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Can I Stay or Shall I Go? – Factors Influencing the Participation of Black and Minority Ethnic Science, Engineering and Technology (SET) Graduates in SET Occupations in the Northwest

K Booth, L Welamedage, K Mansi, H Takturi-Rizk

Abstract

Science, Engineering and Technology (SET) have been at the heart of government policy priorities for many decades because of its contribution to the economy and exploitation of the science base is key to improving productivity and growing the market in the Northwest (NWDA, 2006). Against this, black and minority ethnic (BME) groups are projected to account for half the growth in the working age population between 1999 and 2009 and are generally over-represented in SET at undergraduate level in comparison to their white counterparts. It is therefore important that the region makes particular efforts to develop and retains its BME SET graduates. This paper presents findings from a European Social Funded (ESF) funded project looking at issues relating to the participation of BME students and graduates in SET degrees and occupations in the Northwest. The study was conducted via survey questionnaires and interviews with undergraduates, graduates and employers. We found that although the desire of BME undergraduates and the actual participation of BME graduates in SET careers at least equaled the aspirations and decisions of their White counterparts BME undergraduates were more likely to want to leave the region and more BME than White graduates had done so. The BME undergraduates in our study expressed considerable concern about whether or not their ethnicity would affect their career prospects although few of our BME graduates, who were primarily employed in large organisations, had actually experienced it. Employers in our survey on the one hand reported few applications from ethnic minority graduates and, on the other hand, the majority admitted that they use informal methods to recruit for available vacancies. Companies had a very varied range of equal opportunities and career development policies and practices with large employers being the most proactive. We therefore conclude that a lack of awareness of employment opportunities in the region and a limited number of employers with well developed career development policies discourages potential applicants. For BMEs there is the added

problem of a lack of existence and promotion of equality & diversity policies and practices and the extensive use of informal recruitment methods. Unless these deficiencies are addressed we believe that future SET employees, particularly those from a BME background, will continue to seek work elsewhere.

Introduction

The contribution of SET to the UK's GDP and labour productivity has significantly increased over the past few decades, characterised by strong manufacturing and a fast growing service sector. Research suggests that SET-based sectors produced 27.3% of the total UK value added in 2002. High-tech sectors, for which science and technology were the key drivers, contributed 27.1% of the improvement in labour productivity over 1993 to 2000 (ETB, 2007).

Over the past six years the economic performance in the Northwest region has progressed strongly, recording a £106 billion economy in 2005, the third largest in the country (NWDA, 2006). However, the region has experienced relatively modest growth of businesses in sectors that are important for SET-based activities: the employment in knowledge-based occupations stands at 36.4%, compared to an England average of 41.8%. In addition, the region attracted 12.7% of total business R&D, but less than 4% of government (non HEI) R&D. However, in 2005/06 more businesses than any other region were supported to develop collaborations with the region's knowledge base (NWDA, 2006).

The past decade has witnessed a 10% expansion of employment. However, many of these jobs have been low paid, often part-time jobs, with many in the service sector (NWDA, 2006): employment rates in managerial and professional occupations are below the UK average, implying a detrimental effect on the employability of qualified people in both traditional and new SET fields. Nonetheless, a range of career opportunities does exist for graduate scientists and engineers in SET sectors in the Northwest. This is especially true for large companies and the opportunities in SMEs cannot be underestimated. Therefore, attracting and keeping high quality SET graduates is vital to regional economic success. However, there exist concerns over the equality and diversity of the SET labour market where ethnic minorities are under-represented.

In 2001 (ONS), ethnic minorities overall accounted for 5.6% of the Northwest's population. However, analysis of HESA data shows that the *average* participation rate of BME students on SET degrees in Northwest HEIs over the four academic years 2002/2003 to 2005/2006 was 9.7%. Thus ethnic minority groups, overall, are over-represented on SET degrees in the Northwest (as in the UK as a whole). However, analysis of HESA first destination data shows that, proportionately, fewer ethnic minority students than white students remained in the Northwest upon graduation. So what might be the reasons for this? Although some statistical studies on UK BME undergraduates and graduates have been done (see for example Battacharyya *et al*, 2003) there is a paucity of empirical work, especially specifically focused on SET, where the authors are not aware of other work. However, for HE generally Conner *et al* (2004) published a key report on empirical research into the issues affecting BME participation in HE, and transition into the labour market. They found that BME graduates find it harder to find jobs, although those in employment may be in 'better' jobs. Likewise, a report by Race for Opportunity and Hobsons (2004) found that African, Caribbean and Asian undergraduates are twice as likely as White undergraduates to be unemployed after graduation. In their statistical analysis of HESA data Elias and Jones (2005) found similar results for SET BME students. Although this may be due to racial stereotyping (Prospects, 2005) Connor *et al* believed that recruitment strategies, especially those of private sector organisations, can discriminate against BME graduates. Few organisations promote positive action and employers' procedures do not necessarily support the development of a diverse workforce. For example, a study of diversity and equality of employment in Ireland (Burtenshaw Kenny and Associates, 2003) found that two-thirds of employers reported that their staff had received no training in this area, and over two-thirds had no specific actions to recruit and retain excluded individuals, such as those from BME groups. With regard to SET industries, Connor *et al* observed:

'organisations with more minimal approaches to ethnic diversity included most of the recruiters of technical graduates that we interviewed. Here, ethnic diversity often had a lower priority because their main interest was tackling specific skill shortages. In several, there was also a more pressing need to increase the proportion of female graduates (which was very low) than ethnic minorities.' (p.108)

Although the Connors report made a number of recommendations, a report for the National Black & Minority Ethnic Education Strategy Group (Tolley and Rundle, 2006) concluded that ***‘nothing of note has happened’*** to take the recommendations forward. Against this background this paper will report the findings of a research project looking at issues surrounding the participation of minority ethnic students and graduates in SET occupations in the Northwest and will make recommendations aimed at increasing the numbers that stay.

Methodology

Survey questionnaires were distributed amongst 1100 undergraduates in the Schools of Computing, Science & Engineering and Environmental & Life Sciences at the University of Salford and sent to 842 graduates who had graduated from the same schools (and their predecessors) between July 2000 and July 2006. Questionnaires were also sent to 2,400 SET employers in the Northwest. Responses were received from 102 undergraduates (68 White and 34 BME), 66 graduates (35 White and 31 BME) and 45 employers. Face-to-face interviews were conducted with 7 undergraduates, 11 graduates and 7 employers. The survey was carried out during the autumn of 2006 and the spring of 2007.

Results

Undergraduates

Undergraduates on SET degrees are the pool from which future SET professionals will be drawn. We were interested to find out why our undergraduates had chosen to do a SET degree and what their future career aspirations were: career/degree choice can be influenced by many factors. From Table 1 it can be seen that for the majority of both BME and White students the degree programme that they are doing is their own choice because of their own interests.

Table 1: Factors Influencing Career Choice/Degree Programme

	White		BME		All	
	Freq.	%	Freq.	%	Freq.	%
Own decision	37	56.9	16	48.5	53	54.1
Family	7	10.8	7	21.2	14	14.2
Teachers	8	12.3	1	3.0	9	9.2
Courses in SET	5	7.7	3	9.1	8	8.2
Previous training	2	3.1	2	6.1	4	4.1

Other	3	4.6	2	6.1	5	5.1
Friends	2	3.1	1	3.0	3	3.1
Role models	-	-	1	3.0	1	1.0
Career advisers	1	1.5	-	-	1	1.0
Total	65	100.0	33	100.0	98	100.0

Example student comments were:

“The way technology keeps on changing and coming and (I) wish to be a part of it.” (BME undergraduate)

“Background and subject that I am interested in.” (White undergraduate)

Although family influence is considered to be greater for students from BME communities (Connor *et al*, 2004) in our sample this is seen as the second most prevalent reason for choicer of degree for BME students, while for White students teachers are the next biggest influence.

“My grand father taught me a lot when I was little” (BME undergraduate)

“Science and physics teacher.” (White undergraduate)

We then asked the students if they wanted to pursue a career in SET. Encouragingly, from Figure 1 it can be seen that overall nearly 70% of the respondents indicated that they want to pursue a career in SET with the BME students in our sample being somewhat more enthusiastic (76.4%) than their White counterparts (64.7%).

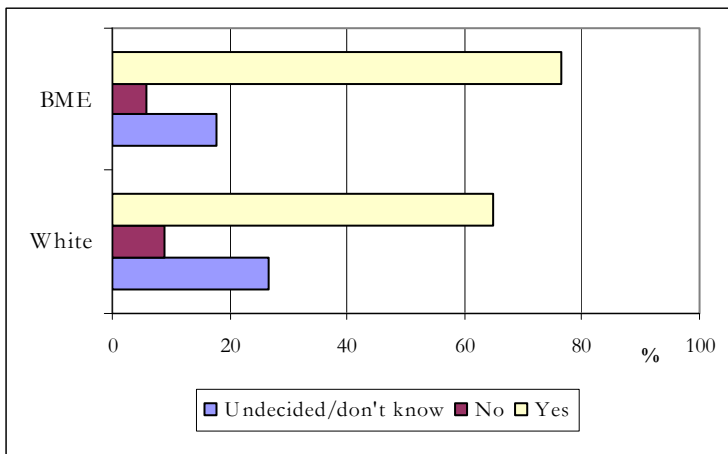
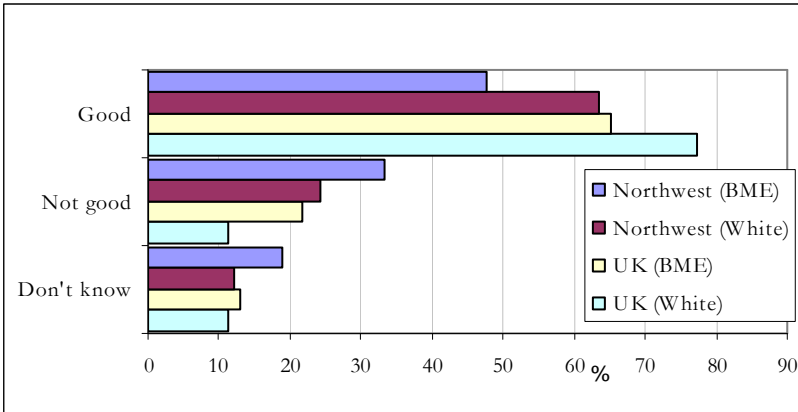


Figure 1: Response to the question “Do you want to pursue a career in SET”

When asked why they wanted to be a SET professional the primary reason for both BME and White students was because they were interested in SET, although once again the proportion was higher for BME



students (80.0%) than White students (72.7%). Reputation and recognition was next most important for BME students (12.0%) whereas for White students it was career prospects and pay (13.6%).

Finally, we asked students for their views on career prospects in SET in both the UK and the Northwest. From Figure 2 it can be seen that even though BME students are as least as enthusiastic about pursuing a career in SET as White students they are more pessimistic about their chances of doing so in the UK generally and the Northwest in particular.

Figure 2: Undergraduates' views about future career prospects in SET in the UK and in the Northwest

When asked to justify their response it was quite noticeable that although some students seemed quite well informed about employment in the region

"Well in the UK there's a company called Airbus ... there's other engineering companies, like Marshall Aerospace, there's quite a few companies that just do small parts for the aircraft industry and other industries so I mean this is where I would be interested." (BME undergraduate)

"With the BBC rumoured to move to Manchester things are looking bright." (White undergraduate)

many were quite vague about the opportunities

“Equally promising, the Northwest is developing and construction of new facilities and infrastructure will contribute a great deal in that” (White undergraduate)

“I have a positive mind in the sense that I think there will be a demand, a demand for scientists or IT specialists, all that. Mainly because of the way the world of technology is evolving.” (BME undergraduate)

We also asked students what they considered would be the challenges and potential barriers for them in pursuing a career in SET. The forty seven responses are summarised in Figure 3.

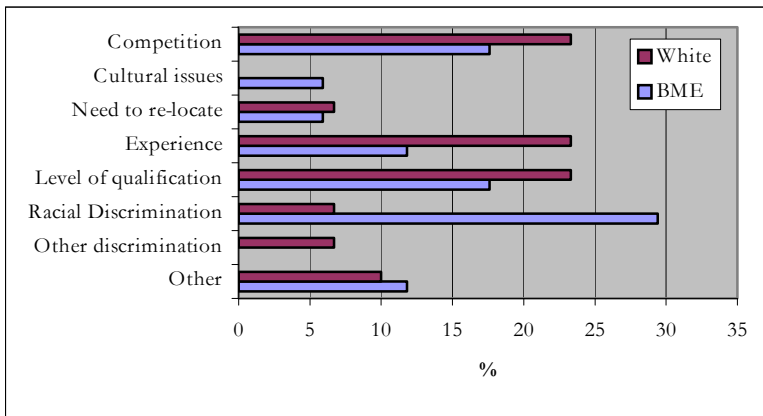


Figure 3: Undergraduates’ perceptions of challenges and barriers to pursuing a career in SET

From this it can be seen that racial discrimination is perceived as the biggest barrier for BME students,

“Being of black origin and female, I feel that I am not and would not be in the near future be taken seriously.” (BME undergraduate)

“Inequality: by this I mean, if I am treated unfairly and as a result I am not able to get a job I am well suited and qualified for.” (BME undergraduate)

“Competitive industry and I’m an ethnic minority.” (BME undergraduate)

whereas White students are most concerned about the level of qualification they will hold and the experience they will need to offer or obtain and the competitiveness of the marketplace (which are the three next most pressing concerns for BME students also).

“I would be at a lower level of understanding compared to colleagues.” (White undergraduate)

“Hard to get your foot in the door so to speak.” (White undergraduate)

A concern amongst BME students about discrimination was also apparent in response to the direct question ‘Do you think that your ethnic origin can affect your career?’ Whereas similar proportions of White and BME students said ‘Yes’ (25.0% vs 29.4%), 55.9% of White students said ‘No’ compared to 60.0% of BME students said that they ‘Didn’t know’.

Graduates

As with the undergraduates we were interested in what had influenced our graduates to pursue a career in SET. Table 2 summarises the graduates’ reasons for choosing their degree programme.

Table 2: Factors Influencing Career Choice/ Degree Programme

	White		BME		All	
	Freq.	%	Freq.	%	Freq.	%
Own interest in SET subjects or career	16	50.0	9	34.6	25	43.1
Parents and/or family members	3	9.4	7	26.9	10	17.2
Contents of the degree programme / previous training, education or job	4	12.5	3	11.5	7	12.1
Teachers / Tutors	4	12.5	2	7.7	6	10.3
Friends / peers	2	6.3	3	11.5	5	8.6
Other	3	9.4	2	7.7	5	8.6

The results are similar to those for the undergraduates in that the most common reason for both BME and White graduates is personal choice, followed by parents/family members for BME graduates and Teachers/Tutors (along with degree programme content) for White graduates. Comments about their influences included:

“Personal interest, (my) chosen career path.” (White graduate)

“I have always been interested in electronics, and wanted to find out how everyday electronic equipment (was) designed.” (BME graduate)

Less than half SET graduates go into SET careers (Marriott, 2006) so we were interested to see if BME graduates had made different employment choices to White graduates. Figure 4 shows the responses of the 46 graduates who were employed at the time of the survey to a question asking them about the relationship between their degree programme and their current employment.

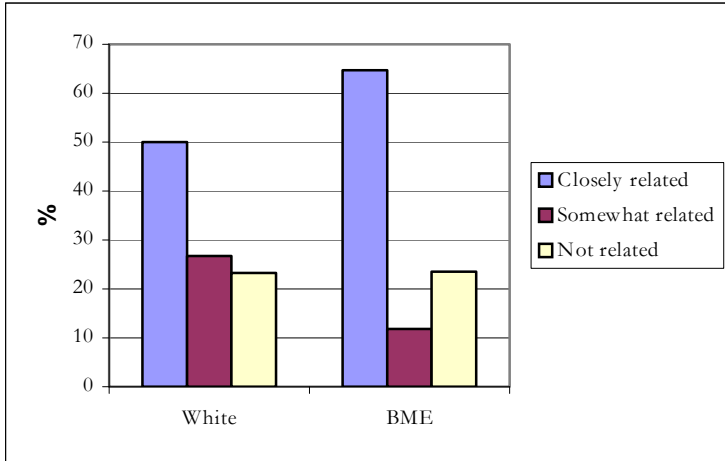


Figure 4: Relationship between degree programme and current employment

From Figure 4 it can be seen that a higher proportion of BME graduates (64.7%) were working on jobs closely related to their first degree compared to White graduates (50.0%) with a greater share of White respondents saying that their jobs were ‘Somewhat related’ to their first degree than BME graduates. Those whose jobs were outside of their first degrees constituted equal proportions across both groups with 23.3% Whites and 23.5% BMEs.

The survey asked respondents to indicate what was important to them when selecting a job and the results are presented in Table 3. Both White and BME respondents rated ‘Job itself’ as the highest priority (83.3% and 88.2% respectively).

	White		BME		All	
	Freq.	%	Freq.	%	Freq.	%
Job itself	25	83.3	15	88.2	40	85.1

Job content/type of duties/work assigned	18	60.0	8	47.1	26	55.3
Relevant to degree	14	46.7	11	64.1	25	53.2
Career prospects	15	50.0	8	47.1	23	48.9
Attractive salary	11	36.7	6	35.3	17	36.2
Attractive benefits	10	33.3	7	41.2	17	36.2
Easy to get to work	4	13.3	5	29.4	9	19.1
The hours working	6	20.0	3	17.6	9	19.1
Flexible working	6	20.0	2	11.8	8	17.0
Crèche facilities	2	6.7	0	0	2	4.3
Part-time working	1	3.3	0	0	1	2.1
Other	6	20.0	2	11.8	8	17.0

For BME respondents, relevance to degree was the next most important factor, whereas for White respondents ‘Job content, type of duties and work assigned’ came second.

The respondents considered career prospects associated with jobs (50.0% Whites and 47.1% BME) equally important at third in the list. Interestingly, for both groups salary and benefits came in relatively low at fourth and fifth places.

Therefore as with the undergraduates we see that both BME and White graduates have broadly similar choices and aspirations with regard to SET employment and careers. However, when we asked our graduates how easy it had been to find a job some significant differences between the groups emerged. In order to assess the success of job-seeking in our sample we asked all the graduates how long they had been unemployed after graduation. The analysis of the responses to this question is shown in Figure 5.

From this figure it can be seen that a higher proportion of White graduates (74.3%) found jobs in the first six months compared to their BME counterparts (51.6%).

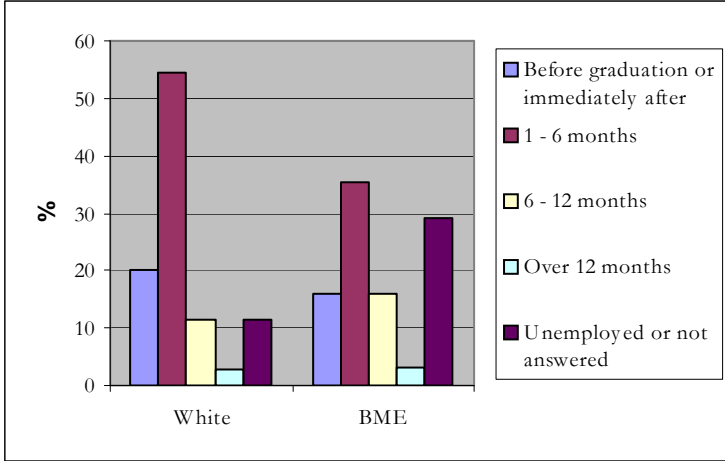


Figure 5: Time between graduation and employment

We also asked the graduates to state the number of applications made and number of job offers received.

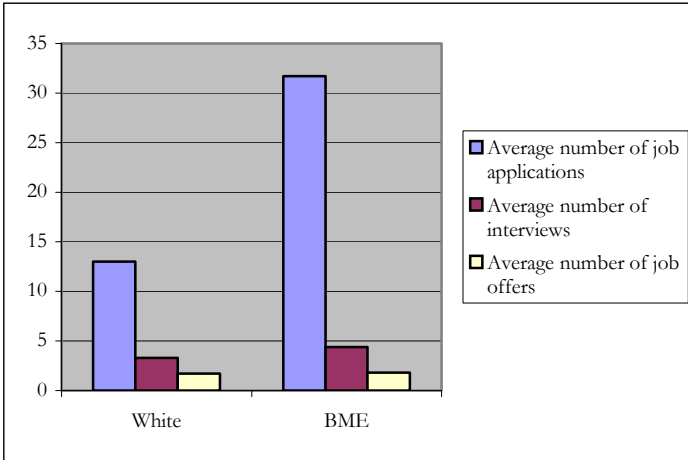


Figure 6: Job applications, interviews and offers

From Figure 6 it can be seen that the number of job applications submitted averaged twice as much for BME respondents as for White respondents although the average number of interviews for White graduates averaged slightly lower than for BME respondents (3.3 and 4.4 respectively). However the ratio between number of job applications

and job offers is much higher for BME graduates (17.6 to 1) compared to White graduates (7.6 to 1).

The employed graduates were also asked to provide general information about their employer such as legal status, type, sector and size. Table 4 presents the analysis of their responses.

	White		BME		All	
	Freq.	%	Freq.	%	Freq.	%
Legal status						
Government/public sector	16	53.3	6	37.5	22	47.8
PLC/Limited Company	4	13.3	3	18.8	7	15.2
Sole proprietor/Partnership	4	13.3	1	6.3	5	10.9
Higher Education/Further Ed.	1	3.3	3	18.8	4	8.7
Blue-chip/Multinational/Offshore	1	3.3	0	0	1	2.2
Size						
Micro (0-9 employees)	1	3.3	1	6.3	2	4.3
Small (10-49 employees)	4	13.3	0	0	4	8.7
Medium (50-249 employees)	4	13.3	1	6.3	5	10.9
Large (Above 250 employees)	20	66.7	13	81.3	33	71.7

It can be seen that similar trends are observed with White and BME respondents with the majority working in Government/public sector/HE/FE organisations. However, more BME graduates (81.3%) are working in large organisations than White graduates (66.7%).

When we analysed the responses to the question about the spatial patterns of employment of our graduates, Figure 7, we again saw a difference between BME and White graduates.

Although proportions were similar for both groups regarding initial employment in the region we can see that there is a trend for a greater proportion of BME graduates to leave the region in search of employment when compared to White graduates. Although for different cohorts, this trend mirrors the stated intentions of our undergraduates with regard to their future employment location.

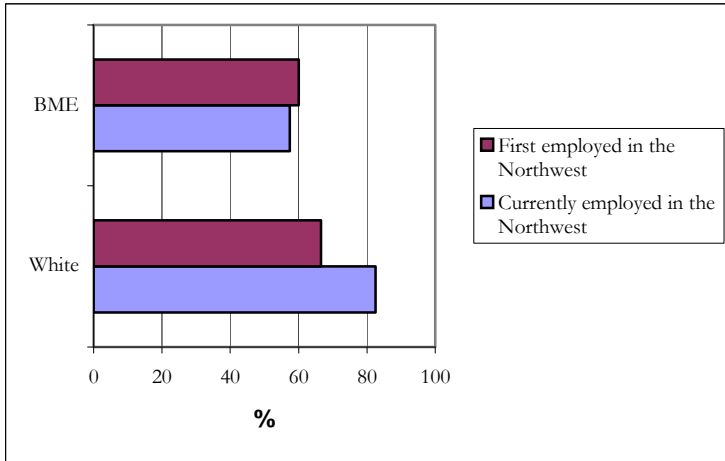


Figure 7: Employment location of graduates

As with the undergraduates we wanted to explore issues relating to equality and diversity practices in the workplace. In contrast to the undergraduates, where we asked if they *thought that* their ethnicity could affect their career, with the graduates we asked them if they *had* experienced discrimination. With regard to employed graduates, about 87% of the respondents said that they have never been unfairly treated at their workplace because of their nationality, ethnicity or religious beliefs. However, 7.2% (5) of BME and 5.9% (2) of White graduates had experienced some form of unfair treatment and thought these incidents were racially or religious belief based.

The small proportion of respondents who reported being less favoured at work based on race and religious grounds held a common view that racial prejudice and discrimination do exist but in a very isolated manner. One BME graduate said:

“Working for ... in third year out I was made to be scapegoat. People at ... did not treat me fair and square unlike other colleagues at work who came same time as me, which led me to further problems down the line in my career.”

Some did something about it

“I am now.... BME rep & am the lead for a pilot project to tackle racism at (the) workplace”

Most did not

“Nothing, ignored.”

So from our undergraduates and graduates the picture that emerges is that BME undergraduates are at least as keen as White undergraduates about following a career in SET, and that more of our BME graduates than White graduates have done just that. However, BME undergraduates have a more pessimistic view of their prospects in SET, particularly in the Northwest and are more likely to move out of the region to seek employment. This picture is supported by the responses of our graduates in that they had to work much harder to find jobs and have tended to find work more out of the Northwest than their White counterparts. Amongst undergraduates, although experience of discrimination is relatively low, fears of it and the effect it may have on career aspirations appear to be widespread. Conversely, few graduates report it actually happening. However the majority of our graduates are employed in large organisations, for reasons that may be explained in the next section. It therefore appears that career choices of our undergraduates and graduates, particularly BMEs, are heavily influenced by their expectations of how their ethnicity will be received in the workplace.

Employers

From the point of view of employers, employing the best candidate for the job is crucial. Equally, once an interviewee becomes an employee, so is retaining that person. In both interviews and questionnaires employers generally stressed that what mattered most was an individual's ability to do the job:

“Defining reasons for recruitment are qualifications plus skills. Ethnicity is irrelevant. Where helpful, we have provided language coaching.”

“We ask for candidates with the appropriate qualifications/experience for the job.”

“We recruit irrespective of ethnic origin.”

However, when asked about the employment of BME candidates a general feeling amongst employers was that recruitment was difficult because they did not apply. For example, two employers commented:

“We really struggle. you don't get the percentage of ethnic minorities that you would expect. Out of say 200 people come to an event, you may get five, six ethnic minority people come in. At the bigger recruitment events, we get a high proportion of foreign students coming looking for generally undergraduate work,

some graduate scheme things but in general it's a very low percentage that actually come to the events." (Large SET Employer)

"Very few. Quite why I am not sure but in the last three rounds of recruitment, we've only had one person who is from an ethnic background apply." (Small SET Employer)

This issue was noted even by employers who were themselves located close to areas in which there were large minority ethnic populations.

"Very low. It's been a bit of a disappointment if anything considering we live near to ..., where there is quite a large number of ethnic minority people, and ... and ... because people travel from all about and it's very rare, particularly on the apprenticeship side of things. I think on the technical side, we occasionally get somebody who may apply who will be qualified to degree standard or something like that." (Large SET employer)

Figure 8 shows a comparison between employers' recruitment practices and graduates' job-seeking approaches. From this it can be seen that while informal methods (eg word of mouth) are one of the most common approaches for employers it was rarely used by the graduates. Such methods place great emphasis on networking, something which is known to disadvantage minority groups (Gray *et al*, 2007) and supports recent research which has suggested that employers need to review the ways in which they recruit to maximise recruitment of BME students (Speed, 2007)

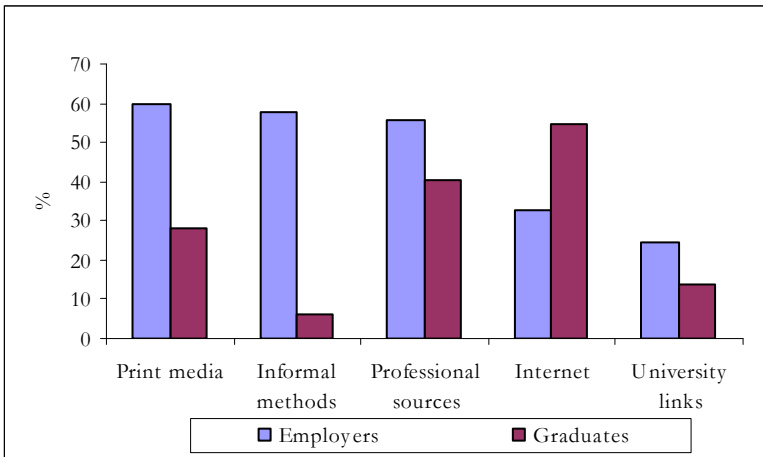


Figure 8: Comparison of recruitment and job-seeking methods

Although some organisations are concerned about the proportion of ethnic minorities amongst their staff, 68.9% of those who completed the questionnaire reported that they did not use (or did not know if they used) the 2001 Census classification for their employees. Even of those that did use such categories all were not able to provide a breakdown of staff in different occupational groups. This suggests that although monitoring may be done on recruitment it is not continued during employment.

Figures 9a and 9b show the analysis of responses to questions related to the use of equality and diversity policies and procedures. It can be seen that their use is varied across with regard to size and sector. This is particularly true in the case of policies to recruit and support BMEs, and mandatory diversity training, where some organisations or sectors have no such policies or procedures. Closer examination of Figures 9a and 9b show some interesting results in the context of the choices of our graduates, most notably that it is the large organisations that tend to have the policies and procedures rather than the small ones.

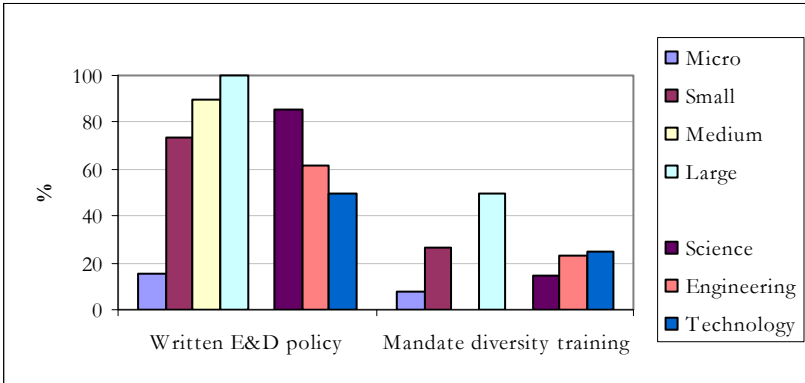


Figure 9a: Use of E&D policies and diversity training by size and sector

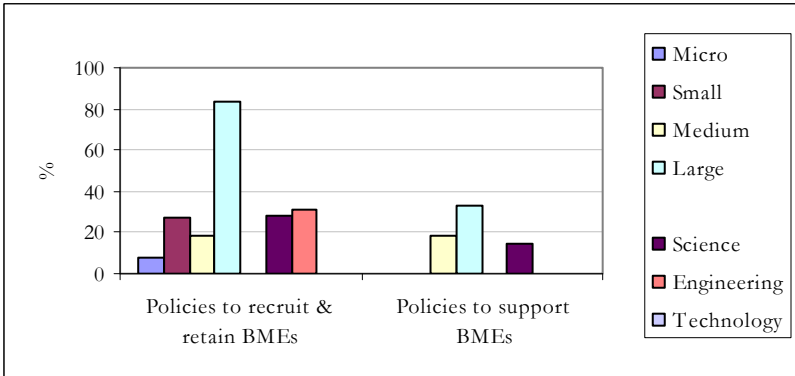


Figure 9b: Use of policies to recruit and support BMEs by size and sector

During face-to-face interviews all the organisations we spoke to stressed their policies with regard equality, diversity and recruitment, for example:

“We have very strict rules on recruitment and we will not ever discriminate on the basis of race, religion, colour, creed. We will talk to anybody, we will take CVs off anybody, we’ll consider everybody.” (Large SET Employer)

“Colour doesn’t come into it, race doesn’t come in.” (Micro SET Employer)

And one employer also illustrated the importance with which diversity training is viewed within the organisation:

“Well we’ve got things like the mouse-mat’s got core values on it. Then we’ve got posters on the walls, itemising what the company’s philosophy is.”

We've got booklets on everybody's desk explaining what the equality and diversity policy is. It goes out with every recruitment folder. So the potential recruits are aware of what the policy is and say every six weeks, every two months, there will be a refresher on what it's about and how the company plays it out and what they look for in the staff when they're dealing with various members of the public and members of staff. Anybody who's recruited has to go through an induction course. And that's generally introduced by the Chief Exec, because it is so high priority." (Medium SET Employer)

We also found that large organisations tended to have more defined career development opportunities, such as Human Resource Development policies and dedicated training budgets for their employees, Figure 10.

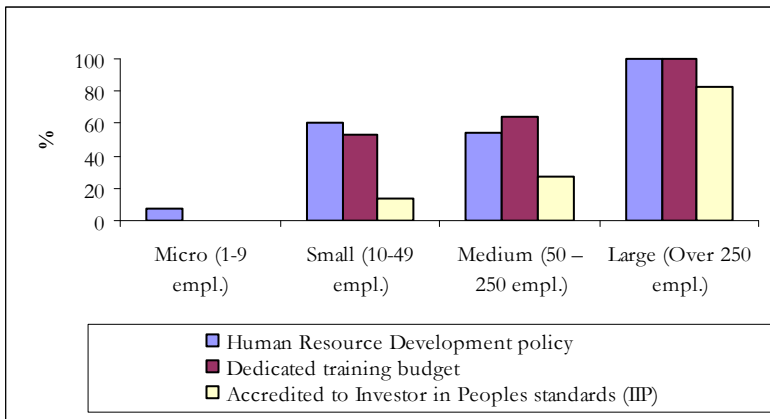


Figure 10: Career development policies of organisations by size

Conclusions and Recommendations

An encouraging finding from our results is that the students and graduates in our sample, having made their own choices of degree, are generally keen pursue a career in SET, particularly those from a BME background. However, rather less encouraging from the Northwest perspective is the greater tendency for BME students and graduates to move, or consider moving, out of the region to find employment. This appears to be reflected in the fact that the Northwest employers we surveyed and talked to reported relatively few applications from BME graduates. Based on our findings we would propose two major reasons for this. Firstly, students generally appear to be poorly informed about

the opportunities that the region presents in terms of employment and consequently may not be paying it due attention when job-searching. The prevalence of the use of informal methods of recruitment does not help this situation. Secondly, we believe that for BME graduates a fear of discrimination (real or perceived) encourages them to look for employment within large organisations that have well-developed equality and diversity policies and practices. Since such organisations also tend to have structured training and development packages, they may be felt to provide more security in terms of career advancement: if you have to work much harder than your White colleagues to get a job then it would seem to make sense to choose one that is likely to be worthwhile for you for some period of time. A difficulty with this approach from a regional perspective is that the Northwest has relatively few large organisations, with the majority falling into the SME category. However, our research also shows that the smaller organisations in our sample, particularly the small companies, also take equality and diversity and training seriously. Therefore it is not only the large companies that offer good employment prospects. Further, all of the organisations we spoke to, of all sizes, expressed their commitment to equality in employment. Our recommendations from the work reported in this paper are therefore:

- There needs to be a much greater promotion of the job opportunities that exist for SET graduates across all sizes of employers within the Northwest region. Without such promotion graduates of all ethnic origins are more likely to look elsewhere in their job-seeking and the potential represented by all SET graduates, but particularly those from BME communities, will not be realised.
- Employers need to be more pro-active in developing and *promoting* good practice with regard to equality and diversity and career development policies and practices. This should include collection of ethnicity data in a form that is consistent with current census categories and tracking application, interview and job offer statistics, and progression within an organisation, as has been recommended for a number of years by the Commission for Racial Equality. The evidence from the graduates in our survey is that, on the whole, the discrimination feared by undergraduates is not experienced by graduates. Only by carrying out such monitoring will it be possible to demonstrate

that this is the case. However, a stark exception to this general finding was the much greater lengths that our BME graduates had to go to in order to secure a job: proper detailed collection of ethnicity data is needed to determine what other explanations apart from ethnicity exist for this particular, and worrying, statistic.

- Employers need to review their recruitment practices to ensure that they are not discriminating against particular groups.

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