ACCREDITING TEACHING AND LEARNING: THE UK CASE FOR INCLUSION IN ENGINEERING AND COMPUTING

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Background - the context

There have been immense changes in the UK higher education sector over the last 10 years. 1992 saw the end of the 'binary divide' between the vocationally oriented Polytechnics and the existing Universities. The former now labelled 'New' Universities and the latter the 'Old' Universities; both now have independent degree-giving authority. Prior to this, and still continuing, has been the emphasis on expanding higher education by widening access. University students had been a relatively privileged elite where only around 12% of the population given the opportunity to attend. All fees were paid for undergraduates and mandatory means-tested grants were awarded for living expenses, books etc. during term time. Major changes relevant to this paper include:

- The Conservative Government under Margaret Thatcher began the non index linking of grants and this continued under John Major. The New Labour Government under Tony Blair introduced a £1000 per year means-tested fee and from 1999, grants are being abolished and replaced entirely by student loans.

- The Conservative Government appointed a Committee on Women in Science, Engineering and Technology which produced recommendations that greater efforts should be made to recruit more women to SET, both to redress the skills shortages and to improve career opportunities for Women in SET (8)

- The Dearing Report (5) had a wide significance for the HE sector. Two recommendations are particularly pertinent here: firstly, the recognition of the dual importance of teaching and research and following on from this the establishment of an accrediting body for all academic teachers in Higher Education (The Teaching and Learning Institute): secondly, widening access to under-represented (and socially excluded) groups.

- The Winning Women to Science, Engineering & Technology (1998). A project funded by the Scottish Higher Education Funding Council (SHEFCE) which produced 3 booklets on access for women to Science, Education and Technology or SET (6), participation of women in SET at Universities (2) and thirdly, progression of women in SET within academia (7).

- Opportunity 2000, endorsed by the Conservative Government and continued under New Labour which stresses the business case of encouraging women into SET. It provides an 'equal opportunities' audit and assists organisations in setting and meeting targets and organises networking meetings. It was initially aimed at industry but now also includes a number of Universities.

The Centre for Women in Technology, Design and Manufacture, aims to encourage girls and women to positively consider a career in technology; to enable them to gain access to technical courses at higher education level and to ensure that the learning environment is appropriate for their needs. We believe that the process of technological development will benefit from the wider visions and perspectives of those who are at present excluded. It is the only such Centre in the UK.

It was in these contexts that we took part in a European Project CuWaT, Curriculum-Women-Technology, the product of which are the 2 booklets (3,4) which are also available in downloadable Word format on the Web (see 3). February 1999 saw the launch of the Athena Project The Athena Project (1999) funded by the funding body for higher education in England (HEFCE) and supported by the other UK HE funding councils the Dti (Department of Trade & Industry) and the CVCP (Committee of Vice-Chancellors & Principals). This aims to encourage strategies, promote good practice and offer incentives to improve the access, participation and promotion of women in SET in Higher Education in the UK. That is, it is akin to the Progression strand of the Winning Women Project.

The agreed language for the project was English and although participants whose first language was not English made remarkable contributions, a major difficulty of such European projects is producing an accessible & easily readable outcome. As the person who had to put the booklets together in readable English (the agreed language of the Project) it was a task of gargantuan proportion to render English, provided by people with Dutch, Norwegian, Swedish, Danish, German and Greek as their first language, into agreed nuances of English as it is understood in the UK.

The aim of booklet is to provide a framework for the development of holistic and inclusive technology, engineering & computing (TEC) curricula. It is not intended to be a definitive curriculum but one which provides a framework and pointers that enable teams to work through the process of , for example, particular course development.

Tasks were divided up between the partners but the booklet itself was written by Denmark, UK, Holland, Germany & Norway (the co-ordinator of the whole project). Examples were provided by other partners. Lynette Willoughby from Leeds Metropolitan University & myself felt that staff development was crucial and that is what we worked on in the UK.

Process of development
We organised 2 seminars, one held in Preston (Northern England) where the University of Central Lancashire is situated, and one in London. The project paid all expenses except travel of the 30 people who attended & both were 2 day intensive events. Unfortunately no one was able to attend from Northern Ireland, however, Scotland was well represented.

We used a variety of methods to elicit the issues surrounding staff development. For example,

we had a negative brainstorming - what we did not want in our courses; futures scenarios - descriptions of what we believed would be possible in 2001; 2005; 2009. We also asked people to bring examples of what we call 'relevant practice'. So often we hear that a project is 'good practice' but what do we mean by 'good?'. From these seminars Lynette & I drew together the chapter on staff development in the booklet. Within this chapter we include an **example module** that can be used as part of the accreditation of lecturers in TEC disciplines. It is based on a particular model which is well known in the UK and is detailed below

Although at present those who teach at Universities do not have to go through any formal teacher training, there is evidence that the attitude towards this is changing. (5)

Teaching and learning for an inclusive TEC curriculum, example module.
This module has been developed in the context of the TEC curriculum in post-compulsory (16+ or 18+, post-school) education and training but it could be adapted for school level education, to science curricula and to address class, culture, disability, age and race issues as well as gender. The terminology used is that of the UK educational system and so definitions will differ from those in other partner countries. The term 'participants' is used here to specify the people studying this module. These will be staff in further/higher education and training but they will be students on this module.

Level: M - masters
Credit rating: 100 hours of study

Target Group: This module is appropriate for practitioners currently teaching in technology, engineering or computing at post-compulsory level, or with appropriate previous experience. To be able to complete the portfolio of work (see assessment section below) participants studying this module should be teaching at least 5 hours/week in this environment and will need the commitment of their institution to provide opportunities for such experience.

Rationale:
This module addresses the under-representation of women in TEC and the need to recognise the diversity of students and encourage them to recognise and acknowledge their own diversity. It is premised on the need to improve the student learning experience and provide a positive learning environment for all students. This module is informed by research on the under-representation of women in TEC and experience of initiatives aimed at encouraging women into TEC education and careers.

Aims:
- Enable participants to deliver TEC programmes of learning that recognise and respond to diverse, heterogeneous student groups.
- Enable participants to develop reflexive and reflective approaches to educational practice (reflecting on both their own and others' practice).
- Recognise the particular needs and situations of women as an under-represented group in TEC disciplines.

Objectives:
These learning outcomes are structured according to the SEDA (Staff and Education Development Association, UK) Underlying Principles and Values.

On completion of this module the member of staff should be able to demonstrate:

1. Understanding of how students learn -
- Awareness that students' personal histories differ, and the use of this in examples drawn from the lives and experiences of a broad range of non-traditional students.
- Use of a range of assessment methods which takes account of different learning styles, with the criteria made explicit in the marking schemes given to the students.
- Awareness that men and women often work differently when working in TEC.
- Use of different delivery styles appropriate to different material and different student groups.
- Awareness of different communication styles appropriate for different students and contexts.

2. Concern for students' development -
- Commitment to give feedback to students on assessments.
- Case studies of individual students, demonstrating counselling skills and awareness of women's situations and experiences.
- Awareness that traditional educational institutions are not neutrally gendered and how men and women view and deal with institutions differently.

3. Commitment to scholarship -
- Awareness of dominant and non-dominant views and of power positions.
- The ability to critique existing curricula and commitment to curriculum development from a gender-inclusive perspective.
- Awareness of gender as an issue and knowledge of the relevant literature.

4. Collaborative working/ability to work in a team

5. Practising of equity-
- Class and course management e.g. how to deal with male students demanding disproportionate amount of attention.
- How to deal with sexism in language and behaviour and with sexual harassment and bullying.
- Awareness of varied international educational contexts and cultural differences and how to deal with cultural clashes.
- The use of gender inclusive language in all situations.

6. Continuing reflection on professional practice -
- An understanding of why they are undertaking this module, using statistics from their own courses and institution and citing key relevant articles and theoretical positions on the under representation of women.

Learning process/teaching and learning strategies:
The learning process involved in studying this module is as important as the content and the learning environment needs to match the learning environment that the module aims to enable the participants to create in their own practice. The process needs to be experiential as well as intellectual and to be holistic and contextualised. The delivery of this module may take a

variety of forms, reflecting the possible deliveries of the TEC curriculum itself. It may include classroom delivery, independent learning with mechanisms and structures for support, peer seminar groups and distance learning, and may involve collaboration between institutions.

Assessment:
The participants will produce a portfolio of work demonstrating understanding and competence at master's level in all six objectives. The particular structure of this portfolio would be developed within the particular institutional context of the participant, taking into account the available resources.

The portfolio may include set assessments such as essays and reports and evidence from the participants current or past teaching e.g. videos of teaching, interviews with colleagues and students, student questionnaires, evidence from role plays.

Possible learning situations include not only lectures, seminars, laboratories etc. but also distance learning situations including written material, computer conferencing, email, etc. Evidence from these would then be included in the portfolio.

Evidence from a range of learning contexts should be included in the portfolio.

Reflective practice may involve a network of 'classroom' observation (observing others as well as being observed and reflecting upon these) and may include reviews of peer groups. Peer groups would include a number of participants from the module and may take a variety of forms e.g. involving participants from a number of institutions or countries, meeting face to face or electronically.

A system of mentors may be used which would be separate from the assessment process.

Key Points for staff development include

1. Staff development is an essential part of the process of the development of an holistic gender-inclusive TEC curriculum.

2. Managers should provide staff development activities including gender equity training to all staff (not only teaching staff) and managers themselves should participate in gender equity training.

3. Decisions must be reached on who should participate, how staff development activities will be organised, structured and funded and how to build these activities into the life of the curriculum.

4. Changes in culture and attitudes are an essential and vital part of the process and must be addressed in a variety of ways. Unsupportive cultures must be identified and changed; policies that are procedurally driven to achieve this are unlikely to succeed. Trust & respect must be part of the culture, both of staff for staff, staff for students, students for staff and students for students.

Positive change may be brought about by experience through training and reflection on that experience. Supportive cultures can only develop where senior management, including Heads of Departments, both undergo such training and put it into practice. Monitoring will be necessary.

5. Credit rated modules for an inclusive TEC curriculum should be available to staff as part of staff development in learning and teaching and for accreditation purposes.

6. Gender equity workshops for other staff should also be developed, implemented and their impact monitored.

How will it lead to systemic change?

There does need to be a multi-faceted approach within institutions (and this must also include Professional Bodies although this facet is not addressed in any detail here). Changes in pedagogy and content, through training, experience and reflection will gradually lead to cultural changes within Departments and Faculties as long as senior management are likewise fully trained, monitored and committed. We refer to culture as the 'atmosphere or milieu that exists within the various TEC Departments. This includes both the physical and psychological 'feel' of the environment as well as the values, attitudes and assumptions which are - consciously or unconsciously - affecting people's behaviour, including their communication patterns and interaction.' (3)

How can we ensure that senior management are committed to equity & diversity?

By recognising that not all students have the same learning preferences we are concerned with equity (fairness, even-handedness) and diversity rather than equality (sameness)(9). As Gender Gaps (1) puts it, not the *same* education necessarily but the *right* education. This is part of the quality of the student's educational experience and, because of the public nature of the Quality Assessment, Universities, and therefore senior management, have a stake in quality. The Higher Education Quality Agency takes into account the equal opportunities policies of the Universities that they assess. We should be ensuring that equity and diversity are included (rather than equality of opportunity) and that these become part of the overall quality assessment of Departments, their teaching and their Courses.

It is not only the student educational experience that is important. As an employer, Universities must recognise that unsupportive cultures for staff must be addressed. Policies against harassment and bullying are on the increase and have a valuable role to play. Preventing the need for such policies by, for example, using upward appraisal (i.e. individuals appraising their line managers) is one way forward. Cultures which are driven by fear & intimidation will not enable ideas or people to flourish.

Equity and diversity must also be part of the validating procedures of the Universities. We have 'equal opportunities' as a facet but it is not clear what is meant by this and no course has failed validation at UCLAN because of its lack of 'equal opportunities'. It is therefore essential that, just as courses must have measurable (assessable) learning outcomes, they must also be accountable in terms of equity and diversity.

Conclusion

Staff development plays a large part in the three dimensional framework suggested by the CuWaT project; that of pedagogy, content and culture. Systemic change can only be sustainable by both bottom-up and top-down initiatives based on the diversity of the student population and an understanding of this by teaching staff and senior management in TEC Faculties and Departments. A multi-faceted approach that integrates equity and diversity into the process of curriculum development and Quality Assessment and Assurance will be one way of ensuring sustainable, systemic change that provides an inclusive TEC education at tertiary level.

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