSI would be suitable for their use. The conclusion to Peter's commentary does however illustrate that management pressure needs to be consistent to be effective:

> *However the senior managers responsible have left and been replaced and the impetus behind the idea has slowed or vanished so it's down to the individual now. All of the ITT group keep it up but the next inspection should give us an insight into how may others have done so. As teacher trainers we can promote leaning styles but we are not managers so we can't enforce their use on our staff. (Peter)*

At Phil's institution management gave staff the choice of two LSI, the VARK or the H&M. Tutors were free to choose as long as they evidenced the use of one as part of their practice for inspection. The VARK was the LSI of management choice at Emma's institute with their use being enforced for induction although other LSI were permitted after induction for inspection purposes. Thea and David's institutions however had management that encouraged the use of LSI during inspection rather than making it compulsory.

Detractors

Of this group three worked in institutions where management had policies in place to ensure learning styles were used in practice, the remainder were bound by departmental or curricular considerations.

Amongst the detractors Alfred was employed within an institution where the Ofsted hypothesis was influential on management policy:

> *Our senior managers are apparently very keen for us to have evidence of differentiation for the next Ofsted they think it will improve our grade. Our last Ofsted wasn't that good…so they think this type of approach, if it's cross college anyway, will improve things. (Alfred)*

For the detractors having to apply learning styles amongst their students could be an onerous task. Roger described a situation similar to that reported by Kingston (2004) of an initial screening being undertaken to generate evidence showing learning styles are supported at the institution. The evidence in both cases is not used:

> *…if it's my turn to do the learning styles questionnaire with one particular group I take them to the PC lab and get them to do the test and print off the results. I put them in a wallet in case my line manager wants them so I know where they are and that's it done. The students aren't interested and if they want to ask questions at a later date I would of course answer them, it's my job. So long as they've done an initial learning style screen my manager is happy, so I don't have to worry and the students have usually forgotten all about them by the next session. (Roger)*

So Roger is able to adhere to his institution's policy regarding LSI, satisfy his line manager and obtains evidence if required for inspection. It is clear that as far as Roger is concerned the evidence is of little everyday concern to the students.

Summary

It appears that management pressure plays an important role in the use of LSI, this pressure appears to be in response to the Ofsted hypothesis. In all cases where management produced policies for LSI usage their aim was to improve the institution's performance at inspection. Thus another specific

rationales to justify the use of learning styles by teacher educators within the sector has been described which helps to further answer sub question 2. It would appear that Wilshaw's (2013) message regarding Ofsted's stance on learning styles is not reaching teacher educators or sector managers.

Theme 5: the learning styles debate

This theme emerged as a result of the detractors concern to represent both sides of the styles debate fairly, a concern that was not always reflected amongst the supporters. This theme provides a contribution to knowledge that is not represented within the literature.

Detractors

This entire group claimed to present both sides of the styles' debate and allow the students to reach their own conclusions. Bridgit's views were typical:

> *…they* [students] *are still free to make their own minds up. I make sure that they understand that their views for or against learning styles are valid if they are evidence based. (Bridgit)*

A similar approach was described by William:

> *The students need an understanding of learning styles but their acceptance or rejectance of them should be based on knowing …what's good and bad, they deserve… both mmm … sides of the argument. (William)*

Alfred's staff development role emphasised this approach:

> *So I have found myself teaching other members of staff how to use something that I don't agree with but I do make sure they get to see both sides of the debate. (Alfred)*

This approach to the debate was summarised by Eric who claimed:

> *I'm paid to teach them not to influence them… (Eric)*

The detractors claim that although they might not personally embrace style theory they don't ignore it, but present it as a constituent part of an active debate that is based on research evidence.

Supporters

When describing their views on the LSDA study by Coffield et al (2004) some dismissed it out of hand. Lily, Emma, Thea, Lucy, David and Linda all claimed to have read the report to varying degrees whilst Phil, Yasmin, and Peter had not.

Part of the supporters' belief in learning styles is based on the common sense/ intuitive view (Reiner & Willingham, 2010) that styles work for them and their students. Phil's comment that:

> …they work for me so I don't want or intend to change. (Phil)

echoed this attitude. Yasmin appealing to authority to support this view: invoked the Ofsted hypothesis:

> *Ofsted haven't said that we mustn't use them as far as I can tell they still support their use in teaching and they have always been effective in my practice (Yasmin)*

These attitudes coincide with those reported by Martin (2010) who cited the belief held by his participants that if LSI didn't work their authors would have gone out of business. These common sense attitudes occurred repeatedly amongst the supporters and were used as justifications for ignoring research findings. Both Phil and Yasmin indicated that they wouldn't be reading Coffield et al's report because they already knew that style theory worked for them. Yasmin, Phil, Lucy, Emma and Peter saw the report as attacking learning styles:

> *I know that they tried to cast doubt on the whole area but in the end their scare tactics haven't stopped people using them and that's because they work. That's why I won't be reading the report, learning styles work for me so I will go on using them. (Peter)*

Thea had not read:

> *…all of it… (Thea)*

*w*hilst Lily said that she had given the report:

> *…a quick look… (Lily)*

she used a similar justification for not reading it fully:

> *I mean if Coffield was right Ofsted would agree and I would have been criticised not praised.* [For using them] *(Lily)*

Emma claimed to have read the report fully and she dismissed Coffield et al's findings along similar lines to Phil and Peter:

> *I don't care what he found out, it works for me and my students and I think that's all that matters… (Emma)*

Emma tried to cast doubt on Coffield et al's report suggesting that they had manipulated the findings:

> *Its easy for researchers to make statistics say what they want them to, you know, lies dammed lies and statistics. (Emma)*

Emma didn't offer any evidence to substantiate this claim; however she also made reference to the Ofsted hypothesis:

> *…do you think they* [LSI] *would be as popular as they are if they didn't work? Why do all the colleges and schools use them and why does Ofsted support their use? (Emma)*

These lines of argument back up the work of Burton (2007), Reiner & Willingham (2010) and Landrum and McDuffie (2010) who suggested that style research has become self-referencing and based on common sense assumptions rather than empirical research. They also back up Coffiled et al's (2004) view that the appeal of learning styles is intuitive rather than evidence based. The emphasis on personal experience as proof of efficacy backs up Gurney-Read's (2014) contention that the level of evidential rigour required within education is low. However the refutation of Coffield by Lucy criticised the methodology:

> *Because they used a quantitative approach, they reviewed the literature numerically; they looked for scores in other research to*

evaluate style models. They missed the human sense that a qualitative approach would provide, the LSDA report was cold and impersonal it's what I call dead data. If they had spoken to people who use styles they could have collected living data, interviews like this allow people to explain their experience and provide a realism for a concept that a nomothetic approach misses. Ideographic methods provide a much deeper analysis of the value of an idea or concept. If Coffield et al had used qualitative methods the results would have been very different. (Lucy)

Detractors

From the detractors Eric offered a viewpoint in support of Coffield et al's (2004) use of quantitative methods:

> *This is what I'm getting at though… as a concept involving only qualitative analyses there is plenty of evidence to support the idea [LSI] but once you move away from this sort of practitioner research approach it just doesn't hold up. If there was something there it would withstand any and all types of analysis. I think Coffield et al's review indicates why it doesn't, it shows that in nearly all cases the questionnaires lack reliability and validity, there's just nothing there. Learning styles are, as far as I can see, a matter of belief, it takes a leap of faith to use them because the evidence for them is just not there. (Eric)*

This could indicate that for some tutors their attitude towards LSI springs from their position on the quantitative versus qualitative debate. However Coffield et al's (2004) report was a systematic literature review that used aspects of both methods.

Supporters

The rebuttal of the LSDA report from Linda was based on her reading of the:

> *…main bits… (Linda)*

and on an inset presentation on it from a colleague. When she was asked if she discussed the Coffield review with her students she answered:

> *Not normally, they get a handout with the main points on and the report is on the recommended reading list so the students can have*

a look if they like, not many of them do though it's a ridiculously long document. (Linda)

Responding to the same question David stated:

No I don't have time, once we've gone through the theory and practice of learning styles that's the session just about done. I put Coffield on the [reading] *list and tell them there is a debate about learning styles. I also encourage them to read up about it but we only have the one session to deal with it all. (David)*

In contrast Lucy demonstrated a wider reading of the critical literature beyond Coffield:

I don't claim that reviews like Coffield are wrong but that there are other ways of looking at things, we shouldn't rely solely on quantitative methods because they don't paint the whole picture. Using them is like watching TV with the sound turned down, not all of the information is available and you have to confabulate to explain what you didn't capture in the first place. It makes me so angry when style models are dismissed because their evidence is based on qualitative approaches, Becta and Demos both did this. Then when quantitative evidence is provided opponents say that it is biased and not representative, that's what was said about the Dunn's and others it was offensive really. I wouldn't have stood for it…it drives me bonkers…I think first of all the bastards dismiss the qualitative data and demand quantitative and then they deride it, pardon my French …but everyone has it in for styles, it really isn't fair. (Lucy)

There was a trend amongst some of the supporters who had read the report to interpret its findings in ways that differed from those presented by the authors. Linda, David and Thea claimed that Coffield et al had recommended twelve or thirteen models as being fit for purpose, as David explained:

…he looked into their validity and reliability and out of the sixty odd he chose, these 12 had good scores so it's ok to use them. (David)

Backing up this misinterpretation Lucy claimed that:

…they only found thirteen style models that in essence were of a reasonable standard regarding their use. (Lucy)

None of the four could name all of the twelve or thirteen models but between them they implicated the H&M, the Thinking Styles Inventory, the Dunn and Dunn and the VARK. Excluding VARK these models did appear on the report's list but not as examples of good practice, they were chosen because they were representative of the most popular LSI and had a suitable body of literature behind them to facilitate a proper analysis of their salient points.

Thea's comments summarise the trio's erroneous views of Coffield et al's report:

> *So what the report has done is very positive it has sifted through the dross and indicated the most popular, usable inventories…We know which inventories to use and which to avoid so Coffield has done all of us a favour, with just a single report he has highlighted what's best and usable within the field. (Thea)*

These misinterpretations are reminiscent of the work of Hadfield (2006) and Guterl (2013) who claimed that Coffield et al's report sanctioned the use of a number of models. Whilst the supporter's rejection of the report's findings is reminiscent of Rogers (2009) whose paper cited Coffield et al, (2004) nine times without discussion or acknowledgement of the report's demeanour and findings?

Detractors

In contrast the detractors' rejection of LSI was often evidence based; the entire group claimed to have read Coffield's report and exhibited an interpretation of its results and analysis more in line with its authors' intentions. For example all the detractors understood that of the thirteen exemplars investigated only the Allinson and Hayes model was found to have acceptable levels of validity and reliability. Roger understood the report's reservations about this model stating that:

> *They said it still had deficiencies and needed more research to clarify its use. Coffield et al didn't actually say it was fit for use they simply said it met the minimum criteria for reliability and validity. (Roger)*

In addition all of them knew that other theorists had recently conducted research that supported Coffield et al's findings. Bridgit and Mike identified the work by Hattie (2009) and Pashler et al (2011) as representative of this body of research.

Summary

This theme demonstrated an important difference between the supporters and detractors that constitutes a contribution to new knowledge. The detractors showed a willingness to represent both sides of the style debate in their practice and let the students' reach their own conclusions about it. The supporters however often relegated the critical view of learning styles to a topic on a handout or reading list that was not discussed in class. These are important points with regard to the main research question which asked '*To what extent are teacher educators aware of the contested nature of learning styles within the sector?'* The discussion of this theme has demonstrated that both supporters and detractors are clearly aware of the styles debate within the sector.

The critical views of style theory were dismissed or distanced by the supporters by using the common-sense view of they work for me and my students so they must work in general. This specific rationale adds to the provision of an answer for sub question2 that asked '*Do specific rationales exist to justify the use of learning styles by teacher educators within the sector?'* This study has found that the supporters were more reliant on their personal common sense experience to validate their use of LSI compared to the detractors who tended to base their critical views on research evidence. Some of the supporters also misrepresented important factors of research to ameliorate its critical impact on style theory

Theme 6: enthusiastic socialisation

The effects of an enthusiastic socialisation into style theory appeared to produce a positive and long lasting effect on the individual's attitude towards them. The evidence suggested that the socialisation process could

be responsible for establishing a confirmation bias. The main agents for this enthusiastic socialisation appeared to be Initial Teacher Training (ITT) courses and colleagues' attitudes. This theme provides a new contribution to the existing knowledge base around learning styles.

Supporters

This entire group reported a positive introduction to LSI either through their ITT experience or a colleague's intervention or both.

Peter reported that his:

> *…PGCE tutors were very committed to them and they showed us how to use them properly. (Peter)*

A positive ITT experience was strongly linked with further engagement with learning styles, for Peter:

> *They also formed one of my MBA modules and I have attended training events inside and outside of the college so I have a broad knowledge of how to use them …. I have also done a lot of research into them on a personal basis… I find the whole area of great interest. (Peter)*

If the personal research was influenced by a confirmation bias set up by Peter's ITT experience this would strengthen his positive attitude towards styles.

A similar situation was described by Phil who worked with his PGCE tutor when he joined his college's teacher education team:

> [Name] *taught me on my PGCE and although we didn't do much about learning styles because the syllabus was so crowded the topic really appealed to me but when …I started working with him he really inspired me with it all. He's err taught me all that I know and pointed me in the direction of books and websites. (Phil)*

Phil's introduction through ITT and his colleague appear to be of a very positive nature and the confirmation bias they set up can be glimpsed in the following comments:

> *…its him you should interview he could put you right about this Coffield shite. He's forgotten more about learning styles than you'll*

probably ever know, I'm not having a pop, its fact. He got me sent me on a training day three years ago, it meant getting the train to London … mmm staying at a hotel, the full …err Monty it must have cost quite a bit. Don't get me wrong about this because although some of it was useful I knew most of what they discussed because [name] *had taught me. So I won't be going to anymore there's no point. (Phil)*

Phil's views appear closed to influences other than his personal experiences which focus on the charismatic teacher who introduced him to the topic. These comments illustrate the metaphysical appeal of learning styles in providing a seemingly plausible construct that is immune to empirical testing (Nixon et al, 2007)

The experience of Yasmin also illustrates the impact of ITT:

Q Have you received any training in learning styles?

I received a relatively large amount of instruction on learning styles in my PGCE much more than is in the syllabus nowadays. My tutor was very interested in learning styles and I think she inspired my interest in them. (Yasmin)

This inspiration led to her engaging with further training:

... I went on a half day INSET course, a full day conference on learning styles and I go on any staff development I am able to regarding learning styles. (Yasmin)

The situation was much the same for Linda when she described her PGCE course and her tutor:

The course didn't include much on learning styles but it really opened my eyes to them. We did all the basic stuff for teaching and some psychology, social policy … lots of teaching practice but the bit that stands out for me was the learning styles. They taught us how to use the H&M it was a revelation, so interesting and so well taught. [Name] *took us for learning styles and made it so interesting; we all loved it …and ummm him as well. (Linda)*

Although Lily didn't report a charismatic teacher she did indicate that her PGCE course provided a positive introduction to style theory that led to further engagement with the concept:

> *…I was introduced to them on my PGCE and that started me off on them. Since then I have been on a number of courses run by the college as part of the Teach Ed development process. (Lily)*

Emma's training experiences illustrated a high level of engagement with style theory:

> *….there was some in my PGCE training, plenty of staff development… some informal training from a colleague. (Emma)*

The commentary from these supporters suggests that positive socialisation experiences appear to provide the individuals with a positive attitude towards styles that leads to further engagement. If as Reiner and Willingham (2010) suggest, confirmation biases are responsible for positive engagement with styles theory they may be induced by such experiences. Once they have been induced then subsequent exposure will be also be perceived positively (Schwind and Buder, 2012). The existence of such a confirmation bias can also be used to explain why some of the supporters could misperceive contradictory evidence so positively.

The situation experienced by Lucy illustrates how the influence of colleagues can inspire engagement:

> *…I wasn't even taught about styles when I did my teacher training so I had no real idea about them. When I got my first post I worked with* [name] *who was really into them, he introduced me to H&M and I just picked it up myself, read about everything I could and started to use them myself. (Lucy)*

She followed a similar trajectory, as the other supporters who experienced style theory in their ITT, and engaged further with learning styles:

> *When I did my Master's dissertation I looked into the use of styles and their benefits for learners and teachers but that's a little dated now. I have tried to get on a number of training courses over the years but never managed to for one reason or another and I don't think there's much point now as I'm not sure I would learn anything new. (Lucy)*

Lucy's narrative illustrates the widespread practice of teachers being introduced to learning styles by colleagues. Gurney-Read (2014) reported that as many as sixty-eight percent learnt of styles from work colleagues.

David's positive introduction to LSI came at a course run by private providers:

> It was run by [name] a private training company) and the main speaker was [name] and one of the workshops was on the proper use of VARK in the classroom and that was taken by [name]. So it was presented by people who knew what they were talking about not just folk who have read about these ideas. (David)

The experience was described as interesting, industrious and productive:

> ...we covered a lot of ground and came out it with a lot of resources; I didn't have to create new resources for a couple of years. I've got new ones now though but lots of them were based on the stuff I got. (David)

Although Thea's PGCE course didn't include style theory she appears to have been influenced to some degree by colleagues when she explained how she had learned about LSI:

> What I have picked up on the job as I went along, what I learned from the people I worked with, the web, books, the H&M manual. (Thea)

Therefore all nine of the supporters could report a more or less positive and/or enthusiastic introduction to style theory that was facilitated by teachers, speakers or colleagues in various combinations.

Detractors

Roger didn't receive any style theory training in his ITT although he did initially engage with the concept enthusiastically and attended Inset training:

> **Q Have you had any sort of training in the use of learning styles?**

> …although my PGCE didn't include style theory I received a lot of training early on in my career, I originally put a lot of credence in learning styles especially VAK and H&M. I really thought that the

idea really made sense, when you think about it it's the sort of thing that if it didn't exist someone would have to make it up. So when I got the chance to go to anything to do with learning styles I went and soaked up everything I could. (Roger)

There is also no mention of any colleague, teacher or speaker to enthuse him and his later engagement was with personal research where he:

…just sort of fell out of love with the idea…it works well in the pages of a book…in theory its fine but it sort of falls apart in the classroom. (Roger)

Therefore, at least for this detractor and unlike the supporters, personal experience is not the major influence on engaging with styles. In this case it worked against their continued application. The lack of an enthusiastic introduction to style theory from any external sources may have allowed Roger to avoid a confirmation bias leading to a rejection of the concept based on his own research and experiences. He gave expansive reasons for his change of direction:

…peoples' styles change for one thing; I used to measure student's styles every term because I wanted to see if their lesser styles were improving. You know get the reflectors to improve on their activist profile etc to make them well developed learners. What I found was that their entire style profile was changing every term and not just for a few students but for most of them. Reflectors became pragmatists, visuals became kinaesthetics. So I compared the results of the H&M against those of the VAK I used at the time and found odd results there. People with similar profiles on one questionnaire got very different profiles from each other on the next. I didn't expect that I thought if they are all measuring the same thing there should be some sort of err umm cross questionnaire standardisation. When I reflected on the situation I felt that if I was measuring something that was unstable and susceptible to change that varied from one questionnaire to another…it sort of felt dishonest. (Roger)

Alfred did receive some training in style theory during his PGCE however he didn't describe it in a positive fashion:

…just a single lesson with someone from a university who was very knowledgeable about them but wasn't very interesting. (Alfred)

This unenthusiastic introduction may have failed to produce a confirmation bias which allowed Alfred to undertake personal research that wasn't set in favour of LSI,

> *…so over the years I've read about learning styles and seen how they work with those around me at work. And I've never found the theory or practice convincing. (Alfred)*

The last statement also indicates that none of Alfred's colleagues have been able to influence him to use them. William described a similar situation:

> *My teacher training included learning styles but it was only a brief introduction, I think it was ok, not great but interesting enough in its own way… (William)*

After this introduction he neglected styles completely until he was employed as a Teacher Educator and felt that he should understand the concept so he could teach it effectively. This revisiting of learning styles introduced him to the critical literature which he felt had the more compelling evidence.

Eric's description of his exposure to style theory reveals that he avoided it during ITT, wasn't influenced by colleagues and seems to have reached his own conclusions on the subject via personal research:

> *… there wasn't even any as part of my teacher training and I've never attended any external or internal events. I read about the theory behind it all for one of my Master's assignments so it's not that I don't understand it. On the contrary I think I understand about the area in some depth and that's why I don't support them, once you start to really examine the common sense assumptions of learning styles the evidence just doesn't back it up. If everyone looked at them to the same depth as I did I think they would reach the same conclusions? (Eric)*

Bridgit claimed that she had had no training on learning styles other than personal research

> *…everything I know about them is what I have learned myself. I have avoided the learning styles training here because I teach HE so attendance is voluntary not compulsory like it is for the others* [FE staff]. *(Bridgit)*

Bridgit and Eric's experiences are comparatively rare with Gurney-Read estimating that only about 8% of teachers are introduced to styles theory through personal research.

Mike couldn't remember if styles were part of his ITT experience and he claimed that he hadn't worked with colleagues who were overly enthusiastic about them. He had attended some inset events but hadn't enjoyed them although they helped him to place style theory within his taught syllabus.

Therefore Roger, Eric and Bridgit experienced no style theory input from their ITT courses and Alfred and William's exposure to it on their courses was not positive. None of the group were influenced by charismatic teachers or enthusiastic colleagues thus they didn't develop a positive confirmation bias and all of them rejected styles theory. The theory that initial positive and /or enthusiastic exposure to learning styles exerts an influence is tentative but is borne out by the narrative provided by the interviewees.

Summary

Another significant difference between the supporters and detractors has been illuminated by this theme's emergence. The data suggests that a positive socialisation into styles via ITT or colleagues may have induced a confirmation bias. All of the supporters reported experiencing one or both of these socialisation experiences compared to none of the detractors who thus avoided the acquisition of a confirmation bias. The supporters' acquisition of a bias facilitated their positive interpretation of further engagement with the concept via training courses and/or personal research. It may also help in providing primacy for personal experiences over contradictory research evidence, a trait that is salient amongst the supporters and less evident amongst the detractors. This theme is seen as a major contribution to new knowledge made by this thesis.

Conclusion

This chapter has presented and described the in vivo themes that have emerged from the analysis of the data these are 'Beliefs about

Stereotyping', 'The Ofsted Hypothesis', 'The Learning Styles Debate' and 'Enthusiastic socialisation'. Neither detractors nor supporters felt that their students were in any real danger of being stereotyped by LSI usage. Supporters felt that learning styles represented a harmless and natural strategy to improve learning whilst the detractors felt their students were not interested in them to an extent where stereotyping would become problematic. All of the supporters and half of the detractors felt that the use of learning styles would improve inspection grades and that their application facilitated differentiation. The belief that they facilitated differentiation was one of the important rationales for the supporters and came from the belief that Ofted supported the use of LSI. Within the learning styles debate it was shown that the detractors were more amenable to presenting both sides of the styles' debate compared to the supporters. The supporters were unlikely to deal with the criticisms of learning styles within their sessions and tended to avoid or distort critical research studies. The final theme of 'Enthusiastic Socialisation' demonstrated the effects of receiving a positive introduction to the concept and practice of learning styles from ITT and/or colleagues. These include the acquisition of a confirmation bias that helps in the rejecting of dis-confirmatory information.

The next chapter presents a summary review of the thesis and answers to the research questions. It presents the grounded theories that have emerged from the synthesis of the themes as a new contribution to knowledge. There are also brief recommendations regarding the presentation of learning styles by teacher educators within the L&SS.

CHAPTER NINE

EMPIRICAL AND THEORETICAL CONCLUSIONS

This chapter provides a summary review of the structure of the thesis, its major conclusions and their justifications. Answers are provided for the research questions and the grounded theories are discussed. The contribution of the thesis to new knowledge is highlighted and the implications and recommendations for the professional practice of teacher educators within the sector are outlined.

Summary review

This thesis argues that learning styles are still used within the L&SS, despite the high level of awareness of the debate surrounding their use amongst teacher educators, because the critical evidence from the debate has been ignored or distorted by the styles' community. The reasons why the contradictory evidence has been treated in this way are complex and cover a significant span of time.

Governmental Interest in learning styles in this country was revived by the Dearing Report (1997). A few years later learning styles began to appear in the policies of the New Labour government. The policy aim was to embed the government's version of the personalisation of learning within the existing educational framework. Deficiencies in the government's approach; their unwillingness to relinquish control of the curriculum; their failure to offer students' multi-institutional, customised pathways meant that their policy was not personalisation but differentiation. However the consultation documentation for the Primary and FE sectors went ahead and it was clear that learning styles would have a part to play in the facilitation of the policy. At the same time the DfES were publicising and promoting styles theory through their website and official publications. Thus the profile of learning styles was raised amongst educators in both sectors.

The personalisation policies had clear political aims but being overseen by ministers rather than researchers their evidence base was not investigated effectively. The advantage of implementing such a policy, for the government was that it would take the responsibility for quality improvement away from itself and place it within the interaction between the teacher and student. Thus failing standards could be blamed on teachers not matching their teaching style to their student's learning style. It was in the government's interest not to publicise the debate that surrounds learning styles, so style theory was presented as uncontested.

The confusion between personalisation and differentiation, the government's championing of learning styles and the involvement of Ofsted by David Milliband in the personalisation policy led to an expectation that Ofsted would require evidence of teaching being matched to individual needs. The most obvious way to do this (for style theorists) would be through the use of LSI. So despite the policy never being implemented due to New Labour's electoral defeat Ofsted were linked with learning styles giving rise to the Ofsted Hypothesis.

The messages from this activity led to the uncritical promotion and acceptance of styles theory throughout the L&SS even though it could be demonstrated that the evidence for learning styles lacks methodological rigour, reliability and validity. Such criticisms have been accepted by some within the styles' community, although it has not led to any changes. In part this is because style theory has given rise to an industry that provides manuals, models, books, and training in the topic that is profitable and prestigious. Thus the vested interests of those involved in this industry have led to a defence of learning styles that has obscured their problems. Thus style theory has been supported politically, academically and commercially giving it an influence that belies its problematic evidence base.

The groundswell of support for learning style's caused an inevitable backlash which came in the form of some high quality critiques, sponsored by credible organisations; although these studies had little impact on the

use of LSI within the L&SS. This thesis looked at the possible reasons for the lack of impact of such research and reached the following conclusions.

For their supporters learning styles have an intuitive appeal that allows them to underpin and justify their use with common sense rather than evidential considerations. This was illustrated by the sample's styles' supporters who rarely engaged with the literature to justify their use of these instruments. Instead, their rationale was based on their intuitive belief that learning styles worked for them and their students supported their use within their teaching practice.

Ofsted's role in the personalisation policy of New Labour was conflated into a belief that differentiation must be illustrated within inspections by the application of learning styles. This has been termed as the Ofsted hypothesis and appears influential in shaping the beliefs of all of the supporters and some of the detractors within the sample. It was used by the supporters as a pseudo theory for the inclusion of learning styles in teaching practice.

The Ofsted hypothesis has also been influential in sector management circles with all of the sample's institutions having policies on learning styles being implemented by senior or middle management. Management teams have applied style theory within their institutions as strategies to help improve their inspection grades.

A final consideration has been the impact of confirmation biases; these are psychological constructs that promote the shallow analysis of information that challenges existing attitudes and a deeper analysis of information that supports them. The effect of such a bias is that the only new information that is engaged with is that which supports existing ideas and attitudes.

Answers to the research questions

Central research question

The main research question that this thesis has answered is:

To what extent are teacher educators aware of the contested nature of learning styles within the sector?

It is has been shown that all of the teacher educators in this study were aware of the contested nature of learning style theory; this was clearly illustrated by the discussion of theme 5 'The Learning Styles Debate'. This showed that even though not all of the supporters had read, or intended to read the work of Coffield et al (2004) they were aware of its findings, direction and intentions to a large extent. The existence of the debate was minimised in their teaching practice, it was often left to their students to investigate the debate themselves. This led to the debate becoming hidden and demonstrates that the supporters clearly know of its existence to be able to hide it. Theme 3 'Beliefs About Stereotyping' further illustrated the supporters knowledge of the debate as their refutation of the claim that LSI lead to stereotyping indicated they must know this is a criticism of styles theory therefore the area could not be uncontested.

For the detractors the debate was central and formed part of their teaching approach when dealing with the topic. Their biggest problem about the debate was in ensuring that their discourse showed both sides of it to facilitate their students making up their own mind. Their views on this topic were much less likely than the supporters to be based on personal opinion with all of the detractors demonstrating engagement with the criticisms of styles reported in the literature.

Therefore with regard to these participants it is claimed that both groups of teacher educators were aware of the contested nature of learning style theory and practice. The extent of this awareness was greatest amongst the detractors who engaged with the debate and lesser amongst the supporters because they minimised, distorted or disregarded it.

Sub-question 1

What are the beliefs held by teacher educators that facilitate the continued application of learning styles within the sector?

The supporters exhibited a number of such beliefs that facilitated the use of LSI; the first was highlighted in theme 3 'Beliefs About Stereotyping'. It was found that none of the supporters believed that stereotyping could occur as a result of learning styles' diagnosis. There was a total denial amongst this group, based on their opinion that this could not happen. This was supported by the findings in the sub-theme 'Learning Styles as Natural Mechanisms': here the supporters described learning styles as benign and natural constructs that led to no such ill effects. The supporters held the belief that their students both supported and engaged with learning styles theory and practice.   A further belief was identified in theme 4 'The Ofsted Hypothesis' that claimed Ofsted supported the use of learning styles and favoured LSI users in their inspection visits and would recognise this by awarding superior grades. This specific belief received support in the sub-theme 'Management Involvement' as managerial support of LSI use was invariably linked to the belief that the application of styles theory would improve institutional inspection grades. These beliefs were again largely based on opinion though some supporters exhibited awareness of the last New Labour government's consultation paper on personalisation (see chapter 2).

The negative beliefs espoused by the detractors regarding the utility of style theory and practice appeared diametrically opposed to those articulated by the supporters. The exception to this was found in theme 3 'Beliefs About Stereotyping' when the detractors also expressed the belief that LSI diagnosis would not lead to stereotyping. This was based on their opinion that their students were not interested enough in learning styles to be influenced by LSI diagnoses. This goes against all of the accounts in the literature which highlight stereotyping as a major hazard. Therefore the detractors were not immune to citing opinion based on personal experience as justification for their beliefs.

Sub-question 2

> *Do specific rationales exist to justify the use of learning styles by teacher educators within the sector?*

This was partly answered in the sub-theme 'Learning Styles as Natural Mechanisms' here the acquisition of learning styles by students was viewed by the supporters as empowering rather than restricting. It was seen as a freeing of the student's academic potential. Thus style theory was conceptualised as desirable because it was improving the students' educational experience and abilities. Another rationale was found in theme 4 'The Ofsted Hypothesis' when the supporters claimed that the use of learning styles facilitated effective differentiation amongst their students. This was held to be the reason for Ofsted awarding superior inspection grades to users of learning styles. Further information to answer this question came from theme 5 'The Learning Style's Debate'. This theme illuminated the common sense rationale used by the supporters that because style theory worked for them it would work in general regardless of contradictory research.

All of the detractors used LSI in their practice and their use was founded on two rationales. The first rationale presented was that their relevant institutional policies required the use of LSI to provide evidence for inspection. The second was that for those not affected by such policies they couldn't present the debate to their classes without illustrating style theory and providing instruction on LSI.

Grounded theories as new knowledge
The analysis of the data that provided answers for the research questions led to the discovery of grounded theory that make a contribution to new knowledge. As indicated in chapter 8 the themes 'Beliefs About Stereotyping', 'The Learning Styles Debate' and 'Enthusiastic Socialisation' contain insights into the debate that are not found in the extant literature. However it is when all of these findings are synthesised that the theses' contribution to new knowledge becomes fully apparent.

The socialisation of a confirmation bias

From this synthesis a theory emerged that a tutor's ITT experiences and/or interactions with colleagues can induce a confirmation bias that produces a

resilient positive orientation to learning styles theory and practice. If an individual experiences an enthusiastic and enriched socialisation into styles theory they develop a positive affiliation with the concept (chart 9.1 appendix 10).

Primary influences

The primary influences in this socialisation process are the individual's experience when introduced to learning styles during their ITT and/or through the intervention of a colleague. The important factor is that the initial introduction to styles theory is enthusiastic, enriched and positive; in these circumstances it leads to the acquisition of a confirmation bias. All of the styles' supporters in this study reported experiencing positive primary Influences which were absent from the reports of the detractors. Thus it can be hypothesised that the supporters acquired a confirmation bias but the detractors did not. This is consistent with Reiner & Willingham's (2010) claim that learning styles' popularity relies on such biases to ensure that individuals select information that confirms a belief that is already held rather than opposing it.

The supporters' confirmation bias leads to a belief system that accrues information that supports these existing beliefs and ignores and/or distorts those that challenge them. This can explain why Phil, Yasmin and Peter were happy not to read or acknowledge Coffield et al's (2004) report. This rejection of research can lead to a reliance on common sense and personal experience to validate the rejection. Phil's comment about styles' utility is emblematic of this approach:

…they work for me so I don't want or intend to change. (Phil)

Appeals to personal beliefs to enable research evidence to be rejected (as would be predicted by the acquisition of a confirmation bias) were common amongst the supporters. In comparison the detractors, who had not acquired such a bias, more often offered critical views that were anchored in the literature rather than being opinion based. When faced with contradictory research evidence the supporters invariably fell back onto

personal beliefs and opinions to protect and support their stance. As Emma's attitude illustrates:

> *…do you think they* [LSI] *would be as popular as they are if they didn't work? Why do all the colleges and schools use them and why does Ofsted support their use? (Emma)*

Thus due to the effects of the bias the supporters' beliefs regarding styles theory are immune to attack from dis-confirmatory research evidence, even when based on erroneous assumptions, such as Ofsted's support.

According to Hernandez and Preston, (2013) this is because confirmatory evidence, even at the level of opinion will be selected over data that challenges a belief. It is also claimed that information which is critical of a belief will receive a shallow analysis (Hernandez & Preston, 2013). This aspect is illustrated by Linda, Thea and Lily's rejection of the findings of Coffield et al's (2004) report even though they all admitted to not having read it properly. The bias can also explain why despite the claims made by the supporters to have undertaken personal research into styles theory their views did not change. The bias would predict that personal research would simply lead to the acquisition of more confirmatory material. Even Lucy who demonstrated knowledge of the wider criticisms of style theory wouldn't concede that the criticisms may have a basis in fact. Instead she felt that learning styles were being treated unfairly by such research expressing the belief:

> *…the bastards…everyone has it in for styles, it really isn't fair. (Lucy)*

This exemplifies Schwind and Buder's (2012) claim that when faced with a number of viewpoints regarding controversial issues individuals prefer information that is consistent with their existing beliefs. For Lucy to represent such evidence based criticisms of styles in this way appears as an emotional or personal response rather than a scholarly one. So Lucy's conclusions may be facilitated by the effects of a confirmation bias rather than the deep analysis of the available alternatives.

The confirmation bias appears responsible for the distortion or misinterpretation of evidence that is critical of style theory; this effect was

noticeable amongst the supporters' reports. Linda, David and Thea believed that Coffield et al had proposed that twelve of the thirteen models they reviewed were declared as being fit for purpose, David claimed:

> …he looked into their validity and reliability and out of the sixty odd he chose, these 12 had good scores so it's ok to use them. (David)

Continuing this misinterpretation Lucy believed that they:

> … found thirteen style models that in essence were of a reasonable standard regarding their use. (Lucy)

Thea's comments summarise the trio's erroneous views of Coffield et al's report:

> So what the report has done is very positive it has sifted through the dross and indicated the most popular, usable inventories…We know which inventories to use and which to avoid so Coffield has done all of us a favour, with just a single report he has highlighted what's best and usable within the field. (Thea)

Thus the findings of Coffield et al's (2004) report have been transformed from the serious and credible challenge they represent in reality to a helpful identification of the best models within the literature. Similar misinterpretations are also found in the literature, Hadfield (2006) and Guterl (2013) both claimed that Coffield et al's report sanctioned the use of a number of models. Whilst Rogers' (2009) paper, that was supportive of style theory, cited Coffield et al, (2004) nine times without acknowledging its negative findings. Reports such as these could themselves be influenced by confirmation biases and would certainly provide the sort of evidence that would appeal to a styles' supporter's confirmation bias. In this way this type of misinformation is protected and reproduced adding to the pool of bogus evidence that supports styles theory. This process can explain why so much of the evidence in support of learning styles can be challenged and dismissed (see chapters 3 and 4).

Secondary influences

These were concepts and ideas that exerted some influence on beliefs about learning styles but were not as prevalent as the primary influences:

they included government policy, inspection regimes, management policy and personal research.

To be fair on the supporters the last New Labour government and its DfES were very supportive of style theory in their policies and publications (see chapter 2). They also took pains to hide the debate that surrounds learning styles' theory and practice. However outside of Linda and Phil only limited use was made of these sources of support. This may be a product of the supporters' reluctance to engage with the relevant literature due to their preference for their own experience to serve as justification. As all the participants were teacher educators it may be surprising that the supporters were not aware of such policies and views. This situation underlines their failure to engage with relevant literature and highlights their reliance on opinion and personal experience.

However much was made of the Ofsted Hypothesis, perhaps because inspection plays a more salient part in the personal experience and practice of the supporters. The evidence base to suggest that Osted supported the use of LSI to illustrate differentiation and thus improve inspection grades was tenuous at best, yet it profoundly influenced all of the supporters and many of the detractors. The analysis of published inspection reports does indicate that some Ofsted inspectors support styles theory (see p 16 and appendix 1). In 23% of those reports reviewed for this study inspectors praised institutions for their use of learning styles or criticised them for not applying them effectively. Whilst this is actually supportive of styles it does ignore the fact that in 77% of the reports learning styles were not mentioned. However the claims made by the supporters regarding inspection were made on the basis of personal experiences not an analysis of Ofsted statistics. Again this disjunction highlights the supporters' reliance on opinion rather than fact.

Management policy has been shown to be largely supportive of learning styles with most of the institutions from which interviews were drawn operating policies that enforced learning styles use. The reasons given for this was the management's wish to improve their Ofsted inspection grading.

If an institution's management accepts the Ofsted hypothesis it is reasonable to suppose that this will influence staff. Therefore the supporters may take these policies at face value seeing them as evidence that learning styles are an effective strategy for inspection.

Thus the evidence that is available regarding the efficacy of styles' usage from these secondary influences can be shown to contain enough positive content for a confirmation bias to select only supportive aspects. Therefore the personal research of the supporters is unlikely to lead to a change in their attitudes because of the influence of their confirmation bias. Thus the positive and supportive evidence that the supporters experience via the effect of their confirmation bias strengthens their belief system.

The only reported instance of a change from supporting learning styles to opposing them came from Roger one of the detractors (see p 127). Although he initially felt that learning style theory was a useful concept he didn't report experiencing an enthusiastic introduction during his ITT or from colleagues. It can thus be surmised that he didn't acquire a confirmation bias and was amenable to examining and changing his beliefs when he experienced an environment critical of styles' practice. Roger was the only example of change from being a supporter of learning styles to becoming a detractor and significantly he didn't receive an enthusiastic and enriched socialisation into them.

The role of teacher educators

This study has also provided insights into the role and responsibility of teacher educators in popularising LSI in isolation of the debate that surrounds them. The analysis shows that the supporters amongst the teacher educators were unable or unwilling for various reasons to present both sides of the debate in their teaching practice (see theme 5). Thus style theory is being presented as uncontested and non-problematic which perpetuates its application in the sector. In relation to my belief, outlined on page 3, the findings illustrated, that all the teacher educators in the sample were aware of the styles debate. Thus it would appear unlikely that many teacher educators within the sector are unaware of the debate. However it

appeared that it was only the detractors who had engaged with it and were willing to discuss both sides of it. There is no excuse for knowingly presenting inaccurate information, as was the case amongst the supporters in this study. It is professionally and ethically reprehensible especially amongst individuals charged with educating the sector's new tutors.

Recommendations

Rectification of the present situation can be facilitated by only two modifications to the practice of teacher educators within the sector.

1) Teacher educators will present learning styles as a contested theory and present both sides of the debate in their practice. This will allow students to make evidence based decisions about their acceptance or rejection of styles' theory. It may also help in reducing the likelihood of acquiring a confirmation bias. Regardless of any other considerations the area is demonstrably contested and therefore must be represented as such.

2) Ofsted's position on the use of learning styles within inspections must be made clear within ITT courses. Oftsed clearly proposes that there is no right way to teach and that inspectors mustn't give the impression that they favour a particular style of teaching, or that all teaching must always be matched to individual needs. Therefore there is no requirement for differentiation, personalisation or inclusion to be illustrated only by the use of styles' theory.

The role of teacher educators in sustaining the use of learning styles within the sector is considerable and they must be responsible for what they are teaching. There are ethical dilemmas here because if styles' theory and practice are presented as uncontested, as it is amongst the supporters in this thesis, reality is not being acknowledged. It is the role of teacher educators to present accurate representations of their topics that are evidence rather than opinion based.

Conclusion

This chapter has provided a summary review of the thesis that leads into the answers to the research questions. The central research question's answers demonstrated that the study's participants were aware of the contested nature of learning styles. The answers to the sub questions described the beliefs held by the teacher educators about learning styles and illustrated the rationales used by supporters to continue with their teaching of styles theory. The contributions to new knowledge detailed how an enthusiastic socialisation into learning styles can induce a confirmation bias. The bias leads to a belief system that is supportive of style theory and thwarts any attempts to change it. The responsibilities of teacher educators in presenting an unrealistic illustration of the styles debate was considered and followed by recommendations to remedy the present situation.

The next chapter is a set of personal reflections derived from the experience of undertaking the Ed.D. Policy and Values.

CHAPTER TEN

REFLECTIONS

For me the completion of the thesis has been very challenging and has entailed a number of changes in my philosophical approach to research. Up to starting this thesis I would describe myself as favouring quantitative methods and possessing only a limited understanding of qualitative methods and approaches. Whilst I would have fallen short of describing myself as a positivist my worldview was based on measurement rather than interpretation or insight. My original intention for the study was to apply a mixed-method survey approach using a quantitative questionnaire and qualitative interviews. However the vast amount of information that was accrued from the iterative sampling made my original multi-method approach so data heavy as to be impractical. Therefore I decided to take a new road and focus on a qualitative approach using grounded theory because it was new to me and I stood to learn a lot more from engaging with it than from applying quantitative methods. I chose to use a social constructionist approach to grounded theory because it appeared to allow greater analytical freedom than classical versions. However I found that the level of detail that this approach provided may have benefitted from the more structured classical approach with its inclusion of a central category. The application of a central, influential category that all other categories related to may have helped order the data in a way that would have an appeal to me. However the constructionist rejection of a central category because of its representation of an objective rather than a co-constructed reality would not allow this. For the future I will have to make the effort to use the classic formula to compare it with the social constructionist approach.

I found qualitative interviewing very rewarding and began to appreciate just how much detail could be lost or overlooked by the exclusive use of quantitative approaches. The in-depth, face to face approach provided a sharp focus on the humanness of the participants. The iterative approach

was absorbing and theoretical sampling provided a sense of research freedom that is lacking in the strict recruiting of representative samples. I was surprised how easily the recruitment of participants went, one of the concerns I held about interviewing was running out of participants before the study was complete. However the snowball sampling used after the initial interviews allowed me to recruit individuals who matched the requirements exactly.

As the qualitative approach began to make more sense for me its boundaries became more visible. Realising that data saturation is gauged when the responses received become predictable and suggest no new questions was worrying. This meant that the data had to be totally understood to allow the judgement to be made effectively. However when saturation did occur it was clear that it was happening because I was able to consistently anticipate what the content of an interviewee's response would contain to an ever increasing degree. Whilst I still believe that there is a need for a greater acceptance of quantitative methods within educational research, I accept there is a greater need for the assimilation and accommodation of qualitative methods by myself.

Another concern was as to how the grounded theory would emerge from this process, the reading that I had undertaken portrayed emergence as an amorphous concept with no real guidelines to follow. I initially found this problematic because it was difficult to determine if the perceived emergence was based on the data, its interpretation and associated memos or whether it was unduly influenced by prior knowledge and thus forced. However as the aim of constructionist grounded theory is co-construction I was eventually confident enough to trust my instincts and join the data streams together to create theory.

This engagement with qualitative methods has given me the confidence to widen my inclusion of them in my own teaching practice. I feel that I can offer my students some real depth and detail regarding grounded theory that will enrich their educational experience.

At the start of this thesis my views on learning styles and their putative evidence were fiercely critical, however as the research progressed my views softened to some extent. The interviews gave me the opportunity to meet people who use LSI as part of their practice; they were all reasonable and sincere people who were doing a difficult job to the best of their ability. They used style theory because they honestly believed what they were doing was for the benefit of their students even if this was facilitated by a confirmation bias. For ethical reasons I made all of the interviewees aware of my stance on learning styles prior to asking questions thus they were all aware of my opposition to them. Yet the majority of them graciously agreed to take part without taking offence or adopting a defensive stance. The time taken to create rapport with the interviewees prior to the interview itself was time that was well spent. It allowed the interviewees to see that although I was not a supporter of style theory I was still willing to provide them with a platform to explain their support for the instruments.

During the research it became clear that the only real difference between a good teacher who uses learning styles and a good teacher who doesn't is the categorisation of students to a learning style. All good teachers use many and diverse strategies to engage their audience, thus segments of a style supporters' teaching practice will be designed to appeal to visual learners (such as video clips) whilst others may be designed to appeal to kinaesthetic learners (handling and using resources) for example. These same strategies will appear in the practice of those opposed to style theory, so they can add variety to the proceedings. Thus the actual content of the sessions would be of a comparable structure. If, as both the sample's detractors and supporters claimed, the use of LSI would not lead to stereotyping than the dangers of learning styles may not be as immediate as I thought. I had not appreciated that the inclusion or exclusion of learning styles within a lesson will do little or nothing to mediate the quality of the teacher's performance in getting their message across. It seems to me that the most important aspect of a session is the tutor's ability to teach effectively using strategies that the audience find engaging. These conclusions seem to support the view that the actual impact of learning

styles on students is very limited, so financial resources should be aimed elsewhere in educational provision.

Future research

Whilst the findings of this thesis have provided an accurate representation of the participants used in this study they cannot be automatically generalised to the whole sector. Therefore a mixed method approach using the same and similar questions in interviews and questionnaires, to facilitate methodological triangulation, should be considered. The number of respondents involved would be much larger to recruit a sample that is representative of the sector's attitudes towards learning styles. To further aid triangulation the sample should be stratified and include student teachers, established tutors, teacher educators and managers. In this way a cross-sectional picture of the impact of learning styles and confirmation biases could be constructed to provide a focus for the sector.

There is a dearth of empirical evidence to assess the contention that learning styles lead to the stereotyping of students exposed to them. Thus a case study approach that documents the effects of stereotyping due to LSI diagnosis could be used to provide evidence of its existence, or not, and provide an initial description of its effects, or lack of them. If no cases can be found then it may be assumed that stereotyping is a moral panic constructed by the opponents and some supporters of style theory. If, on the other hand, cases are found their contents could be used as the basis of a mixed method survey approach to assess the scale of the situation and to consider strategies to reverse any ill effects.

References

Adult Learning Inspectorate (2002). *Chief inspector's report.* ALI: Coventry.

Allinson, C. W., & Hayes, J. (1996). The cognitive style index: A measure of intuition-analysis for organizational research. *Journal of Management Studies*, 33(1), 119-135. doi: 10.1111/j.1467-6486.1996.tb00801.x

Anderson, J. A., & Adams, M. (1992). Acknowledging the learning styles of diverse student populations: implications for instructional design, In Border, L, L, B. & Chism, N, V, N. (Eds) *Teaching for Diversity,* p 19 – 34. Jossey-Bass: San Francisco.

Andrews, T. (2012) What is social constructionism? *The Grounded Theory Review.* 11(1): p 39 – 46.

Archer, M,S. (1991) Presidential address: sociology for one world: unity and diversity. *International Sociology,* 6(2): p 131 – 147.

Armstrong, S. J. (2002) "Effects of cognitive style on the quality of research supervision", in A. Francis, A., Armstrong, S.,Graff, M., Hill, J., Rayner, S., Sadler-Smith, E. & Spicer, D. (Eds.), *Proceedings of the 7th Annual Conference of the European Learning Styles Information Network,* 26-28 June 2002, Ghent University, Belgium, p 13 - 24.

Armstrong, S. J., & Priola, V. (2001) Individual differences in cognitive style and their effects on task and social orientations of self-managed work teams. *Small Group research,* 32: (3), p 283 – 312.

Arthurs, J., B. (2007) A juggling act in the classroom: managing different learning styles. *Teaching and Learning in Nursing*, 2: p 2– 7.

Ashwin, A. (2005) The Coffield report: the end for learning styles? *ELSIN*: An international forum newsletter, Winter, p8.

Atkinson, P. & Coffey, A. (2002) Revisiting the relationship between participant observation and interviewing. In J.F. Gubrium & J. A. Holstein (editors), *Handbook of interview research.* Sage: Thousand Oaks.

Barker, I. (2013) Ofsted:teachers should be free to teach as they want as long as children learn. *Times Educational Supplement Online.* [www] http://news.tes.co.uk/b/news/2013/12/24/ofsted-inspectors-told-there-is-no-right-way-to-teach.aspx. (last accessed 21/04/13)

Barnes, I. & Harris, S. (2006) *An overview of the summary report findings: special series on personalisation,* National College for School Leadership: Nottingham.

Bartlett, R, L. (1985) *Integrating the new scholarship on women into an introductory economics course*, American Economic Association Meetings, New York.

Bartlett, S. & Burton, D. (2007) *Introduction to education studies.* (2nd edition), Sage: London.

Becta, (2005) Learning styles – an introduction to the research literature *http://industry.becta.org.uk/content_files/industry/resources/Key%20docs/Content_developers/learning_styles.pdf* (last accessed 21/08/09)

Becker, H. S. (1970) Field work evidence. In H. Becker, *Sociological Work: Method and Substance,* (39 – 62). Transaction Books: New Brunswick.

BERA (2011) Revised ethical guidelines for educational research [online] *https://www.bera.ac.uk/researchers-resources/publications/ethical-guidelines-for-educational-research-2011* (last accessed 21/07/12)

Berger, P. & Luckmann, T. (1991) *The social construction of reality.* Penguin: London.

Bergman, M.M., Eberle, T.S., Flick, U., Forster, T., Horber, E., Maeder, C., Mottier, V., Nadai, E., Rolshoven, J., Seale, C. & Widmem, J. (2010) *Qualitative research methods.* The Swiss Academy of Humanities and Social Sciences: Bern.

Bhaskar, R. (1989) *Reclaiming reality: A critical introduction to contemporary philosophy.* Verso: London.

Bird, R. (2006) Personalisation: what does it really mean? *Teaching expertise* [online] http://www.teachingexpertise.com/articles/personalisation-what-does-it-really-mean-1442 Last accessed 16/03/09

Biggs, J, B. (1987) *Student Approaches to Learning and Studying*, Australian Council for Educational Research: Hawthorn.

Bishka, A. (2010) Learning styles fray: brilliant or batty? *Performance Improvement,* 49(10). DOI: 10.1002/pfi.20181

Black, A, C., & McCoach, D, B. (2008). Validity study of the thinking styles Inventory. *Journal for the education of the Gifted,* 32(2): p180 – 211.

Bostrom, L. & Lassen, L, M. (2006) Unraveling learning, learning styles, learning strategies and meta-cognition, *Education and Training,* 48: (2/3) p178 -189.

Brabazon, T. (2006) Writing curriculum is not sexy but it is rewarding In Gill, J. A matter of opinions, *Times Higher Education* p 30-35, 11-17 Dec, No1,875.

Bryman, A. (2012) *Social research methods.* (3rd edition). Oxford University Press: Oxford.

Bucholtz, M. (2000) The politics of transcription. *Journal of Pragmatics,* 32: p 1439 – 1465.

Burningham, K. & Cooper, G. (1999) Being constructive: social constructionism and the environment. *Sociology,* 33(2): p 297 – 316.

Burr, V. (2003) *Social constructionism.* (2nd edition). Routledge: London.

Burton, D. (2007) Psycho-pedagogy and personalised learning. *Journal of Education for Teaching,* 33: (1), p 5 – 17.

Bury, M. (1986) *Social constructionism.* (2nd edition). Routledge: London.

Campbell, R,J., Robinson, W., Neelands, J., Hewston, R, & Mazzoli, L. (2007) Personalised learning: Ambiguities in theory and practice. *British Journal of Educational Studies,* 55: (2), p 135 – 154.

Canfield, A.A., & Lafferty, J.C. (1970) *Learning styles inventory.* Humanics Media (liberty Drawer: Detroit.

Carbo, M. (1983). Research in reading and learning style: Implications for exceptional children. *Exceptional Children, 49*, 486-494.

Carlson, D,S., Kacmar, K,M. & Williams, L,J. (2000) Construction and initial validation of a multidimensional measure of work-family conflict. *Journal of Vocational Behaviour,* 56: p 249 – 276.

Cartney, P. (2000) Adult learning styles: implications for practice teaching in social work, *Social Work Education,*19 (6) p 609 – 626

Cassidy, S. (2004) Learning styles: an overview of theories, models and measures. *Educational Psychology,* 24: (4), p 419 – 444.

Charlesworth, Z., M. (2008) Learning styles across cultures: suggestions for educators. *Education & Training,* 50: (2), p 115 -127.

Charmaz, K. (2004) Grounded theory. In: Hesse-Biber, S. N. & Leavy, P. (eds.), *Approaches to qualitative research*, pp. 496-521. Oxford University Press: New York.

Charmaz, K. (2006) *Constructing grounded theory: A practical guide through qualitative analysis.* Sage: London.

Charmaz, K. (2008) Constructionism and the grounded theory. In Holstein, J,A. & Gubrium, J, F. (Eds), *Handbook of Constructionist Research,* pp 397 – 412. The Guildford Press: New York.

Chen, L. (2004) Cooperative project-based learning and students' learning styles on web page development. *J. Educational Technology Systems.* 32: (4), p 363 – 375.

Chen, S, Y., George D. Magoulas, G, D., & Macredie, R, D. (2004) Cognitive styles and users' responses to structured information representation. *International Journal of Digital Libraries*, 4: (2), p 93 – 107.

Chenail, R.J. (2012) Conducting qualitative data analysis: Reading line-by-line, but analysing by meaningful qualitative units. *The Qualitative*

Report, 17(1): p 266 – 269 [www] http://www.nova,edu/sss/QR/QR17-1/chenail-line.pdf. (last accessed 17/10/13)

Cho, J., & Trent, A. (2006) Validity in qualitative research revisited. *Qualitative Research,* 6(3): p 319 – 340.

Clarke, T, A., Lesh, J, J., Trocchio, J,S., & Wolman, C. (2010) Thinking styles: teaching and learning styles in graduate education students. *Educational Psychology,* 30: (7), p 837 – 848.

Coffield, F., Moseley, D., Hall, E., & Ecclestone, K. (2004) *Learning styles and pedagogy in post-16 learning. A systematic and critical review.* Learning and Skills Research Centre: London.

Coffield, F., Moseley, D., Hall, E. and Ecclestone, K. (2004a) *Should we be using Learning Styles: What research has to say about practice* Learning & SkillsResearch Centre: London.

Coffield, F. (2005) Kinaesthetic nonsense*. TES*, January 14th, 2005, p 28, School Leadership.

Coffield, F. (2006) Wrongly labelled. *Education Guardian* [online] http://education.guardian.co.uk/further/opinion/story/0,,1827802,00.html (last accessed 03/09/06)

Coffield, F.C. (2008) *Just suppose teaching and learning became the first priority,* LSN: London.

Cohen, J. (1992). A power primer. *Psychological Bulletin,* 112(1): p 155 – 159. DOI:10.1037/0033-2909.112.1.155.

Cools, E. (2009) A reflection on the future of the cognitive style field: a proposed research agenda. *Reflecting Education*, 5: (2), p.19 – 34 [online] http://reflectingeducation.net (Last accessed 03/09/10)

Cools, E. & Van Den Broeck, H. (2008) Cognitive styles and managerial behaviour: a qualitative study. *Education and Training,* 50(2) p 103 - 114.

Craib, I. (1997) Social constructionism as a social psychosis, *Sociology.* 31(1): p 1 – 15.

Cresswell, J.W. (2008) *Educational research: Planning, conducting, and evaluating quantitative and qualitative research.* (3rd edition). Pearson Education: New Jersey.

Cronbach, L. J. and Snow, R. E. (1977) *Aptitudes and Instructional Methods: A Handbook for Research on Interaction.* Irvington: New York.

Crooks, D, L. (2001) The importance of symbolic interaction in grounded theory research on women's health, *Health Care for Women International.* 22: p 11 -27.

Crotty, M. (1998) *The foundations of social research: Meaning and perspective in the research process.* Sage: London.

Curry, L. (1983) An organisation of learning styles theory and constructs in Curry, L. (Ed.), *Learning Style in Continuing Education*, ERIC Document No. 235, Dalhousie University, Halifax.

Curry, L. (1987) *Integrating concepts of cognitive or learning style: A review with attention to psychometric standards*. Canadian College of Health Service Executives: Ottawa, ON

Curry, L. (1990) A critique of the research on learning styles. *Educational Leadership*, 48:(2), p 50 – 61.

Curry, L. (1991) Patterns of learning styles across selected medical specialities. *Educational Psychology,* 11: p 247 – 278.

Curry, L. (1999) Cognitive and learning styles in medical education. *Academic Medicine,* 74:(4), p 410 – 413.

Cuthbert, P,F. (2005) The student learning process: learning styles or learning approaches? *Teaching in Higher Education*, 10: (2), p 235 – 249.

Dearing, R. (1997) *Higher Education in the Learning Society*, Report of the National Committee of Inquiry into Higher Education, HMSO: London.

DeBello, T, C. (1990) Comparison of eleven major learning styles models: variables, appropriate populations, validity of instrumentation, and research behind them. *Journal of Reading, Writing, and Learning Disabilities International*, 6: (3), p 203 - 222.

Deckinger, E.I. (2000) How I found pedagogy, In Dunn, R. and Griggs, S.A. (Eds), *Practical Approaches to Using Learning Styles in Higher Education*, Bergin, Westport, CT.

Dembo, M.H., & Howard, K. (2007) Advise about the use of learning styles: a major myth in education. *Journal of College Reading and Learning,* 37: (2), p 101 – 109.

Demos (2004) *About Learning. Report of the Learning Working Group*, Demos: London.

Denzin, N. (1983) Interperative interactionism. In G. Morgan (editor), *Beyond method: Strategies for social research.* Sage: Beverley Hills.

Dey, I. (1999) *Grounding grounded theory guidelines for qualitative inquiry.* Academic Press: San Diego.

DfES (2002) *Learning styles and writing in English Key Stage 3: National Strategy.* Date of issue 05/2002, Ref 0371/2002.

DfES (2004) *Assessment for learning* [online] www.standards.dfes.gov.uk/thinkingskills/resources. (last accessed 09/08/09).

DfES (2005) Higher standards, better schools for all: More choice for parents and children, The Stationery Office: Norwich.

DfES (2006) *Personalising further education: developing a vision* , The Stationery Office: Norwich.

Diener, E., & Crandall, R. (1979) *Ethics in social and behavioural research.* University of Chicago Press: Chicago.

de Vaus, D.A. (1986) S*urveys in social research,* Allen & Unwin: London.

Devine, F., & Heath, S. (1999) *Sociological research methods in social research.* Palgrave: Basingstoke.

Dey, I. (1999) *Grounding grounded theory guidelines for qualitative inquiry.* Academic Press: San Diego.

DiCicco-Bloom, B. & Crabtree, B, F. (2006) The qualitative research interview. *Medical Education,*40: p 314 – 321.

DiNapoli, R. (2004) *What is student centred learning,* Educational Initiative Centre [online] http://www.wmin.ac.uk/pdf/WhatIsSLC.pdf Accessed 12 July 2009

Dingwall, R. (1997) Accounts, interviews and observations. In G. Miller & R. Dingwall (editors), *Context and method in qualitative research,* (51 – 65). Sage: London.

Driver, M. J. (2000) Decision Style: Past, Present and Future Research, in Riding, R. & Rayner, S. (2000), (Eds) *International Perspectives on Individual Differences. Volume 1: Cognitive Styles*, Ablex: Stamford, Connecticut.

Duff, A. (2004) The role of cognitive learning styles in accounting education: developing learning competencies. Journal of Accounting Education 22(1), 1st Quarter 2004, p 29 – 52.

Duff, A., & Duffy, T. (2002) Psychometric properties of Honey & Mumford learning styles questionnaire. *Personality and Individual Differences*, 33: p 147–163.

Dunn, R., & Dunn, K. (1978) *Teaching students through their individual learning styles.* Reston Publishing: Reston, VA.

Dunn, R., & Dunn, K. (1999) *The complete guide to the learning styles in-service system.* Boston: Allyn & Bacon.

Dunn, R., & Griggs, S. A. (2000) *Practical approaches to using learning styles in higher education.* Bergin and Garvey: Westport, CT.

Dunn, R, Griggs S, Olson J., Bassly, M. & Gorman, B. (1995) A meta-analytic validation of the Dunn and Dunn model of learning-style preferences. *Journal of Educational Researc,* 88 (6), p 35 - 62

Dunn, R., & Honigsfeld, A. (2013). Learning styles: what we know and what we need. *The Educational Forum,* 77 (2): p 225 – 232.

Dunn, R., Honigsfeld, A. Doolan, L, S., Bostrom, L., Russo, K., Schiering, M, S., Suh, B. & Tenedero, H. (2009) Impact of Learning-Style Instructional Strategieon Students Achievement and Attitudes: Perceptions of Educators in Diverse Institutions, *The Clearing House,* p135 – 14 [www] http://www.bostromenterprise.se/files/1552.pdf (last accessed 23/04/13)

Ekwensi, F., Moranski, J. & Townsend-Sweet, M, (2006) 'Instructional Strategies for Online Learning' , *E-Learning Concepts and Techniques,* Bloomsburg University of Pennsylvania [www] http://iit.bloomu.edu/Spring2006_eBook_files/chapter5.htm (last accessed 12/12/09).

Elen, J., Clarebout, G., Le´onard, R.,& Lowyck, J. (2007) Student-centred and teacher-centred learning environments: what students think, *Teaching in Higher Education,* 12(1), p105 - 117

Entwistle, N. (1981) *Styles of Teaching and Learning: An Integrated Outline of Educational Psychology for Students, Teachers, and Lecturers*, Wiley: New York.

Entwistle, N. (2001) Styles of learning and approaches to studying in higher education, *Kybernetes*, 30: (5/6), p 593 - 602.

Entwistle, N., & Peterson, E. R. (2004) Learning styles and approaches to studying. In C.Spielberger, C. (Ed.), *Encyclopedia of applied psychology.* New York: Academic Press

Erickson, F. (2007) *Specifying "usually" and "some": using simple descriptive statistics in qualitative inquiry.* Presented at the 2007 Congress of Qualitative Inquiry, Urbana, IL.

Erickson, F., & Guitierrez, C. (2002) Culture, rigor, and science in educational research . *Educational Researcher.* 31(8), p 21 – 24.

Erlandson, D. A., Harris, E. L., Skipper, B. L., & Allen, S. D. (1993) *Doing naturalistic inquiry: a guide to methods.* Sage Publications Inc: Newbury Park.

Evans, C. (2004) Exploring the Relationship between Cognitive Style and Teaching Style, *Educational Psychology*, 24: (4), p 509 - 530.

Evans, C., & Sadler-Smith, E. (2006) Learning styles in education and training: problems, politicisation and potential. *Education &Training*, 48: (2/3), p 77 – 83.

Evans, C., & Waring, M. (2006) Towards inclusive teacher education: sensitising individuals to how they learn. *Educational Psychology*, 26: (4), p 499 – 519.

Eysenck, M., W. (1984) *A handbook of cognitive psychology,* Lawrence Earlbaum Associates Ltd: London.

Fatt, J, P, T. (2000) Understanding the learning styles of students: implications for educators. *International Journal of Sociology and Social Policy,* 20: (11/12), p 31 - 45.

Favre, L., R. (2009). Kinesthetic instructional strategies: moving at-risk learners to higher levels, *Insights on Learning Disabilities,* 6(1): p 29 – 35.

Feder., I., Jolin, A. & Feyerherm, W. (2000) Lessons from two randomized experiments in criminal justice settings. *Crime and Delinquency*, 46(3), p 380 – 400.

Felder, R.M. & Silverman, L.K.(1988) Learning and teaching styles in engineering education, *Journal of Engineering Education*, 78 (7): p 674 - 681

Ferrell, B, G. (1983). A factor analytic comparison of four learning-styles instruments. *Journal of Educational Psychology,* 75(1): p 33 – 39.

Fife-Schaw, C. (1995) Questionnaire design. In Breakwell, G., Hammond, H, & Fife-Schaw, C. (Eds) *Research methods in psychology.* London: Sage.

Fisher, M. (1999) Using computers in qualitative analysis. In Henry, M. (Editor). *I.T. in the social sciences: A student's guide to the information and communication technologies,* Oxford: Blackwell.

Fleming, N., and Baume, D. (2006) Learning Styles Again: VARKing up the right tree!, *Educational Developments*, SEDA Ltd, Issue 7.4, Nov. 2006, p 4 - 7 [online] http://www.varklearn.com/documents/Educational%20Developments.pdf (last accessed 13/06/09)

Fleming, N., & Mills, C, E. (1992). Not another inventory, rather a catalyst for reflection. *To Improve the Acdemy,* 11: p 137 – 142.

Frazer,E. & Lacey,N. (1993) *The politics of community: a feminist critique of the liberal communitarian debate*, Harvester Wheatsheaf: Hemel Hempstead

Furnham, A. (1992) Personality and learning style: a study of three instruments. *Personality and Individual Differences*, 13: p 429 – 438.

Furnham, A. (2001) Test taking style, personality traits, and psychometric validity. In J. M. Collis & S. Messick (Eds.), *Intelligence and personality: bridging the gap in theory and measurement* (pp. 289–301). Lawrence Erlbaum Associates: New Jersey.

Gardner, H. (1983). *Frames of mind: the theory of multiple intelligences.* New York: Basic Books.

Gardner, H. (1993). *Multiple intelligences; the theory in practice.* New York: Basic Books.

Gardner, H. (1999) *Intelligences reframed: multiple intelligences for the 21st century.* Basic Books: New York.

Gbrich, C (2013). *Qualitative data analysis: An introduction.* (2nd edition). Sage: London.

Geake, J. (2005) Educational neuroscience and neuroscientific education: in search of a mutual middle way. *Research Intelligence, 92*, p10-13.

Geertz, C. (1973) Thick description: Toward an interpretive theory of culture. In Geertz, C. (Ed), *The interpretation of cultures.* Basic Books :New York.

Gergen, K. J. (1999) *An invitation to social construction.* Sage: London.

Giles,J., Ryan, D.A.J., Belliveau,G., De Freitas, E. and Ryan, C. (2006) Teaching style and learning in a quantitative classroom, *Active Learning in Higher Education,* 7; 213-225 [online] http://alh.sagepub.com/cgi/content/abstract/7/3/213 last accessed 29/01/09.

Glaser, B, G. (1992) *Basics of grounded theory analysis emergence vs forcing.* Sociology Press: California.

Glaser, B, G. (1998) *Doing grounded theory: Issues and discussions.* Sociology Press: Mill Valley.

Glaser, B, G. (2003) *Conceptualization contrasted with description.* Sociology Press: Mill Valley.

Glaser, B, G. & Strauss, A,L. (1967) *The discovery of grounded theory: Strategies for qualitative research.* Aldine de Gruyler: New York.

Gobo, G. (2011) Glocalizing methodology? The encounter between local methodologies, *International Journal of Social Research Methodology*, 14(6): 417-437 doi.10.1080/13645579.2011.611379

Gordon, D. & Bull, G. (2004) The Nexus Explored: A Generalised Model of Learning Styles, *SITE* 2004, Atlanta, Georgia, [www] http://arrow.dit.ie/scschcomcon/145/ (last accessed 14/07/14)

Graf, S., Kinshuk, & Liu, T.-C. (2009). Supporting Teachers in Identifying Students' Learning Styles in Learning Management Systems: An Automatic Student Modelling Approach. *Educational Technology & Society*, 12: (4), p 3–14.

Gravells, A. (2011). *Preparing to teach in the lifelong learning sector.* (4th edition). Learning Matters: Exeter

Gregorc, A. F. (1979) Learning/teaching styles: potent forces behind them. *Educational Leadership*, p 234 - 236.

Gregorc, A.R. (1982). *Style Delineator.* Gabriel Systems: Maynard, MA.

Grigorenko, E. L. & Sternberg, R. J. (1995) Thinking styles. In D. H. Saklofske & M. Zeidner (Eds.), *International handbook ofpersonality and intelligence* (pp. 205–230). Plenum Press: New York.

Guba, E. G. & Lincoln, Y.S. (1981) *Effective evaluation: Improving the usefulness of evaluation results through responsive and naturalistic approaches.* Jossey-Bass: San Francisco

Guba, E. G. & Lincoln, Y.S. (1982) Epistemological and methodological bases of naturalistic enquiry. *Education Communication and Technology Journal,* 30: p 233 – 252.

Gubrium, J, F. & Holstein, J. A (2001) *Handbook of Interview Research: Context & Method,* Sage: London.

Gurney-Read, J. (2014) Education and neuroscience fund launched to develop educational practice. *Daily Telegraph* [www] http://www.telegraph.co.uk/education/educationnews/10559083/Education-and-Neuroscience-fund-launched-to-develop-educational-practice.html (last accessed 25/03/2014)

Guterl, S. (2013), Is teaching to a student's "learning style" a bogus idea?" *Scientific American* [www] http://www.scientificamerican.com/article/is-teaching-to-astudents-learning-style-a-bogus-idea. (last accessed 13/04/14)

Hadfield, J. (2006) Teacher education and trainee learning style. *RELC,* 37 (3): p 367 – 386

Hall, E. and Higgin, S., (2004) *Picking the strawberries out of the jam: thinking critically about narrative reviews, systematic reviews and meta-analysis.* Presented at the British Education Research AssociationConference, (Manchester Metropolitan University, September 2004),[online] http://www.leeds.ac.uk/educol/documents/00003835.htm (last accessed 22/08/10)

Hall, E. & Moseley, D. (2005) Is there a role for learning styles in personalised education and training? *International Journal of Lifelong Education*, 24: (3), p 243 – 255

Hammersley, M. (1987) Some notes on the terms 'validity' and 'reliability'. *British Educational Research Journal*, 13(1): p 73 – 81.

Hammersley, M. (1992) What's *wrong with ethnography?* Routledge: London.

Hammersley, M. (1998) *Reading ethnographic research,* (2nd edition). Longman: London.

Hammersley, M. (2003a) Recent radical criticism of interview studies: any implications for the sociology of education? *British Journal of sociology of Education,* 24(1): p 119 – 126.

Hammersley, M. (2003b) Conversation analysis and discourse analysis: Methods or paradigms? *Discourse and Society,* 14(6): p 751 – 781.

Hammersley, M. (2007) The issue of quality in qualitative research. *International Journal of Research and Method in education,* 30(3): p 287 – 305.

Hanson, A. (1996) 'The search for separate theories of adult learning: does anyone really need andragogy?' in Edwards, R., Hanson, A., and Raggatt, P. (eds.) *Boundaries of Adult Learning. Adult Learners, Education and Training Vol. 1*, London: Routledge.

Harper, H. (2013) *Outstanding teaching in lifelong learning.* Open University Press: Maidenhead.

Harris & Brown (2010), Mixing interview & questionnaire methods. *Practical Assessment, Research & Evaluation,* 15 (1): p 1 – 19. [online] http://pareonline.net/getvn.asp?v=15&n=1(last accessed 27/06/13)

Harris, A., & Ranson, S. (2005) The Contradictions of Education Policy: Disadvantage and Achievement . *British Educational Research Journal* 31 (5): Education Policy and Social Justice (Oct., 2005), p 571 - 587

Hastings, S., & Jenkins, S. (2005) Learning styles. *Times Educational Supplement,* 04.11.2005.

Hartley, J. (1998) *Learning and studying: a research perspective.* Routledge: London.

Hattie, J. (2009) *Visible learning: a synthesis of over 800 meta-analyses relating to achievement*. Routledge:London.

Henry, J. (2007). Professor pans 'learning style' teaching method. *The Daily Telegraph.* 29/07/2007

Heritage, J. (1984) *Garfinkel and ethnomethodology.* Polity: Cambridge.

Hernandez, I. & Preston, J, L. (2012). Disfluency disrupts the confirmation bias, *Journal of Experimental Social Psychology,* 49:(1), p 178 – 182.

Herrmann, N. (1999) *The Theory Behind the HBDI and Whole Brain Technology* [WWW] http://www.herrmannsolutions.com/ (Last accessed 12/08/14)

Hermanussen, J, Wierstra, R, F, A, De Jong. J, A, & Thijssen, J, G. L, (2000) Learning styles in vocational work experience, *Journal of Vocational Education Research*, 25: p 445 – 471.

Hill, C. (2008) *Teaching with e-learning in the lifelong learning sector.* (2nd edition), Exeter: Learning Matters.

Holden, C. (2010) Learning with style? *Randomsamples* [online] http://www.psychologicalscience.org/pdf/Learning_With_Style-Science.pdf (last accessed 14/12/14)

Holstein, J, A., & Gubrium, J, F. (2011) Animating interview narratives In Silverman, D. (Editor) *Qualitative research.* (3rd Edition), Sage: London.

Holton, J. (2010) The coding process and its challenges. *Grounded Theory Review,*1(9):p 1 – 15. [www]http://groundedtheoryreview.com/2010/04/02the-coding-process-and-its-challenges/ (last accessed 05/06/2015)

Honey, P. (www). Peter Honey publications. [online] *http://www.peterhoney.com/* (last accessed 13/09/09).

Honey, P. and A. Mumford (1992). *The Learning Styles Questionnaire.* Maidenhead: Peter Honey Company.

Honey, P., & Mumford, A. (1986) *The manual of learning styles.* Honey, Ardingly House: Berkshire.

Honey, P., & Mumford, A. (1992) Questions and answers on learning styles questionnaire, *Industrial and Commercial Training,* 24:(7), p 10 – 13.

Honey, P., & Mumford, A. (2006) Learning *styles helper's guide.* Peter Honey: Maidenhead.

Honigsfeld, A., & Schiering, M. (2004) Diverse approaches to the diversity of learning styles in teacher education. *Educational Psychology,* 24 (4): p 487 - 507

Huberman, A. M. & Miles, M. B. (1985) Assessing local causality in qualitative research. In D,N, Berg & K.K. Smith (editors), *Exploring clinical methods for social research,* (351 – 382). Sage: Beverley Hills.

Hudson, L. (1966) *Contrary imaginations.* Penguin Books Middlesex: England.

Hunt, D.E. (1979) Learning style and student needs: an introduction to conceptual level. In Keefe, J. W. (ed) *Student Learning Styles: Diagnosing and Prescribing Programs,* p 27 – 38. National Association of Secondary School Principals: Reston.

The Independent. (1997). Dearing: so much paper, so little inspiration. 24th July: p 17.

Jarvis, P. (1995). *Adult and continuing education: theory and practice,* (2nd edition). Routledge: London.

Johnson, M. (2004). *Personalised learning- an emperor's outfit?* Institute for Public Policy Research: London.

Johnson, M. (2009) Evaluation of learning style for first year medical students. *International Journal for the Scholarship of Teaching and Learning,* 3: (1), p 1 – 15.

Joppe. M. (2000) The research process. Cited by Golafshani, N. (2003) Understanding reliability and validity in qualitative research. *The Qualitative Report,* 8(4): p 597 – 607.

Kagan, J., Rosman, B. L., Day, D., Albert, J., & Phillips,W. (1964) Information processing in the child: significance of analytic and reflective attitudes. *Psychological Monographs,* 78 (578), p 1 – 37.

Kappe, F,R., Boekholt, L., den Rooyen, C., & Van der Flier, H. (2009) A predictive validity study of the learning style questionnaire (LSQ) using multiple, specific learning criteria. *Learning and Individual Differences,* 19: p 464 – 467.

Karakus, O, Howard-Jones, P,A. & Jay, D. (2014) Primary and secondary school teachers' knowledge and misconceptions about the brain in Turkey. *Procedia- Social and Behavioral Sciences.* [www]http://research-information.bristol.ac.uk/en/publications/primary-and-secondary-school-teachers-knowledge-and-misconceptions-about-the-brain-in-turkey(68b442a7-95ab-42ab-bb1d-736e1be88e59).html (last accesssed 07/07/2014)

Kavale, K. A., & LeFever, G, B. (2007) Dunn and Dunn model of learning-style preferences: critique of Lovelace meta-analysis. *The Journal of Educational Research,* 101: p 94 – 97.

Kennedy, T, J, T. & Lingard, L, A. (2006) Making sense of grounded theory in medical education. *Medical Education,* 40: p 101 – 108.

Kingston, P. (2004). Fashion victims. *The Guardian.* Tuesday May 4 2004

Kirton, M. J. (1976) Adaptors and innovators: a description and measure, *Journal of Applied Psychology,* 61:p 622 - 629

Klein, B., McCall, L., Austin, D. & Piterman, L. (2007) A psychometric evaluation of the learning styles questionnaire: 40-item version. *British Journal of Educational Technology,* 38: (1), p 23 – 32.

Knowles, M. S., Holton, E. F., III, & Swanson, R. A. (2005) *The adult learner* (6th ed). Elsevier: Boston.

Knowles, M. S. (1990) *The Adult Learner. A neglected species* (4th edition), Houston: Gulf Publishing.

Kolb, D, A., & Fry,R. (1975) Towards an applied theory of experiential learning. In Cooper, C, L. (Editor) *Theories of group processes.* Wiley: New York.

Kolb, D.A. (1976). *The learning style inventory.* McBer: Boston.

Kolb,D . A. 1984. *Experiential learning: experience as the source of learning and development.* Prentice-Hall: New Jersey.

Koriat, A., Lichtenstein, S., & Fischhoff, B. (1980). Reasons for confidence. *Journal of Experimental Psychology: Human Learning & Memory*, 6: p 107–118.

Kozhevnikov, M. (2007) Cognitive style in the context of modern psychology: Towards an integrated framework of cognitive style. *Psychological Bulletin*, 133, p 464–481.

Kratzig, G. P. & Arbuthnott, K. D. (2006) Perceptual learning style and learning proficiency: a test of the hypothesis. *Journal of Educational Psychology,* 98 (1): p 238 – 246.

Kvale, S., & Brinkmann, S. (2009) *Interviews: learning the craft of qualitative research interviewing.* Sage: London.

Kyprianidou, M., Demetriadis, S., Tsiatsos, T. & Pombortsis, A. (2011). Group formation based on learning styles: can it improve students' teamwork? *Education Technology Research Development,* 60: p 83 – 100. DOI 10.1007/s11423-011-9215-4.

Lakoff, G. (1987) *Women, fire, and dangerous things: what categories reveal about the mind.* University of Chicago Press: Chicago.

Landrum, T.J., & McDuffie, K.A. (2010). Learning styles in the age of differentiated instruction, *Exceptionality:A Special Education Journal,* 18(1): p 6 – 17. DOI:10.1080/09/09362830903462441.

Leadbeater, C. (2003) *Personalisation through participation.* Demos: London.

Learning and Teaching Support Network (2002) *Resource Guide*: *The Development of Key Skills in Higher Education* [online] http://www.heacademy.ac.uk/assets/hlst/documents/resource_guides/development_of_keyskills_in_higher_education.pdf (last accessed 20/08/11)

Leite, W, L., Svinicki, M., & Shi, Y. (2010). Attempted validation of the scores of the VARK: learning styles inventory with multitrait – multimethod confirmatory factor analysis models. *Educational and psychological measurement*, 70(2): p323 – 339.

Leplin, J. (1984) Introduction. In Leplin, J. (editor), *Scientific realism.* University of California Press: Berkeley.

Lewis,J. & Ritchie,J. (2003) Generalising from qualitative research, in Lewis & Ritchie (eds) *Qualitative research practice: A guide for students and researchers.* Sage: London.

Lincoln, Y. S. & Guba, E.G. (1985) *Naturalisitic inquiry.* Sage: Beverley Hills.

Lingard, L. (2014) When I say… grounded theory *Medical Education*, 48: p748–749 doi: 10.1111/medu.12394

Lofland, J. & Lofland, L. H. (1995) *Analyzing social settings, a guide to qualitative observation and analysis,* (3rd edition). Belmont: Wadsworth.

Lonkila, M. (1995) Grounded theory as an emergent paradigm for computer-assisted qualitative data analysis, in U. Kelle (editor), *Computer-Aided Qualitative Data Analysis.* Sage: London.

Lovelace, M,K. (2005) Meta-analysis of experimental research based on the Dunn and Dunn model. *Journal of Educational Research* 98(3) p 176 – 183.

Lucas, S, R. (2014) Beyond the existence proof: ontological conditions, epistemological implications, and in-depth interview research. *Qual Quant,* 48: p 387 – 408. DOI 10.1007/s11135-012-9775-3.

Mainemellis, C. Boyattziz, R. and Kolb, D. (2002) Learning styles and adaptive flexibility. *Management learning,* 33 (1): p 5 – 33.

Mark, M. M., Henry, G. T. & Julnes, G. (2000) *Evaluation: an integrated framework for understanding, guilding, and improving policies and programs.* Jossey-Bass: San Francisco.

Marks, D.F. (1972). Visual imagery differences in the recall of pictures*. British Journal of Psychology*, 64, p17 – 24.

Marshall, B. (2006) *Preparing to teach in the lifelong learning sector,* Edexcel: Harlow.

Marshall, C. & Rossman, G. (2011) *Designing qualitative research.* Sage: Thousand Oaks.

Martin, S. (2010) Teachers using learning styles: Torn between research and accountability? *Teaching and Teacher Education* 26: p 1583 -1591

Marton, F. and Booth, S. (1997) *Learning and Awareness*, Lawrence Erlbaum: Mahwah, NJ.

Marton, F. and Saljo, R. (1976) On qualitative differences in learning: outcome and process, *British Journal of Educational Psychology*, 46: p. 4 - 11.

Mason, J. (1996) *Qualitative researching.* Sage: London.

Maudsley, D.B. (1979) A Theory of Meta-Learning and Principles of Facilitation: An Organismic Perspective. University of Toronto: Toronto.

Mautner, T. (Editor), (2005) *Dictionary of philosophy.* (2nd edition). Penguin: London.

Maxfield, M, G. & Babbie, E, R. (2009) *Basics of research methods for criminal justice and criminology,* (3rd Edition). Wadsworth Cengage Learning: USA.

Maxwell, J. (2002) Realism and the role of the researcher in qualitative psychology. In Mechthild Kiegelmann (editor), *The role of the researcher in qualitative psychology.* Verlag Ingeborg Huber: Tuebingen

Maxwell, J,A. (2010) Using numbers in qualitative research. *Qualitative Inquiry,* 16(6): p 475 – 482.

McCarthy, B. (1981). The 4MAT system-teaching to learning styles with right/left ivode techniques. (2nd ed.) Barrington, Ill: Excel.

McKenzie, W. (2005) Multiple intelligences and instructional technology: Surf Aquarium Consultancy.

McLoughlin, C. (1999) The implications of the research literature on learning styles for the design of instructional material. *Australian Journal of Educational Technology,* 15: (3), p 222 - 241.

McLoughlin, M., & Jones, A, M. Building on vocational competence: achieving a better workforce by degrees In Campbell, A., & Norton, L. (eds) (2007) *Learning, Teaching and Assessing in Higher Education.* Learning Matters: Southernhay South.

Melia, K, M. (1996). Rediscovering Glaser. *Qualitative Health Research,* 6(3), p 368 - 373.

Merriam, S. B. (2009) *Qualitative research: a guide to design and implementation.* Jossey-Bass: San Francisco.

Messick, S. (1984) Assessment in context: appraising student performance in relation to instructional quality. *Educational Researcher,* 13, p 3 – 8.

Messick, S. (1994) The interplay of evidence and consequences in the validation of performance assessments. *Educational Researcher,* 23(2), p 13 – 23.

Miles M.B. & Huberman A.M. (1994) *Qualitative Data Analysis.*Sage Publications, Thousand Oaks, CA.

Miller, J. & Glassner, B. (2011) The "inside" and the "outside": finding realities in interviews. In Silverman, D. (editor), *Qualitative Research.* (3rd edition). Sage: London.

Milliband, D. (2003). *Personalised learning: the route to excellence and equity.* Specialist Schools trust: London.

Milliband, D. (2004). *Personalised learning: building a new relationship with schools.* Conference speech at the North of England Education Conference, Belfast, 08/01/2004.

Morgan, D., L. (1998) *Planning focus groups.* Sage: Thousand Oaks.

Munro, E,R., Stein, M., & Ward, H. (2005) Comparing how different social, political and legal frameworks support or inhibit transitions from public care to independence in Europe, Israel, Canada and the United States. *International Journal of Child Welfare.* 4: p 191 – 201.

Murphy, E., Dingwall, R., Greatbatch, A. & Parker, F. (1998) Qualitative research methods in health technology assessment: a review of the literature. *Health Technology Assessment.* 2(16): p 1 – 294.

Myers, I. (1978) *Myers-Briggs type indicator.*: Consulting Psychologists Press: Palo Alto.

Neisser, U. (1976) *Cognition and reality.* W.H. Freeman: San Francisco.

Nelson-Jones, R. (1988) *The theory and practice of counselling psychology.* Cassell: London.

Newton-Suter, W. (2011) *Introduction to educational research: a critical thinking approach,* (2nd Edition). Sage: Los Angeles.

Nickerson, R. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology*, 2: p 175–220.

Nielsen, T. (2008) Implementation of learning styles at the teacher level. *Education and Training,* 50:(2), p 155 – 166.

Nielsen, T. (2005) *Learning styles of Danish university students – do they differ according to subject of study at the start of the first academic year? – Is there a subject specific socialization effect of one year of higher education? Development of and research by means of The Danish Learning Styles Inventory (D-LSI) based on Sternberg's theory of mental self-government*, PhD thesis, The Danish University of Education, Copenhagen.

Nilson, L, B. (2003) *Teaching at its best.* Jossey-Bass :San Francisco.

Nixon, L., Gregson, M. & Spedding, T. (2007) Pedagogy and the intuitive appeal of learning styles in post-compulsory education in England, *Journal of Vocational Education and Training,* 59: (1), p 39 – 51.

Novak, S., Shah, S., Wilson, J, P., Lawson, K, A. & Salzman, R, D. (2006) Research students' learning styles before and after a problem based learning experience. *American Journal of Pharmaceutical Education,* 70: (4), p 1 – 7.

Ochs, E. (1979) Transcription as theory. In E. Ochs & B.B. Schiefflin (Eds), *Developmental Pragmatics,* p 43 – 72. Academic: New York.

Oftsed (online) Find an inspection report [online] http://*www*.ofsted.gov.*uk/reports*/ (last accessed 13/12/2014)

Oliver, D.G., Serovich, J.M. & Mason, T.L. (2005) Constraints and opportunities with interview transcription: Towards reflection in qualitative research. *Social Forces,* 84(2): p 1273 – 1289.

Onwuegbuzie, A. J. (2002) Positivists, post-positivists, post-structuralists, and post-modernists: why can't we all get along? Towards a framework for unifying research paradigms. *Education*, 122(3), p 518 - 530.

Opie, C. Research procedures in Opie, C. (2004) (Editor), *Doing Educational Research.* Sage: London.

Parry, G. (2004) British higher education and the prism of devolution. p 160 – 189 , In Tapper, T. & Palfreyman, D. (Eds) *Understanding Mass Higher Education: Comparative Perspectives on Access.* Routeledge Falmer: London

Partington, G. (2001) Qualitative research interviews: identifying problems in technique. *Issues in Educational Research.* 11(2): p 32 – 44.

Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2009) Learning styles: Concepts and evidence. *Psychological Science in the Public Interest*, 9, 105-119.

Pask, G. (1976) Styles and strategies of learning, *British Journal of Educational Psychology,* 46: p128 -148.

Pask, G. & Scott, B.C.E. (1972) Learning strategies and individual learning, *International Journal of Man-Machine Studies*, 4: p 217 – 253.

Passmore, B. (2006) MI: mission impossible? *TES magazine,* 24.11.2006, pp20-21.

Patton, M. Q. (2002) *Qualitative research and education eethods,* (3rd Edition), Sage, Thousand Oaks, CA.

Paivio, A. (1969), Mental imagery and associative learning and memory, *Psvchological Review.* 76 (May), p 241-263.

Pawson, R., & Tilley, N. (1997) *Realistic evaluation.* Sage: London.

Petersilia, J. (1989) Implementing randomised experiments – lessons from BJA's intensive supervision project. *Evaluation Review*, 13(5), p 435 – 458.

Peterson, E, R., Rayner, S, G., & Armstrong, S, J. (2009) Researching the psychology of cognitive style and learning style: is there really a future? *Learning and Individual Differences,* 19: p 518 – 523.

Pheiffer, G., Holley, D., & Andrew, D. (2005) Developing thoughtful students: using learning styles in an HE context. *Education and Training*, 47: (6), p 422 – 431.

Pickering, S, J. & Howard-Jones, P. (2007). Educators' views on the role of neuroscience in education: findings from a study of UK and international perspectives. *Mind, Brain, and Education,* 1:(3), p 109 – 113.

Pigg, K. E., Busch, L. & Lacy, B. (1980). Learning styles in adult education: a study of county extension agents, *Adult Education* (USA), 30:(4), p 223 – 244.

Pike, R. W. (1989) *Creative training techniques handbook: tips, tactics, & how to's for delivering effective training.* Lakewood Books :Minneapolis.

Pitts, J. (2010). Identifying and using a teacher-friendly learning styles instrument. *The Clearing House: A Journal of educational Strategies, Issues and Ideas,* 82(5): p 225 – 232. http://dx.doi.org/10.3200/TCHS.82.5.225-232.

Presland, J.(1994) Learning styles and CPD, *Educational Psychology in Practice*, 10: (3): p 179 -184.

Provost, J, A. (1984) *A casebook: applications of the Myers-Briggs type indicator in counselling.* Center for Applications of Psychological Types Inc: Gainesville.

Provost, J. A., & Anchors, S. (1991) *Applications of the Myers-Briggs Type Indicator in higher education.* Consulting Psychologists Press: Palo Alto.

Putnam. H. (1999) *The threefold cord: mind, body, and world.* Columbia University Press: New York.

Raynor, S. G. (2006) What next? Developing global research and applied practice in the field of cognitive and learning styles, in Lassen, L., Bostrom, L. and Evans, C. (Eds), *Enabling Lifelong Learning in Education, Training and Development, Proceedings of the 11th Annual Conference of the European Learning Styles Information Network, University of Oslo, Oslo (CD-ROM)*

Rayner, S. G. (2007) A teaching elixir, learning chimera or just fool's gold? Do learning styles matter? *British Journal of Support for Learning* 22: p 24 – 31.

Reichmann, S. W., & Grasha, A. F. (1974) A rational approach to developing and assessing the construct validity of a student learning style scale instrument. *Journal of Psychology*, 87: p 213-223.

Reiner, C., & Willingham, D. (2010) The myth of learning styles. *Change: The Magazine of Higher Learning,* 42: (5), p 32 – 35.

Revell, P. (2005) Each to their own. *The Guardian,* Tuesday May 31st

Reynolds, M. (1997) Learning styles: a critique. *Management Learning,* 28: (2), p 115 – 134.

Richardson, J. T. E. (2005). Students' perceptions of academic quality and approaches to studying in distance education. *British Educational Research Journal, 31*, p 7 – 27.

Riding, R, J., & Cheema, I. (1991). Cognitive styles: an overview and integration. *Educational Psychology,* 11: p 193 – 215.

Riding, R, J., & Pearson, F. (1994) The relationship between cognitive styles and intelligence. *Educational Psychology,* 14: (4), p 413 – 425.

Riding, R, J., & Rayner, S. (1998) *Cognitive styles and learning strategies. understanding style differences in learning and behaviour*, David Fulton: London.

Riding, R, J., & Sadler-Smith, E. (1992) Type of instructional material, cognitive style and learning performance. *Educational Studies,* 3: (18), p 323 – 340.

Riding, R, J., & Sadler-Smith, E. (1997) Cognitive style and learning strategies: some implications for training design. *International Journal of Training and Development,* 1: (3), p 199 – 208.

Rief, S. F. (1993) *How to reach and teach ADD/ADHD children: practical techniques, strategies, and interventions for helping children with attention problems and hyperactivity.* The Center for Applied Research in Education.

Rogers, K, M,A. (2009) A preliminary investigation and analysis of student learning style preferences in further and higher education. *The Journal of Further and Higher Education,* 33: (1), p 13 – 21.

Rohrer, D. & Pashler, H. (2012) Learning styles: where's the evidence? *Medical Education,* 46 (7): p 634 – 635, DOI: 10.1111/j.1365-2923.2012.04273.x

Rosenfeld, M., & Rosenfeld, S. (2004) Developing teacher sensitivity to individual learning differences. *Educational Psychology*, 24: (4), p 465 - 87.

Rush, G, M., & Moore, D, M. (1991) Effects of restructuring training and cognitive style. *Educational Psychology: An International Journal of Experimental Educational Psychology,* 11: (3 & 4), p 309 – 321.

Russell, B. (2008) *The problems of philosophy.* Wilder Publications: Radford.

Sadler-Smith, E. (1996) Learning styles: a holistic approach. *Journal of European Industrial Training,* 20: (7), p 29 – 36.

Sadler-Smith, E. (2001) A reply to Reynolds's critique of learning style. *Management Learning,* 32: p 291 – 304, [online] http://mlq.sagepub.com/content/32/3/291 (last accessed 13/07/10)

Sadler-Smith, E. Spicer, D. P. & Tsang, F. (2000) Validity of the the cognitive style index: replication and extension, *British Journal of Management,* 11, p 175 – 181.

Salvisberg, J. (2005) Cognitive style and learning strategies. *IATEFL Issues,* February – March 2005, p 2 – 3, Darwin College, University of Kent.

Sandelowski, M., Voils, C. I., & Knafl, G. (2009) On quantitizing. *Journal of Mixed Methods Research, 3*(3), 208–222.

Scott, C. (2010) The enduring appeal of 'learning styles', *The Australian Journal of Education,* 54 (5): p 5 – 17. DOI: 10.1177/000494411005400102

Schmeck, R.R., Ribich, F. & Ramanaiah, N., V. (1977) Development of a self-report inventory for assessing individual differences in learning process. *Applied Psychological Measurement,* 1: (3) p 413 – 431.

Schmeck, R, R. (1983) Learning style of college students. In Dillon, R. F., and Schmeck, R. R. (eds.), *Individual Differences in Cognition*, Vol. 1, p. 233 – 279. Academic: New York.

Schmeck, R, R. (1988) *Learning strategies and learning styles*, Plenum: New York.

Schwandt, T, A. (2003) Three epistemological stances for qualitative inquiry: Interpretivism, hermeneutics and social constructionism. (pp. 292-331).In Denzin, N. and and Lincoln, Y (Eds.), *The Landscape of Qualitative Research: Theories and issues.* Sage: Thousand Oaks.

Schwind, C, & Buder, J. (2012). Reducing confirmation bias and evaluation bias: When are preference-inconsistent recommendations effective – and when not? *Computers in Human Behavior,* 28: (6), p 2280 – 2290.

Schwind, C., Buder, J., Cresse, U, & Hesse, F.W. (2012). Preference-inconsistent recommendations: An effective approach for reducing confirmation bias and stimulating divergent thinking? *Computers & Education,* 58: (2), p787 – 796.

Scott, D & Morrison, M (2005) *Key ideas in educational research*. Continuum: London.

Seale, C. (1999) *The quality of qualitative research.* Sage: London.

Searle, J, R. (1996) *The construction of social reality.* Penguin Books: London.

Searle, J. (2006) Reality and relativism: Shweder on a which? hunt. *Anthropological Theory*, 6,p 112-121.

Sharp, J,G., Byrne, J. & Bowker, R (2008) The trouble with VAK. *Educational Futures,* 1(1) p 89 – 97.

Sharp, J, G. & Murphy, B. (2006) The mystery of learning IN Sharp, J, G., Ward, S. & Hankin, L. (editors) *Education Studies: An Issues-based Approach.* Learning Matters: Southernhay East.

Sheehan, P. (1967) A Shortened Form of Betts' Questionnaire Upon Mental Imagery, *Journal of Clinical Psychology.* 23, 386-389.

Shenton, A, K. (2004) Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information,* 22: p 63 – 75. [www] http://www.crec.co.uk/docs/Trustworthypaper.pdf (last accessed 13/06/13)

Shipman, S., & Shipman, V. C. (1985) Cognitive styles: some conceptual, methodological, and applied issues*. Review of Research in Education*, 12: p 229–291.

Sitko-Lutek, A., Rakowska, A. & Hill, J. (2000) To match or not to match / the conundrum of management education for reflective-analytical polish managers, In Armstrong, S., Francis, A., Graff, M., Hill, J., Rayner, S., Sadler-Smith, E. & Spicer, D. (Eds.) *Proceedings of the 5th Annual Conference of the European Learning Styles Information Network,* 26-27 June 2000, Business School, University of Hertfordshire, Hatfield, p 261 - 277.

Silverman, D. (1985) *Qualitative methodology and sociology: describing the social world.* Gower: Aldershot.

Silverman, D. (1997) Towards an aesthetics of research, in: D. Silverman (Ed) *Qualitative research: theory, method and practice* Sage: London.

Sismondo, S. (1993) Some social constructions. *Social studies of science,* 23: p 515 – 553.

Sloan, T., Daane, C, J. & Giesen. (2004) Learning styles of elementary preservice teachers. *College Students Journal,* 38 (3): p 494 – 499.

Smith, W., Sekar, S. & Townsend, K. (2000) The impact of surface and reflective teaching and learning on student academic success, In Valcke, M. & Gombeir, D. (Eds), *Learning styles: Reliability and validity: Proceedings of the 7th annual learning styles conference,* pp 407 – 418.

Smith, A. (1996) *Accelerated learning in the classroom.* Stafford: Network Educational Press.

Smith, A. (1998) *Accelerated learning in practice: brain-based methods for accelerating motivation and achievement.* Stafford: Network Educational Press.

Smith, A. (2002) *The brain's behind it: new knowledge about the brain and learning.* Stafford: Network Educational Press.

Smith, A. and Call, N. (1999) *The alps approach: accelerated learning in primary schools.* Stafford: Network Educational Press.

Smith, A. and Call, N. (2001) *The alps approach resource book.* Stafford: Network Educational Press.

Snider, V, E. (1992) Learning styles and learning to read: a critique. *Rase Remedial Special Education,* 13: (1), p 6 – 18.

Snook, I. (2007) Learning styles and other modern educational myths. Paper presented at the Philosophy of Australasia Conference. [online] http://www.pesa.org.au/html/documents/2007-papers/Snook,%201.pdf (last accessed 23/ 06/ 08)

Stahl, S. A. (2002) Different strokes for different folks? In L. Abbeduto (Ed.), *Taking sides: Clashing on controversial issues in educational psychology* (pp. 98-107) McGraw-Hill: Guilford.

Steedman, P. (2000) On the relations between seeing, interpreting and knowing. In Steir, F. (editor), *Research and Reflexivity,* (53 – 62). Sage: London.

Sternberg, R. J. (1997) *Thinking styles*, Cambridge University Press, New York.

Sternberg, R, J., & Zhang, L. (2003) Styles of thinking as a basis of differentiated instruction. *Theory Into Practice*, 44: (3), p 245 – 253.

Stitt-Gohdes, W.L. (2005) Student teachers and their students: do their instructional and learning preferences match? *Business Education Forum,* 57 (4): p 22 – 27.

Strauss, A. (1987) *Qualitative analysis for social scientists.* Cambridge University Press: New York.

Strauss, A., & Corbin, J, M. (1990) *Basics of qualitative research: Grounded theory procedures and techniques.* Sage Publications, Inc: Thousand Oaks,CA.

Strauss, A., & Corbin, J. M. (1998) *Basics of qualitative research: Techniques and procedures for developing grounded theory.* (2nd edition) Sage Publications, Inc : Thousand Oaks,CA.

Swailes, S., & Senior, B. (2001) The learning styles questionnaire: closing comments? *International Journal of Selection and Assessment,* 9: (3), p 215 - 216.

Talja, S., Tuominen. K. & Savolainen, R. (2005) "Isms" in information science: constructivism, collectivism and constructionism. *Journal of Documentation,* 61(1): p 79 – 101. DOI 10.1108/002294510578023.

Tewksbury, R. (2009) Qualitative versus quantitative methods: Understanding why qualitative methods are superior for criminology and criminal justice. *Journal of Theoretical and Philosophical Criminology,* 1(1): p38 – 58.

Thies, A. (2003) Connections, neuropsychology, neuroscience and learning style. In Armstrong, S.,Graff, M., Hill, J., Rayner, S., Sadler-Smith, E. & Spicer, D. (Eds.), *Bridging Theory and Practice, European Learning styles Information Network (ELSIN).* University of Hull. Hull, 30 june – 2 July 2003, p. 608 - 612.

Thornberg, R., Halldin, K., Bolmsjo, N. & Petersson, A. (2013) Victimising of school bullying: a grounded theory, *Research Papers in Education,* 28(3): p 309 – 329. DOI: 10.1080/02671522.2011.641999.

Tickle, S. (2001) What have we learnt about student learning? *Kybernetes*, 30: (7/8), p 955 – 969.

Tiedermann, J. (1989) Measures of cognitive style: A critical review. *Educational Psychologist*, 24: p 261 – 275.

TIP. (2009) *Learning strategies* [online] http://tip.psychology.org/strategy.html (last accessed 25/07/10)

Torrance, E. (1982) Hemisphericity and creative functioning. *Journal of Research and Development in Education*, 15 (3): p 29-37.

Tulbure, C. (2011). Do different learning styles require differentiated teaching strategies? *Procedia Social and Bahavioural Sciences,* 11: p 155 – 159.

Tummons, J. (2010) *Becoming a professional tutor in the lifelong learning sector,* (2nd Edition), Learning Matters: Southernhay East:

U.S. Department of Education (2002). *Strategic plan 2002 – 2007.* Department of Education: Washington, DC.

VARK http (online) *A guide to learning styles* [online] ://vark-learn.com/ (last accessed 23/03/14)

Van Maanen, J. (1988) *Tales of the field: on writing ethnography.* Sage: London.

Vorhaus, J. (2010) Learning styles. *Psychological Science,* 9: (3), p 105 – 119.

Warburton, N. (2012) *Philosophy the basics.* (5th edition). Taylor & Francis: London

Wason, P. C. (1960). On the failure to eliminate hypotheses in a conceptual task. *Quarterly Journal of Experimental Psychology*, 12: p 129–140.

Williams, M. (2010) Interpretivism and generalisation. *Sociology,* 34(2): p 209 – 224.

Wilson Quarterly. (2010) Do learning styles matter? *In Essence,* Spring 2010.

Witkin, H, A., Moore, C,A., Goodenough, D,R., & Cox, P,W. (1977) Field-dependent and field independent cognitive styles and their educational implications. *Review of Educational Research* 47(1): p1 – 64

Young, R. & Colin, A. (2004) Introduction: constructivism and social constructionism in the career field. *Journal of Vocational Behaviour.* 64(3): p 373 – 388.

Yun Dai, D., & Feldhusen, J, F. (1999). A validation study of the thinking styles inventory: implications for gifted children. *Roeper Review,* 21(4): p 302 – 307.

Zhang, L. & Sternberg, R, J. (2005) A threefold model of intellectual styles. *Educational Psychology Review,* 17: (1) p 1 – 52.

Zhang, Li-Fang, Robert J. Sternberg, and Stephen Rayner, eds. 2012. *Handbook of Intellectual Styles: Preferences in Cognition, Learning, and Thinking.*

Appendix 1 Extracts from Ofsted reports

Hackney Community College May 2010

The use of findings of initial assessment and learners' preferred learning styles results is underdeveloped in the planning of lessons.

Warrington Collegiate October 2010

Teachers prepare very detailed pen portraits of learners' learning needs and styles but some schemes of work contain a limited range of teaching methods to accommodate these

Bournville College of Further Education January 2011

They engage and involve learners through a variety of strategies that match learners' preferred learning styles.

Lincoln College February 2011

…teachers ensure that there are appropriate activities to engage all learners, regardless of their prior knowledge and learning style.

Stephenson College November 2011

Teachers plan lessons well, catering for a wide range of learning styles using a range of approaches.

Burton and South Derbyshire College December 2011

In the less effective lessons, teachers do not plan thoroughly and do not focus on learners' different needs, abilities and learning styles.

Southwark College December 2011

Teachers use resources imaginatively to engage all learners, taking into account different learning styles and abilities.

Brooklands College February 2012

Most teachers have a full understanding of their learners' individual needs and learning styles, using their knowledge to teach their learners in the most productive way.

North Warwickshire and Hinckley College March 2012

Teachers plan lessons well and take into account the different learning needs and styles of individual learners.

Barnfield College April 2012

At induction, students undertake a comprehensive initial diagnostic assessment of their individual abilities and learning styles. Outcomes from these assessments are used well to provide in-lesson support for students and to prepare informative and useful group profiles for teachers.

The College of Haringey, Enfield and North East London June 2012

Since then, managers and teachers have gone a long way towards establishing a culture in which good teaching practices are regularly shared and adopted, and innovative teaching and learning styles are introduced and disseminated.

Appendix 2 Ethical Clearance from the University of Hull

UNIVERSITY OF Hull

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ETHICAL PROCEDURES FOR RESEARCH AND TEACHING
IN THE
FACULTY OF EDUCATION

PERMISSION TO PROCEED WITH RESEARCH: ETHICAL APPROVAL

Reference Number: 13002

Name: Andrew Wilson

Student No: 200600872

Programme of Study: EdD

Research Area/Title: The uses and abuses of learning styles in the face of contradictory evidenced within the learning and skills sector

Image Permission Form N/A

Name of Supervisor: Dr David Plowright

Date Approved by Supervisor: 23 September 2013

Date Approved by Ethics Committee: 30 September 2013

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Participant Information Sheet Learning Styles Research

Section 1

This research follows the University of Hull and the British Educational Research Association's ethical guidelines. The study has been considered by the Institutional Ethics Committee at the University of Hull and has been given ethical clearance. It is part of a doctoral thesis at the University of Hull into the attitudes towards the use of Learning Styles Inventories within the UK Learning and Skills Sector. The main research question that this thesis aims to answer is:

> To what extent are teacher educators aware of the contested nature of learning styles within the sector?

In addition two further sub-questions will be investigated:

> What are the beliefs held by teacher educators that facilitate the continued application of learning styles within the sector?

> Do specific rationales exist to justify the use of learning styles by teacher educators within the sector?

This study will investigate the reasons why teacher educators in the Learning and Skills Sector have, or have not, continued to use learning styles as a consequence of recent negative research into their utility. It is looking at trends amongst teacher educators to investigate how the use of learning styles is perceived by those within the sector; therefore you are not required to have your identity publically or privately revealed. The interview is not a test of your knowledge of Learning Style Inventories or theory; there are no right or wrong answers to the questions. It is your honest opinion of their utility that is required.

The interview, in most cases, should take no longer than an hour to complete and whilst you are encouraged to answer all of the questions please feel free to ignore any you can't or don't want to answer.

If you do not want to take part in this research you are under no obligation to do so. If you do take part in the research and wish to withdraw at a later date (for any reason) you are free to do so and your contributions to the study will be withdrawn.

If you would like to ask any questions please feel free to do so, either now or at any point that you feel is relevant? If you do require any further information at any point during or after your participation in the study please use the contact details below,

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Section 2

To be completed when the recruitment interview has been concluded

- I, the undersigned have read and understand the participant information that is attached
- I have been given the opportunity to ask questions about the study
- I agree to take part in this research and understand that this will entail being interviewed and audio recorded
- I understand that some of my words may be quoted in publications, reports, web sites and other research outputs
- I agree to assign the copyright I hold in any material related to this project to Andrew Wilson
- I am aware that any information provided by myself will be anonymised and that I can withdraw from the research at any point for any reason without having to explain my motivation for doing so.
- I have received enough information to satisfy myself that my consent to participate is fully informed.

Interviewee signature……………………………………………………………………

Researcher signature……………………………………………………………………

Date……………………………………………………………………………………

Thank you for agreeing to take part in this study, your cooperation is greatly appreciated

Appendix 4

Table 4.1 Coffield et al's psychometric analysis of 13 LSI

		Internal consistency	Test-retest reliability	Construct validity	Predictive validity
1	Jackson	-	-	-	-
2	Riding	x	x	x	x
3	Sternberg	x	x	x	x
4	Dunn and Dunn	x	x	x	✓
5	Gregorc	x	x	x	✓
6	Honey and Mumford	x	✓	x	x
7	Kolb	-	✓	x	x
8	Entwistle	✓	-	✓	x
9	Herrmann	-	✓	✓	-
10	Myers-Briggs	✓	✓	x	x
11	Apter	✓	✓	-	✓
12	Vermunt	✓	✓	✓	x
13	Allinson and Hayes	✓	✓	✓	✓

✓ Criterion met   x Criterion not met   - No evidence either way or issue still to be settled

(Source: Coffield et al 2004)

Appendix 5

Table 6.1 Description of interviewees' salient characteristics

Participant (pseudonym)	Years teaching (Teacher Ed)	Gender	Age	Theoretical background	Highest qual	Support LS ?
David	17 (10)	M	39	Motor vehicle	B.A.(Hons)	Y
Lily	20 (11)	F	47	English	M.A.	Y
Emma	14 (10)	F	55	Health Studies	B.A.(Hons)	Y
Alfred	15 (11)	M	45	Sports Studies	M.A.	N
Bridget	20 (12)	F	42	Sociology	M.Sc.	N
Yasmin	16 (10)	F	46	English	M.A.	Y
Lucy	22 (15)	F	43	Child Dev	M.A.	Y
Roger	17 (12)	M	57	Photography	B.A.(Hons)	N
Linda	31 (13)	F	52	Travel & Tourism	M.A.	Y
Eric	16 (11)	M	41	Fine Art	M.A.	N
Thea	26 (13)	F	47	Business Studies	MBA	Y
Phil	23 (14)	M	47	Business Studies	M.A.	Y
Peter	18 (12)	M	47	Business Studies	MBA	Y
William	30 (17)	M	60	ESOL	B.A.(Hons)	N
Mike	19 (13)	M	49	Psychology	B.Sc.(Hons)	N

Appendix 6

Table 6.2 Interview schedule for the study

Q	Question	Purpose
1	*To what extent do you believe that VAK and its variants are the basis of all Learning Style theories?*	Assessed the belief that VAK-type learning styles provide the underpinning structure for all learning styles.
2	*What is the frequency of your use of the matching or meshing hypothesis within your teaching role?*	Investigated the frequency of use of the matching hypothesis and why it was used. .
3	*How would you describe/define the structure of learning styles?*	Questions 3 to 7 established how the respondents constructed and contextualised learning styles. Interviewees were invited to describe the structure of learning styles and compare and contrast them against cognitive styles and other related concepts and models. The questioning assessed the extent these entities were seen as the same, similar or dissimilar.
4	*How do you distinguish between cognitive and learning styles?*	
5	*How do you distinguish between learning strategies and learning styles?*	
6	*How do you distinguish between learning approaches and learning styles?*	
7	*Are you aware of personal style and/or thinking styles?*	
8	*Are you aware of the wider debate surrounding the use of LSI?*	Designed to capture attitudes towards and illustrate knowledge of the debate that surrounds the use of styles.
9	*Have you been trained in the use of LSI?*	Assessed the levels of formal and informal training experienced by the interviewees.
10	*Do you believe that evidence of learning styles usage will improve an Ofsted observation grade?*	Used to explore beliefs about the use of learning styles within Ofsted observations.

Appendix 7

Table 6.3 Generation of themes from coding using responses to question: do tutors believe that evidence of LS analysis will improve an observation grade?

Quote	Sub-theme	Theme
If you look at published Ofsted reports they often cite learning style usage as good practice so it's bound to improve your grade.	Ofsted support	Ofsted hypothesis
It's certainly never harmed mine I have got outstanding and have never fallen below good.	LSI advantages	
Provided everything else within the planning and execution of the session is of a certain standard I think that evidence of the use of learning styles will gain extra credit.	Ofsted support	
It should do because done properly you are showing differentiation, inclusivity and personalisation.	LSI advantages	
In short yes, it has to because you are adding value by including differentiation that is documented in your lesson plan,	Differentiation	
you are matching your teaching to each individual in the class and presenting evidence of how you are doing it.	LSI advantages	
My last Ofsted was some time ago as they missed me the last time but the use of learning styles was mentioned as a good practice.	Ofsted support	
The inspector thought that the use of learning styles was of enough importance to mention and praise their application. If you didn't get some sort of credit for their use why would they mention them?	Ofsted support	

Appendix 8

Table 7.1 Main themes and important sub-themes derived from the data

	Main themes	Sub-themes
1	Knowledge and use of VAK-type LSI	VAK doesn't underpin all LSI
2	Conceptual confusion	The structure and form of learning styles The matching hypothesis Cognitive style Learning strategies Learning approaches Intellectual/ thinking styles
3	Beliefs about stereotyping	Learning styles as natural mechanisms
4	Ofsted hypothesis	Management involvement
5	The learning styles debate	The learning styles debate
6	Enthusiastic socialisation	

Appendix 9

Table 7.2 Showing the use of named LSI by detractors and supporters (N=15)

LSI	Detractors	Supporters
VAK	Alfred, Mike	Lily
VARK	Roger	Phil, Yasmin
Honey & Mumford	Eric, William	Lucy, Thea, Linda, Peter
Both	Bridgit (VARK)	Emma (VARK), David (VARK)

Appendix 10

9.1 Flow chart showing the impact of primary and secondary influences on confirmation bias of style supporters