Model for engaging women within BME populations into HE engineering programmes in East Lancashire

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Abstract
The aim of this project was to encourage and support women from the BME population in East Lancashire to undertake higher education programmes in engineering disciplines and be aware of the career opportunities which may be open to them within this sector. In Lancashire there are currently skills gaps and shortages within the engineering profession, with many companies reporting hard-to-fill vacancies. Whilst there are many BME females undertaking education within the region there are very few who are studying engineering courses and going into engineering-related careers. The main achievements were the development of an Introduction to Engineering module targeted at this group, the development of a targeted marketing campaign and resources and the establishment of a mentoring system for this group of students with local engineering companies. We reviewed our learning environment/teaching practices and identified best practice and gender inclusion tools and provided training to our academic and admissions staff to ensure that they have an understanding of cultural awareness and the influences which are barriers to this group engaging in engineering subjects.

Keywords: outreach, widening participation, women in STEM, careers advice

Background
The Blackburn College approach to widening participation has developed as part of its historic commitment to providing education and training in the context of the local environment and culture. The college aims to recruit students from hard-to-reach groupings, particularly those already in work, and those seeking work in particular occupations where representation has been identified as an issue. Blackburn College has a reputation for working successfully with non-traditional students in terms of age, academic qualifications and family commitments, offering high quality personal support. The prime aim of the college is to provide a high quality educational experience for these students. The majority of the college’s higher education (HE) students are local, the first member of their family to engage in HE and mainly from socio-economic groups 4 and 5, including Asian Heritage females for whom the option of leaving home to study is very restricted.

Through national research (SEMTA) and its own experience, the college is acutely aware of the lack of females undertaking engineering subjects in the UK. Women in the UK currently represent 8.7% of the engineering workforce, and 76% of women educated to degree level in science, engineering and technology (SET) do not go into SET careers. This figure is much lower when considering females from BME backgrounds. Consequently, due to the low number of females applying for and studying engineering programmes within the college and our high BME population, this project was seen as a way of achieving our objective with respect to reaching under-represented students.
Rationale
Blackburn College is located in the Borough of Blackburn with Darwen, which has an estimated population of 141,000. A gender split of 49% male and 51% female is similar to the college’s overall gender profile. The borough is ranked 17th of 354 districts in England in terms of the percentage of people categorised as deprived (population estimates provided by IMD data). Blackburn with Darwen has a minority ethnic population which represents around 23% of the total population, most of whom live in the north and east of Blackburn. Of these, the majority are Muslim, either from Pakistan or India. With almost a quarter of the population being Muslim, this represents the third largest such proportion in Britain.

The aim of the project was to encourage and support women from the BME population in East Lancashire to undertake HE programmes in engineering disciplines and become aware of the career opportunities which may be open to them within this sector. It was hoped that the project would create a sustainable model for engaging with and enrolling these students. The project aimed to develop an innovative outreach programme as well as making long-term changes to the teaching practices and learning environment within the engineering department, both of which could currently be perceived as barriers to encouraging female students from the BME population.

The college wanted to undertake this project in order to give women from the BME population an equal opportunity to understand and take advantage of the many career opportunities available to them in engineering. Although we have two female engineering lecturers in the department, we constantly face the problem that when a female applies for an engineering course she is put off by the lack of other women. This is especially the case for females from BME backgrounds.

Therefore, we felt that the outcomes of this project would give these individuals the opportunity to study their preferred subject and raise their aspirations.

Within the region, due to what is referred to as the “Silver Tsunami” (large numbers of the workforce due to retire within the next twenty years), many of our local engineering companies are experiencing skills gaps and finding recruitment difficult. We firmly believed that if we could encourage females from BME backgrounds into engineering they could provide the workforce required to meet these skills gaps as well as improving their own career prospects. The scope of our project provided transferability and sustainability and as a result we have changed our teaching and admissions practices within the college.

The approach
Our initial approach was to look at the student journey from the initial engagement with or approach to the college through to the enrolled student, the type of support they would obtain, placement opportunities and the curriculum. Having looked at these various stages and processes, we were able to identify aspects we could influence and change that would make a difference to the support and engagement of this group.

Admissions and recruitment
The first area we considered was the admissions and recruitment process and we found that, in some cases, when a BME female approached the college there was an assumption that the type of programme they would be interested in was either childcare or a business-related subject; consequently engineering options were not always discussed. Having spoken to some of the admissions staff and staff within the department we began to discuss why this group didn’t consider engineering and how we could potentially help to overcome this. It was agreed that the admissions team, school liaison team, marketing team and department staff would benefit from some training in diversity issues relating to STEM subjects. Consequently, the college booked 19 staff onto a one-day workshop for gender and equality training, delivered through the UKRC. The aims of the course were to:

- Raise awareness of gender-based attitudes and knowledge amongst staff
- Raise awareness of the benefits of, and the business case for, a positive approach to gender equality in SET
- Improve recruitment, progression and retention of women in STEM
- Raise awareness of the factors influencing access to HE in SET subject areas
Identify actions that SET employees in higher education institutions (HEIs) can take to apply learning from the training

- Produce more inclusive publicity and marketing materials
- Develop the academic research base by ensuring that female talent is not lost
- Improve teaching and learning and ensure inclusivity.

The workshop was excellent. The staff who attended learned a lot and all of them made an action plan at the end of the workshop outlining how they were going to change their working practices going forward. The main benefits of the workshop for the college and the support and engagement of this group have been:

- The workshop helped to inform the development of new marketing materials aimed at this group (in the workshop we were shown some examples)
- Admissions staff are now more confident in suggesting engineering programmes to BME females and have been able to overcome concerns which they may have had
- The teaching staff have become more aware of the cultural issues surrounding this group and how they can change their teaching practices and environment – as a result of this workshop a mentoring system was established where all females on the programmes are now “buddied” with a student in the year above
- The schools liaison team and careers guidance team are actively talking to BME females about career opportunities in engineering
- The workshop helped to overcome misconceptions that engineering is a male-only career and facilitated understanding of the huge number of career opportunities available in engineering which staff can now discuss with BME females.

**Development of a bespoke marketing campaign and literature aimed specifically at this group**

As part of the project, we decided to develop and undertake a marketing strategy aimed specifically at this group, including bespoke publicity materials aimed at the learner and the parents of the learners, highlighting not only the learning opportunities, but also career options, including case studies from the local area.

We felt that our marketing literature was a barrier to attracting this group, and indeed all females, into our engineering programmes, as it was predominantly aimed at male students and showed quite traditional roles within engineering and manufacturing. The first aspect of this part of the project was to undertake a review of all of our current and previous marketing literature for our engineering courses, including brochures, the college website and the prospectus. We then considered what we had learned from the gender and diversity workshop about marketing to this group and looked for examples of best practice from around the UK. We also found some good examples from America. We used all of this information to develop various poster campaigns targeting this group and a leaflet (which is included as an attachment to this report). The leaflet extols the virtues of engineering as a good career, highlights the diversity of roles within the engineering sector, includes case studies and salary comparisons and introduces the reader to two female members of our lecturing staff. These leaflets are currently being used by our schools liaison teams who take them into local schools and colleges and hand them out at college open days, employer recruitment days and events where industry are recruiting (for example, the BAE Systems recruitment fairs across the county). We are currently looking for other distribution outlets for them, such as local community events and events run by the STEM Ambassador programme.

The leaflets and posters have been met with very positive reactions from potential students, careers information advice and guidance professionals and parents of potential students.

As a result of this project, the college now has a suite of marketing materials which it can use and develop on an ongoing basis to engage with females, BME or otherwise, to encourage them to choose engineering careers.

**Undertake a review of our own learning and teaching environment**

Three of the lecturers from the School of Science and Technology undertook a review of the existing curriculum and identified barriers to engaging with this group. They concluded that:
1) The projects are not particularly varied and of interest to female students (for example, they all focus on rockets and cars)

2) Many females who are currently undertaking engineering subjects are specialising in either energy or environmental technologies – these are both areas where the University Centre’s current engineering curriculum is lacking.

We have come up with a number of other projects which will be offered as options with effect from September 2012, including designing new energy systems for buildings and carbon accounting and improvements.

The department is currently undertaking a re-write of its entire curriculum to take into account the potential students from both female and female BME backgrounds and a new foundation degree in Energy Management Systems has been developed which we feel will be of interest to this group.

Having undertaken this project, the college now feels that it has a better programme to offer which will be more engaging for this group of students.

Development of an Introduction to Engineering module

We believed that to stimulate interest and confidence from this group it would be beneficial to develop a 10-credit module as a “taster”. The module specification is:

- **The scope of engineering**: introduction to the various facets of engineering (e.g. aerospace, mechanical, chemical, computer science, electrical and electronic, civil, etc.)
- **New topics impacting on engineering**: low carbon, environmental issues and computerisation
- **Career opportunities within engineering**: locally and nationally
- **Professional ethics and social responsibility**
- **Engineering design and projects**
- **Design problems and alternative designs**
- **Feasibility development and optimisation**
- **Design competition**
- **Guest lecturer from industry**: discussing what it is like to be a female engineer (a female from a BME background).

Our previous adviser, Jenny Young, suggested that we also include something on how buildings operate, which we have now included. The module has been written by a combination of lecturing staff, with some help from the Lancashire Lifelong Learning Network regarding future job opportunities and local labour market intelligence and skills shortages. The module has only recently been completed and will be advertised to students commencing September 2012.

Mentoring/placement companies for female BME students

One of the key issues for these students is work experience and finding the right environment in which they feel safe and secure to undertake a work placement. A number of local companies were identified, some of which the college already has work-based learning links with and some newly-targeted companies. We have also secured the support of BAE Systems for this initiative. A briefing letter was sent to 20 target companies to solicit commitment and advise them what this might be. These letters were followed up by a visit to each company that responded (13 in total) to assess their suitability and working environment. As a result of these visits we now have nine companies who are suitable and willing to offer placements and become mentors for female BME students. Some of these companies are large (for example, BAE Systems), although many are local small-to-medium-sized-enterprises (SMEs) (for example, NIS and Tensar). In order to assist these mentor companies prior to allocating them a student, we intend to roll out to them the gender and equality training which we undertook.
Assessment

In terms of engagement of learners, the college has seen a small increase in interest in engineering courses from females from BME backgrounds which we believe has been as a direct result of our specifically targeted marketing campaign. To date, we haven’t actually enrolled any students, although this is mainly due to the fact that the project’s marketing campaign was executed in December and January. Hopefully we will be able to enrol learners to start in September 2012 and, with the further development of these initiatives, we feel confident that the project will make a significant impact on learner numbers from this group for September 2013.

Evaluation

When this project began we set out the following evaluation criteria:

1) Number of companies recruited
2) Sustainable changes in teaching practices within the department
3) The development and take-up of the 10-credit introductory module
4) Changes in the recruitment practices of the University Centre for engineering subjects.

Considering these criteria in terms of what the project has achieved, we have recruited at least nine companies who are willing to mentor and offer culturally acceptable and appropriate placements to this group of students. We feel that, by reviewing our teaching and learning practices in relation to this group of learners, we have made positive changes to our teaching practices, particularly in relation to new curriculum offerings aimed at this group and the development of new projects. The taster/introduction module has been developed; however, due to the fact that we haven’t yet begun to actively market it we will be unable to evaluate the take-up for a further six months. One of the most significant changes has been the changing of attitudes and understanding of the admissions team, school liaison and lecturing staff as they have become aware of the cultural difficulties and how to overcome and discuss these with potential students.

Discussion, summary

Key outcomes:

- Mindset change of college staff in discussing and engaging this learning group in engineering careers and education
- Development of bespoke marketing literature
- Development of a taster module
- Recruitment of mentor companies
- Training of staff in gender and diversity issues relating to the engineering curriculum
- Review of the teaching and learning environment and the embedding of new practices, projects and curricula aimed at this group of learners
- The college feels confident that once it attracts more learners from this group it will be able to retain and support them better, having gained a greater understanding and changed its practices.

We feel that our approach to this project was successful because we had five stand-alone objectives, all of which contributed to the overall success, but could be worked upon independently. In terms of what we would have done differently at the beginning of the project, we committed to undertaking events targeted specifically at this group of learners and spent a lot of time trying to establish links within the community to support these bespoke events. However, it became increasing clear that, rather than organising bespoke events, we should have instead been partnering with other events. At the seminar in Bradford, the project lead discussed with the project mentors that this objective was one which the HE STEM Programme was not funding under the terms of the project. We have spoken with many of the leaders in the local community and tried to organise a bespoke event aimed at the BME female population; however, this has proved quite difficult. Consequently, with the agreement of both project mentors, we decided it would be more cost effective and beneficial if we could utilise other events, for example ladies’ groups facilitated by Asian Image, college open days and enterprise days. This was a much better way to reach our
target audience and the project lead realised that we had wasted time at the beginning of the project

**Further development**

Through this project, the college has built a sustainable model to engage and support BME females in engineering subjects. The college will continue its recruitment work and will extend this to encompass all females within the local community. We are currently engaging with the MentorSET initiatives to see how we can become part of this and how it complements the output from this project. All of the activities and outputs from this project have been embedded into the college’s normal practices and will therefore be sustained for many years.

**References**


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