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Learning styles and learning strategies: assessing their impact on Science Foundation students

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Abstract *Science Foundation is an integral part of the University of Huddersfield's commitment to widening participation. It is specifically designed for those looking to study and work in the sciences but who lack the appropriate qualifications or experience to enrol as first-year undergraduates. In each year's cohort there is a wide spectrum of diversity in terms of age, ethnicity, social class, previous academic achievement and previous work experience. Many of those who enrol can be described as non-traditional. In the main, they are returning to full-time education following an extended break or they have recently underperformed in previous studies. Intuitively, the introduction of learning styles into the curriculum may help these students cope better with their transition into the culture of higher education. Building on the recent critiques of learning style theories, this article gives consideration to the implications for teaching and learning that their introduction have. It places quantitative and qualitative research undertaken with Science Foundation students within a framework of equity and employability. Ultimately it argues that the way in which learning styles are used has to reflect the motivations and aspirations of students.*

Introduction

In terms of the transition to higher education (HE), Science Foundation (SF) represents a significant first step for those who enrol. Offered by the School of Applied Sciences at the University of Huddersfield, it gives those who lack the necessary science skills, experience or qualifications the chance to achieve their goal of becoming undergraduates. Despite its name, those who enrol on SF are classified as pre-foundation or level zero students. Those who successfully complete this level zero year of study are able to continue their studies at undergraduate level (level one), either at Huddersfield or at another higher education institution (HEI) which recognises SF as an appropriate entry route. The admission policy for SF is focussed on widening participation and SF is a popular option with both mature students and with those who have recently underperformed at college.

Each year, over 100 students enrol on SF and the majority of them live locally. Most hail from the town of Huddersfield, its local authority area of Kirklees, and nearby or contiguous local authority

areas. Despite this geographic concentration, SF attracts a diverse student intake. In the academic year 2004/5, 29 per cent of SF students were classed as 'mature', that is over the age of 21. In the previous academic year this figure was as high as 52 per cent. Again in 2004, 'White' females were the predominant student group. In terms of ethnicity, a total of 27 per cent of those enrolling in 2004 described themselves as either 'Asian' or 'Black'. The categories of ethnicity used here are consistent and comparable with the 2001 Census of England and Wales (Office for National Statistics, 2003). The numbers of Asian and Black students are relatively high considering the 2001 Census showed that 14.4 per cent of the general population of Kirklees and 9.1 per cent of the population of England could be described as 'non-White' (Office for National Statistics, 2001).

In addition to this social and cultural diversity there is a mix in terms of previous educational achievement and, due in part to some of the age differences, a mix of employment experiences. As with Access to Higher Education courses, usually delivered in a further education (FE) setting, SF attracts students from disadvantaged

backgrounds, as well as those from more prosperous areas (Waller, 2006: 120). Similarly, the statistics highlighted earlier represent only the headline figures, and do not necessarily capture the individual experiential and aspirational differences among students. Recognising this diversity is important because it may have an impact on how students cope with the transition to HE. Intuitively, introducing learning style theory into the curriculum seems to offer one way of addressing the issues of diversity and transition for students such as these.

There are many learning styles models to choose from and some, although not all, are based on the premise that learning preferences are fixed and inherited traits (Coffield et al., 2004: 20). Honey and Mumford (1992: 5) believe that learning styles and preferences are developed and become habitual as a result of previous learning experiences. In common with other learning styles advocates, they have developed a questionnaire to help students understand their learning preferences and to help trainers to identify individual training needs. An influential report into the field has recently questioned the reliability and validity of this and other questionnaires (Coffield et al., 2004), raising questions about how and why they should be used. Despite this recent critique, practitioners continue to employ different theories and instruments, and research in the area continues to be disseminated and discussed in journal articles (see, for example, Pedrosa de Jesus et al. (2006)) and through the European Learning Styles Information Network (ELSIN). Crucially then, the introduction of learning styles or otherwise demands an understanding, not only of the range of models available, but also of the key debates around their reliability and their efficacy. Moreover, the Coffield et al. (2004: 52) report argues that learning professionals are 'duty bound' to consider the possibility that learning style intervention may have the effect of making the teaching and learning environment worse. The purpose of this article is to do just that and to assess what impact learning styles intervention would have on SF students.

The article is a result of initial quantitative and qualitative research undertaken with the 2006/7 group of students, aimed at assessing their motivations for enrolling on SF and their current engagement with teaching and learning. In the first instance, this article will seek to explore issues around employment, employability and equity,

and how these potentially conflict with learning styles intervention. Here, consideration will also be given to learning strategies and the impact they have on student engagement. The second part of the article details findings from interviews carried out with students and explores their motivations for being at university.

Only by engaging with the latest cohort of SF students can we hope to understand how social, cultural and experiential differences, as well as career aspirations, influence engagement with the current teaching and learning environment. This is significant because, as Beatty et al. (2005: 75) point out, motivations for adult students undertaking a particular course are important because of the voluntary nature of the education they are engaged in. Moreover, there has been 'a paucity of research examining enrolment choice' (Dalgety and Coll, 2006: 304), particularly in the sciences. Ultimately, this article explains how the decision of whether or not to implement learning style theory in the case of SF was based on a philosophical view of education and, as a corollary, its role in the longer-term prospects of its students.

Literature review

Coffield et al.'s (2004) recommendation to consider the impact of learning styles intervention is part of a wider pedagogical tradition. Many texts recommend that teachers and lecturers reflect on their teaching practice and some suggest opening a dialogue with their students (Lygo-Baker, 2003: 51). In some cases, research in this area has reflected on the learning journeys undertaken by students. Tierney and Slack (2005), for example, focussed on the personal benefits that government sponsored Foundation Degree students took from learning opportunities, rather than just financial, economic or career advantages. Papers such as this aim to personalise the experience of learners, in contrast to much of the policy focus on the financial and the economic. Here, the 1997 Dearing Report is part of a longer tradition of publications that have emphasised the need for a vocational priority in education (Ottewill and Wall, 2000: 521). Hayward (2005: 2) traced a 'vocationalist imperative' to 1882 and the Samuelson Commission on Technical Instruction. The 1963 Robbins Report drew attention to a longer tradition, making the point that European universities existed 'to promote the training of clergy, doctors and lawyers' (Robbins, 1963, cited

in West, 2000: 575). In their assessment of this same training, Yorke and Knight (2006: 3) remark that employability has been on HE's agenda for some time, even if the term is a relatively new one. Indeed, Barnett and Coate (2005: 45) point to the development of 'first destination' statistics as a performance indicator as evidence of forty years of policy framing in which HE has been oriented around the themes of work and employability.

As a former polytechnic, with a history of teaching and training stretching back to the early nineteenth century, the University of Huddersfield has a long tradition of vocationally oriented provision. The establishment of courses in subjects such as textiles, chemistry and the creative industries have reflected the growth and strength of these particular clusters within the town. Recently, the University has changed one aspect of its branding, moving from a slogan of 'Where Courses Turn into Careers' to 'Educating Tomorrow's Professionals'. The emphasis here is on employment, and while the definition of employability is not fixed (Cranmer, 2006: 170), a useful one describes a set of "skills, understanding and personal attributes" that make students more likely to gain employment and be successful in their chosen careers' (Knight, 2003: 4). SF shares the University's aspirational outlook and includes elements of employability in its learning outcomes. Students are taught and assessed in a number of ways and are encouraged to develop a range of skills, including some of the 'softer' skills such as teamwork and communication. They are also encouraged to reflect on their achievements and learning needs in progress files. Successful students have gone on to gain employment and be successful in a range of science-related disciplines, and also in health-related professions.

This focus on skills, employability and employment is significant because notions of widening participation are built on the equality of opportunity. The Leitch (2006: 3) Review of Skills, for example, reports that UK competitiveness is at risk from a rapidly changing global economy, specifically from the emerging economies of India and China. It argues that a comparatively weak skills base is not only holding back productivity and growth, but also holding back social justice. This is significant for teachers and lecturers because, whilst it focuses on skills that have relevance to the market, it does not necessarily

take into account how those already at a disadvantage further develop existing skills and acquire new ones. As has already been shown, there is a wide variety of students entering SF, including a significant cohort of what might be deemed to be non-traditional students. Often, it is students such as these that have already been disadvantaged by their previous experience of education (Hirsch, 2007). One way of making teaching more equitable is by providing additional support mechanisms. One group of mature students who were asked to reflect on their experiences prompted calls for specific systems of support (Carney and McNeish, 2005: 22). By contrast, testing students and adapting teaching practices to match individual learning styles can be seen as a way of embedding equity into the curriculum, although not everyone agrees that this is the case (Reynolds, 1997). In this case, teaching is focussed on the students as individuals rather than the range of skills they need to compete and succeed in the market place. Thus the choice of not only which learning style, if any, to introduce, but also how it is used becomes entwined with a philosophy of education and, as a corollary, the purpose of HE.

This does not mean that employability and learning styles are incompatible, but at the same time as being critical of some of the claims made about the efficacy of matching teaching and learning styles, Coffield et al. (2004: 12, 41) suggest that some practitioners may be seduced into doing so by claims that it can maximise achievement. The fear expressed here is that students are not learning about or developing new ways of learning. This is less about learning styles per se and more about the ways in which they are employed and this emphasis on the relationship between teaching staff and students is also reflected in similar claims made by the same authors about how students approach their learning (Coffield et al., 2004). In this case, it is suggested that in a world where 'teachers and students regard education as primarily about the accumulation of human capital and the gaining of qualifications, they are more likely to employ a surface approach to learning' (Coffield et al. 2004: 59), rather than a deep approach. Questionnaires that attempt to measure this level of interaction were included in Coffield et al.'s (2004) review of learning styles but they are often known as learning strategies, learning orientations or approaches to learning. In these cases, learning styles are seen as more flexible and subject to change (Coffield et al. 2004: 20). Biggs

(2003: 30), for example, stresses that surface and deep approaches to learning are not personality traits but reactions to the teaching environment.

Hartley (1998: 87-88) has charted the development of the deep/surface dichotomy and notes its dominant position in pedagogical research in Europe. In this definition, deep learning is driven by an intention to understand a subject or topic. By contrast a surface learner may attempt to learn by rote, without trying to understand the wider picture (Nicholls, 2002: 31-32). This is highly significant, not least because it is intrinsic motivation that drives deep learning and produces the best academic work (Biggs, 2003: 62). Research carried out in different countries has led to the development of a framework of 'learning orientations' which capture a personal context for individual student learning (Beatty et al., 2005: 76). In summary, intrinsic motivation is driven by curiosity and the satisfaction of being involved in and learning from a task. By contrast, extrinsic motivation sees learning tasks as a means to an end, such as an assessed piece of work (Nicholls, 2002: 30). Moreover, Beatty et al. (2005: 77) have identified both intrinsic and extrinsic vocational motivations. Here, a student with vocationally intrinsic motivation might be focussed on the relevance of the qualification to their future career, which reflects an individual concern with the issue of future employment prospects.

Clearly then, there is a range of issues to consider here. SF gives students, who often lack a track record of academic success, the best possible chance of meeting their learning and career goals. Introducing some aspect of learning styles into the curriculum seems to offer one way of helping them to achieve this. However, just as concerns have been raised about the validity and reliability of learning styles instruments, questions have also been asked about their efficacy based on assumptions about how they are used. For learning styles to have any value, they must encourage students to develop new skills. Whether this is the case is dependent on how they are delivered and, as a corollary, how students engage with them. The remainder of this article is given to exploring students' motivations for enrolling on SF and questioning how they engage with the current teaching and learning environment. Only by doing this can an assessment can be made about the potential impact of learning styles in the classroom.

Methodology

The methodology employed for this research has been both quantitative and qualitative. Across the University, students are asked to complete a two-stage Individual Learning Profile or ILP questionnaire. Usually completed in the first few weeks after enrolment, the ILP is concerned with identifying individual learning needs.¹ In addition to a series of tick boxes, there is a qualitative element which allows students the opportunity to identify any concerns they may have about their course. It also asks them to consider their motivations for applying for the course and their aspirations in the short and medium terms. The ILP was distributed to SF students during a teaching session. At the start of the 2006/7 academic year, 120 students had enrolled on the course and 85 forms had been returned completed. For the purposes of the research, this information was supplemented by information extracted from student learning diaries. Completed weekly by each student, the aim of the diaries is to encourage students to reflect on their progress and to take some responsibility for their own learning by identifying areas for development. In this case, because the diaries sometimes contain personal and emotional details, students were invited, rather than compelled, to return their diaries for inclusion in the project and 31 were returned for analysis. The evidence provided here revealed less about work and motivations than it did about individual students' everyday engagement with teaching and learning at university. For this reason, the use of data from these sources is limited. Nevertheless, they did reveal some tensions between students leading to some valuable information concerning mature students. Both the ILP and the student diaries were chosen because they were existing sources providing rich and comparable data. Using these sources allowed for a baseline of knowledge to be developed which could then be tested further with a series of individual interview sessions. Individual interviews, rather than focus groups, were chosen as a data collection method in order that a more detailed picture could be arrived at. A non-teaching member of staff conducted the interviews which meant that the students could be frank and honest in a way that might not have been achieved under other circumstances. Interviews were recorded and transcribed. Students were assured that their input was confidential and their responses, detailed later, have been anonymised.

In total, 23 self-selecting students attended individual sessions providing a range of ages, ethnicities, and previous academic and work experiences. While this particular methodology precludes an input from a larger cohort, a range of motivations for enrolling on SF were presented which could be compared and contrasted with the other sources used.

Findings and discussion

Predominantly, students completing the ILP identified the course as a route to further study (67 per cent) and/or as a route to a career (61 per cent). A significant number (58 per cent) had a clear idea of the degree they wanted to study, with the remainder in this subset undecided or unclear about specific courses. Identifying a route to further study is unsurprising. First, the course is designed to give those who are successful 'the opportunity to gain entry to a variety of courses within the University' (University of Huddersfield, 2007) or at other institutions. Second, a significant number of respondents enrolled on the course following a previous unsuccessful attempt to enrol as an undergraduate, usually because they lacked the necessary qualifications to do so. In these instances, successfully completing SF allows them to re-apply for their original choice of undergraduate study. Similarly, the emphasis on work and careers might also be considered to be unsurprising. The motivation section of the ILP asks students not only for the reasons behind their application, but also what they expect to be doing in five years' time. It is equally unsurprising that students enrol at university with a view to improving their career prospects, given local and national considerations. On a local level, the University's branding emphasises graduate careers and, nationally, the Government places emphasis on the benefits of HE for career development.

Within this context, the high numbers of 2006/7 SF students who had a relatively clear idea of what the progression from SF to career might look like might not be unusual. However, while 54 per cent of students returning the form had already identified either a specific job title or area in which they envisaged themselves working, the remaining 46 per cent had not. This, in part at least, rests in SF's broad appeal. As it represents a level zero year of study, it does not have the focus that subject specific courses such as chemistry, biology or indeed other courses outside the sciences, such

as history, have. On the face of it, the responses elicited from the ILP indicate that, on the whole, the students enrolling on SF do so for extrinsic reasons, but this does not necessarily mean that they do not see the value of SF for their career rather than just the grades they need to move to undergraduate study. Indeed, as the ILP captures a number of motivations, it revealed that 59 per cent of respondents included 'other' motivations behind their decision to enrol. These motivations included an enjoyment or interest in the sciences (11 per cent), as well as a desire to build on previous knowledge or to realise potential in the field (21 per cent). Others, by contrast, enrolled on SF because they were unsure of what they wanted to do (7 per cent), or because they lacked the relevant qualifications to enrol as an undergraduate (15 per cent). Even at this early stage, detailed analysis of the ILP revealed a range of motivations for enrolling on SF. Conducting individual interviews with students enabled these motivations to be examined in more detail.

Students, university and identity

The Dearing Report revealed that university graduates could expect a pay premium when compared to their less qualified peers (West, 2000: 576). Whether this remains the case or not, evidence such as this has been used more recently by the UK Government as part of their rationale for introducing student course fees. Significantly, the potential for increased earning ability did not feature explicitly in the returns of the ILP. Further evidence from the semi-structured interviews, however, revealed that this was an important motivating factor for some students. When asked to expand on her motivations for enrolling on SF, a White mature female student replied, 'I've just come because I can't live on minimum wage. I think because I've experienced working full-time in rubbish jobs that just makes me want to come' (SF:I). Feelings such as these were also reflected in the response of a younger Asian student, who had hoped to train to be a medical doctor but who now hoped to study pharmacy. This was because jobs in this area are 'relatively well respected jobs [with] high status amongst others' (SF:K), as well as being better paid. Enrolling on SF was definitely the right decision 'because I was thinking of going straight into work but obviously education has a better path to success doesn't it?' (SF:K).

In both these cases, however, it is clear that while there might be an economic imperative, there was

also something about the status of the careers they were aiming to work in. As the first quotation from student SF:I illustrates, this often had resonance for those who had already had some experience of the employment market. For one student, for example, potential earnings were less of an issue because she had left a job where she was earning 'quite a lot of money' so that she could eventually study Forensic Science as an undergraduate (SF:J). For others too, there is a sense that the previous working environment was unfulfilling. One student reported that he wanted 'to stop having dead end jobs and make something of myself' (SF:L). Part of this motivation stemmed from 'all the people I'd been to school with. They'd all gone to university and gone through A levels and they were going on to other things, and all moving away from home and everything and I was still here, doing nothing' (SF:L). Although he would not describe these people as friends, this context provided him with a fatalistic view of life without a university education. 'I want to do something, something I feel is worthwhile doing. And this is a stepping stone to do that basically. Basically, if I don't pass this course, I can't see a future for me' (SF:L).

Here, then, there is a clear emphasis, if not on status, then on the positive self identity conferred by a university education and, in some cases, the potential career opportunities that it brings with it. This emphasis was also found in responses from those students who had previously had vocational or training opportunities. One student who had had significant work experience in call centres stated that he wanted a 'professional career. I've been in vacancies and I want to have a different lifestyle altogether now and this is the only way forward for me' (SF:U). Another student with experience of telesales, hairdressing, accounting, retail and care already possessed a range of National Vocational Qualifications (NVQs). For her, however, these were seen as inferior to other alternatives. Her rationale for being at university was that 'I haven't really got [the] kind of an education that I call a proper education and that's why I enrolled on the Science Foundation course really' (SF:G). Despite the differences in age, ethnicity and previous work experience, these students identified something about university that made it 'different' to their other experiences. To some extent evidence such as this suggests a synergy between the University's aims and those of the students and, in the main, these students want to study and work in the sciences. Motivations

such as these do not necessarily have a bearing on their performance at university, however, as this can be affected by a number of factors, including curriculum design (Prosser and Trigwell, 1999: 92). Similarly, SF's role as a gateway to further study is another important issue to consider. Students starting their SF studies at the end of September need to complete Universities and Colleges Admissions Service (UCAS) application forms by the following January, for consideration in the next year's undergraduate intake. Courses such as midwifery, which is the first choice for many mature female students, and pharmacy, which is often the favoured destination amongst young Asian males, are particularly popular. This popularity, combined with limits on intake, means that the competition for places is high. In these cases, it seems likely that these students benefit from the focus on employability and the emphasis on skills development. It is not clear how a shift towards a learning style influenced curriculum, based on testing, would prepare students for the rigours of these highly selective courses or, in the longer term, the associated careers. For students such as these, it may be counter-productive, if not inequitable, not to help them develop a range of skills necessary to succeed in the science field, as well as in the competitive market place. This, however, may not be the case for less motivated or less focussed students.

Mature students and non-scientists

During analysis of the reflective diaries, it became apparent that there were some tensions between some groups of students. At the heart of these were the issues of late arrival to, and talking throughout, lectures (SF:2; SF:6; SF:16; SF:30). This issue was also raised at the course committee by student representatives. As a result, students were asked to reflect on the mix of students enrolled on SF during their semi-structured interviews. Generally, it was felt that students who had recently been through the A level process had an obvious advantage over their older peers. One mature student in her 40s said, 'I think you're at an advantage if you are straight from college and [you have] been doing A levels because a lot of the subjects are fresh, fresh to you' (SF:H). Primarily, this was because they had not had a break from education and it was felt that they had previous experience of the subjects being studied. This view was prevalent despite the fact that many of these

students had struggled with or failed some element of their previous course. It also did not take into account the culture of HE, which was new to all but a few students, or the range of subjects offered by SF. By contrast, some of the younger students felt that their mature peers had the advantage, simply by being more motivated. One student thought, 'the older students, the mature students, they come on to the course because they want to go somewhere and they are more determined to get there. So they might struggle with it but they've got the drive to do it' (SF:L). Another found that the 'mature students are scoring the highest, definitely.... They are obviously trying hard because they may not have got opportunities before.... They are scoring higher because they are concentrating more' (SF:K).

In some cases, it was felt that SF offered a 'make or break' year for mature students. One of the younger students talked of the strengths of both older and younger students but felt that the mature group did not 'want to waste this last chance' (SF:R). It is clear, however, that how much the year was 'make or break' depended on individual circumstances. For mature female students especially, the timing of their return to full-time education coincided with some freedoms from previous child care responsibilities. SF:H, SF:G and SF:Q all mentioned that their children were of an age where they could take care of themselves. In SF:Q's case, education was something that she 'always wanted to do...but [she never] really had the chance'. Her opportunity now arose from the fact that she was financially secure because 'I don't have to work, my husband earns enough money' (SF:Q). Nevertheless, this intuitive viewpoint is reflected in a quantitative survey of Scottish university students. Using a Learning and Studying Questionnaire, Christie et al. (2006: 358-9) found that older students were more likely to adopt a deep approach to learning when compared to their younger counterparts. While that may be the case generally, there is clear evidence that a surface or strategic approach, in some cases, was linked to study and career aspirations. When asked to discuss her commitments to the different elements of the course one student said,

The other topics I think you can read round them, not that I have really. I'm really lazy. Do you know why? Because I actually couldn't give a damn about anything to do with physics, chemistry, even a lot of

biology, maths, health and environment and sciences skills. All I want to do is do my [chosen degree] course and I just have to pass this course to get onto it. (SF: B)

While students are encouraged to engage fully with the teaching and learning environment on SF, the success of the course rests, in part at least, with its status as a gateway to further study. Comments such as these reflect research that has shown that to promote a deep approach to learning, the students' own interests should be kept in mind (Marton and Säljö, 1984: 52). SF's strength in attracting students with a range of aspirations can also be a weakness. This, of course, is just one example but the ILP revealed that 58 per cent of students had similarly already identified a specific study route. The findings reflect the external factors that some students include when making calculations about expending their efforts (Beatty et al., 2005: 85). In SF:R's case, calculations were made against the conditional offer of a place on an undergraduate degree programme at another HEI and the relevance, or the perceived irrelevance, that she ascribed to some elements of her studies. While it is not impossible to take into account these factors, it is difficult to see how learning styles intervention will address this lack of motivation with some aspects of SF.

These issues were also important to the group of students who, somewhat surprisingly, had very different motivations for being on SF. Research elsewhere has shown that some students pursue some vocational study options as a means of obtaining a general education, rather than because of a commitment to the vocational area which they are studying (Wahlberg and Gleeson (2004) cited in Hayward (2005: 10)). There is also evidence that something similar is occurring on SF. While SF is designed for those looking to study and work in the science field, there are cases of students using it as a convenient stepping stone to other, unrelated studies. One student revealed that he hoped to study geology and philosophy at undergraduate level. He enrolled because SF 'lets me show to other universities that I've been able to pass a university themed subject [sic] and that...opens more doors in the future' (SF:N). Like some of the other students, he already had some work experience but, he explained, 'I have just decided that I didn't want to stack shelves and stay at the [supermarket] for my entire life, which is where I've worked for three years'. His decision to

progress from SF to philosophy was based not only on the fact that it was something he was going to 'enjoy for the next three years', but also because of the variety of career opportunities it offered in the future. 'It'll still open doors for me because a lot of businesses look for philosophy as well [and] because there are a lot of skills within it that are useful' (SF:N). By contrast, the appeal of SF for another student related to its duration. 'To be perfectly honest with you, the only reason I've done this course is because it's a foundation course and it's only for one year, and most of the other foundation courses in this university are for two years, at least' (SF:O). Here, then, is evidence of some misunderstanding of the role of SF and because SF:O had little interest in or experience of the study of science, he struggled with some elements of the course. Further questions about his motivations revealed that he had enrolled to get onto a degree course studying either travel and tourism or the public sector (SF:O). Unfortunately, in this case, his preferred destination of a course in travel and tourism did not recognise SF as an appropriate entry route. Examples such as these are surprising because they identify SF students who are not interested in the sciences. In the process of applying for a place on SF, prospective students are usually interviewed and, where they lack the appropriate science background, they are asked to undertake an entrance test. Longer term motivations may be masked but they may also change as students are exposed to new experiences and opportunities. In both these cases, obtaining a 'general education' was less about the subject they were studying and more about the value of the qualification as a means to accessing other, more appealing study opportunities. In these cases, the students, and SF:O in particular, are at a disadvantage because they have little intrinsic interest in the course and little understanding of the subjects being studied. With this in mind, it is unsurprising that SF:O was 'easily distracted' in lectures and soon lost concentration. Such a lack of commitment can, unsurprisingly, be counterproductive and research has shown that it is one of the prime reasons behind working class students dropping out of HE (Quinn et al., 2005: 3). Again, this is significant because the introduction of learning styles will not necessarily help these students. Moreover, while it is not the role of SF to prepare students for non-science subjects and non-science careers, it seems much more sensible to encourage all students, wherever possible, to develop a range of transferable skills,

especially as research has shown that students take something positive from the trauma of having to leave HE, if they gain some skills and experience they can utilise in other circumstances (Quinn et al., 2005: 51).

Conclusions

For many students, SF represents a belated first chance of a university education, while for others it is a second opportunity to gain access to undergraduate study. Intuitively, these students may find adapting to the culture of HE more difficult than their peers who have a recent track record of educational success. Introducing learning styles theory into the classroom appears to offer one way of making the transition to HE less traumatic. While there is a danger that instruments such as the ILP overemphasise longer term aspirations, the message from this cohort is that these aspirations can and do impact on how students engage with teaching and learning. In the case studies presented here, it has been shown that not all mature students engage with all aspects of the curriculum, and neither do all the people with ambitions outside the science field. These students are not necessarily representative of the entire SF student body but quantitative data show that next steps, be they career or education aspirations, are on the minds of SF students when they enrol. This is hardly surprising but it means that it is unlikely that they will engage with learning styles unless they can see an immediate or longer term benefit in doing so. Indeed, the recent Coffield et al. (2004: 4) report suggested that students' interest in testing lasted only as long as the session in which it took place. Here, however, the student response to learning styles reflects their use and an alternative method of delivery might be to embed them more fully within the SF year. Irrespective of the recent criticism about validity and reliability of learning styles questionnaires (Coffield et al., 2004), this would mean amending the curriculum. This, however, may well lead to the disadvantaging of some SF students, particularly those hoping to go on to study on some of those courses which are selective, but also those looking to develop graduate skills, including those skills that will make them more employable. A recent survey conducted by the Association of Graduate Recruiters (Ford, 2007) revealed that 43 per cent of employers surveyed were unable to fill all their graduate vacancies in 2006 because candidates lacked the necessary 'soft' skills. The

most common reasons cited for this failure were a lack of leadership, teamwork and communication skills amongst students. While graduation may be a long way off at this point, it is the development of these skills that can benefit students across SF's diverse intake. West (2000: 586) argues that these employability skills are some of those that are 'essential' for success in HE anyway, and Yorke and Knight (2006) provide a framework for embedding them in the curriculum. Crucially, however, the focus now must be to address the lack of engagement with some elements of the course, as exhibited by some students. In light of the report by Coffield et al. (2004) and the interviews with students, a consideration of students' learning strategies rather than their learning styles will provide more solutions to that problem.

Notes

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Endnote

1. The ILP was developed for use in the University of Huddersfield by a group of Academic Skills Tutors. It is based on similar instruments used at De Montfort University and the University of Wolverhampton.



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