

London Engineering Project

**Transition Issues and their Impact on  
Curriculum Development for Engineering**

By Paul Sandford

Curriculum Development Officer

London South Bank University

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## **1. SCOPE**

This report identifies the principle issues surrounding the transition of students in Science, Technology, Engineering and Mathematics (STEM) to Higher Education, and lays out recommendations for curriculum development taking into account diversity and equal opportunity issues. Information has been gleaned from published sources and professional events attended during the second half of 2006, as well as from interviews with selected associates of the LEP in the 14-19 sector. Other evidence, from STEM transition research in the UK and elsewhere including Aim Higher and other programmes, has been included.

Students and staff from the Faculty of Engineering, Science and the Built Environment of London South Bank University have provided further insight into local issues surrounding transition to HE. Staff in partner institutions of the London Engineering Project have contributed further issues and comments.

## 2. EXECUTIVE SUMMARY & RECOMMENDATIONS

In order to increase participation in Science Technology Engineering and Mathematics (STEM) courses in UK HE, the needs of a wider and more diverse student base need to be considered. This is driven by the background of a global economy, a growing dependence on technology and a national interest to support SMEs, with changing demographics. The London Engineering Project focuses on bringing into STEM courses and supporting more women and members of the specific UK domiciled ethnic minority groups (Bangladeshi, Pakistani, and Afro-Caribbean) with low representation in HE. It also aims to attract young people from families with no prior experience of HE. In all categories, the emphasis is on identifying early amongst 14-19 year olds those with capability and potential who may, for various reasons, have exhibited low or erratic attainment in STEM subjects. This report focuses on prior research of issues which affect take-up and retention in STEM, and proposes some solutions to enhance in particular the first year experience of all students. The range of issues identified through industry, academic staff including Programme Monitoring Reports, and student's feedback include:

- Some inadequate, dilapidated and overflowing teaching and lab facilities (e.g. structures and soils labs; some computer labs with outdated hardware, lack of support for Mac facilities for design)
- Lack of diversity in teaching staff
- A chasm to cross from school to HE in maths education
- Teaching materials and assessments designed to appeal to a traditional white male audience
- Reluctance to carry out 'social engineering' on the curriculum with its risk of alienating majority stakeholders, such as traditional white male intake
- Intimidating atmosphere and tokenism concerns amongst some
- Uncertain attitude of accrediting bodies to change in the curriculum
- Unit/Course student feedback may be ignored in some Programme areas, with no formal Faculty management system in place to analyse, evaluate and action feedback.
- Poor or uncertain facilities for women in HE buildings, and later in industry
- A lack of flexibility in timetabling courses to take account of student commitments. For both genders, full day 10am -5pm core teaching periods and hence minimising the number of days attendance is essential for retention
- Lack of parental support for unfamiliar territory of engineering vs. law, medicine, accountancy etc., which are known to pay higher salaries at outset.
- The brightest young women studying engineering in prestigious schools and Universities are often attracted by financial institutions on graduation. Higher chances of retention in engineering industries exist through the post -1992 HE institutions.
- Perception of engineering as a 'dirty' area of activity, for "lads with ASBOs"
- Perception of engineering as a low pay sector vs. law, medicine, accountancy
- Perception of a global engineering workforce rather than a nationalistic perspective recognising shortages of talented engineers (Whyte 2003, et al)
- Girls under-estimate their ability in STEM disciplines
- Colleges reducing their engineering capability in recent years and no longer have staff with practical and innovative skills required to engage young people in engineering. Therefore, are LEP activities in schools sustainable?
- Collaboration with FE colleges raises quality assurance issues

- Universities have significantly cut resources to undergraduates and to project work in engineering, perceived by industry as the most important element in engineering education (Ref. RAE Henley Report, 2006)
- UK industry find it difficult to recruit, within the UK, 'enough of the best'
- Contact time with students impacted by financial pressures in UK HE, with senior experienced academics increasingly on overseas recruiting missions for courses
- Contact time with Year 1 students impacted by research agendas in HE, vital to financial viability of most HE institutions, which cannot just be engaged in teaching

## 2.1 RECOMMENDATIONS

In order to address these issues and concerns the following general recommendations, in no particular order of priority, are proposed for discussion and implementation in STEM courses as far as is *reasonably practicable*, taking into account resourcing constraints:

- Adapt teaching methods and timetabling to allow for diversity, including that of learning styles and lifestyles (Ref. LEP HEI Good practice checklist to promote inclusive engineering courses, distributed to FADC members for actioning)
- Ensure that provision for disability is well publicised and maintained
- Use e-Learning methods more for knowledge transfer and self-assessment
- Increase Fast Track provisions for remedial maths, ICT skill and English at an earlier stage, including provision within FE and sixth forms
- Resource and implement the recommendations of the LSBU Maths Working group and liaise more with schools maths teachers
- Adopt interactive tutoring ideas from the Maths Working Group at LSBU to wider areas of science and technology
- Increase participation of practitioners from industry in course programmes, in order to capture the imagination of students, inspire and present role models. Use the RAE Visiting Professor scheme.
- Build a 'social relevance' dimension in courses, such as addressing environmental concerns of the subject with solutions and putting 'values' into the curriculum
- Value understanding of the subject over exam/assessment success
- Expand work placement opportunities and practical content of courses
- Make course materials more relevant to the modern world and lifestyles
- Devise a more comprehensive, timely and inclusive student feedback procedure and detail it in the Student Charter.
- Build self-confidence through timely and supportive feedback to coursework and assessments
- Combat isolationism through group projects and teamwork
- Educate students to cope with cultural and technical complexities they will encounter in the workplace, e.g. consider the integrated approach of HAN et al in Civil Engineering in the Netherlands.
- Equip students for the global market place for engineering skills
- Identify best practice in STEM transition and seek academic exchanges (e.g. with the USA) to transfer best practice.
- Seek funding to sustain innovation in STEM transition

It is recognised that many areas of concern listed are currently being addressed to varying degrees within UK HE. They should be examined, however, in light of the questions posed in Appendix 1 of the full report.

**Specific Recommendations for ESBE Faculty Academic Development Committee (FADC):**

The FADC was requested to select by the Easter break 2007 at least one Engineering course *for each Department* in the Faculty in which to apply some of the above listed features in the first year components of the course from September 2008. Target courses may include an existing Course or a new Foundation Course (e.g. FdSc in Science in Building Services Engineering or in Engineering Infrastructures). Once a course has been selected, it is expected that the teaching team, the Course Director and student Course Reps will work closely with the LEP Curriculum Development Officer in examining existing provisions and working up appropriate enhancements using the ideas listed above. At a later stage an accrediting body may also engage with the transformation of the course, to ensure that standards are upheld while making the chosen courses more relevant and inclusive. The curriculum development indicated above should run in tandem with CPD for all academic staff, commencing with those engaged in the selected courses and Course Directors.

Evaluation of student feedback and demographic data before and after implementation of the above will inform the LEP and the NEP, National Engineering Programme. It is expected that all students taking the revised courses will benefit from better, more engaging and relevant approaches to teaching, leading to increased enrolments from all ethnic and gender groups including the target groups. It is expected that much of this reform will be underpinned by Progression Agreements between FE and HE. (Ref. 'Bridging the Divide' conference findings, March 2007)

### 3. INTRODUCTION

It is appropriate to address the following questions when considering transition issues of students moving from school or FE College to HE:

- Are applicants prepared for HE?
- How do we know they are prepared?
- How can we provide continuous support beyond the induction period?

In answering these questions and providing focus on areas of greatest need we can draw on the findings of a recent NERFS report (Wood, et al, 2005). The following statements, drawing on this and other research, are considered a fair representation of the current situation in science education:

1. Science as it is practiced starts with problems rather than subject disciplines, working across boundaries. Careers of scientists may well move across boundaries using skills built in an increasingly complex business environment with globalisation (Ref. RAE Henley Report)
2. Many aspects of science are inherently fascinating to the population. Learners are motivated by the excitement of demonstrations of technologies, inspired by books or individuals through broadcasts (e.g. Kate Humble, Adam Hart-Davis, Fred Dibnah), through initiatives such as the Faraday Lectures, thrilled by challenging ideas in cosmology or evolutionary theory and engaged through relevance of science and engineering to everyday life.
3. There is a teacher supply problem with fewer science teachers having degrees in science disciplines
4. Teachers are tired of imposed change, especially in a climate of scarce resources, and are not adequately rewarded for innovation.
5. Gender differences are significant in curricular choice and approaches to learning. Higher education courses with a clearly defined link to societal issues are more attractive to the consumer (Ref RAE website)
6. Problems in maths and science education are not unique to the UK (Ref. Martin et al, NSF, 2003)

#### 4. BACKGROUND

**The LSBU approach:** LSBU was chosen to lead the London Engineering Project pilot of the National Engineering Project on account of its active and long-standing engagement in Southwark, a multi-ethnic area of London. To ensure this initiative is maintained, it supports a Widening Participation Unit (WPU).

The Widening Participation team assists with the University's mission to encourage applications from those who have *the ability and the potential to benefit* from the increased life chances that the experience of higher education brings, but who may be discouraged from applying because they do not believe that university is relevant to them. This is often because there is little or no history of other people from their family or background engaging in higher education. We also aim to encourage those who are under represented in higher education to apply e.g. care leavers, people with disabilities and people from other minority groups.

A range of activities and projects are organised, which aim to raise the aspirations and achievements of such young people and adults and which enable their ability to make informed and confident choices about their progression. LSBU is particularly keen to support those people studying vocational courses by making clear the learning and employment opportunities available to them in their chosen area of study.

Partnership working is an essential element of successful widening participation, and LSBU works closely with local Further and Higher Education institutions, Connexions, Education Authorities, community groups and employers. The AimHigher networks (Aspire AimHigher South East London and London South) provide LSBU with personal contacts in schools and sixth form in local boroughs. In 2006 LSBU expanded this activity through the London Engineering Project.

Current students who act as ambassadors and mentors are essential to the work of the WPU. LSBU train over 100 new student ambassadors a year and use them to mediate much of the work that the Unit does.

LSBU are also involved in the National Mentoring Scheme (NMS). Students are recruited and trained to act as mentors in local schools, assisting Year 10 and 11 pupils (14-16 year olds) on a one-to-one basis with their coursework, revision and personal development. The annual Summer School is an exciting, action packed week of academic and extra curricular activities designed to give Year 10 and 11 pupils a real taste of what University life is like. The Widening Participation Unit also administers London South Bank University's unique Associate Student Scheme which enables local people in full time education to use the university's facilities, bringing down the barriers between the institution and the local community.

This year, both Mentors and Ambassadors will have the opportunity to apply to become Student Associates, undertaking placements in local schools which will count towards a teaching training qualification.

**ESBE Learning & Teaching Strategy:** The faculty of Engineering, Science and Built Environment has developed a new L&T strategy in 2006, linked with the University's strategy. In its summary of six main activity areas, in 'Teaching Practice and Resource Development' the Faculty undertakes:

“To use, develop and share up-to-date teaching practices which are geared to the needs of our students.

To secure and maintain modern technical and other learning resources appropriate to our programmes of study.”

In detail, this includes: “Carry out a diversity audit of the faculty’s students, especially re teaching/learning styles. Complete audit by Dec 2007 and adjust plans in the light of significant findings by summer 2008”

The full strategy document is available to staff via the Staff Information & Academic Development Blackboard VLE website. In February 2007, it is again under review to ensure harmonisation with the published institutional strategy. Early in the consultation process, a draft was made available for feedback and comments but only a few academic staff responded. Since publication, and with our wider awareness of issues through the LEP, it is perceived that more specific provisions may be required in the Strategy to properly address equality and diversity and widening participation. Inclusivity and differentiation issues need to be addressed if students enrolled with assessed high capability but low attainment are to succeed. Such assessment should be done by the University, as recommendations from schools are rarely a deciding factor when offering a place.

The proxy of traditional ‘A’ Levels or BTEC qualifications for skills for success will need to be re-evaluated in light of new qualifications such as the Engineering Diploma as an entry point to an Engineering Programme. (Ref. DTI Report, March 2006). Account will need to be taken of stepping stones such as summer school Fast Track provisions. Within the First Year, maths initiatives such as those put in place through a ‘Maths Working Group’ at LSBU will also play a significant part in assuring a smooth transition. National studies of maths teaching include the work of NERF. (Ref. NERF 5 Working Paper, Dec. 2005)

### **Context statement: The diversity and opportunity agenda of the LEP.**

The London Engineering Project (LEP) works to get more young Londoners into the engineering careers in the capital. It particularly seeks to engage women, Caribbean, Bangladeshi and Pakistani students, all of whom are currently under-represented in engineering.

The approach is to create attractive, inspiring, relevant engineering courses in local universities and then to populate these with students from nearby schools and FE colleges.

The LEP has been created by The Royal Academy of Engineering with significant funding from Government. It is designed to create more people with engineering skills in the capital, forming a pipeline that takes students from schools, through FE and HE and into the profession. Engineering employers have a significant role to play in this; helping to form new university courses and promoting the advantages of a life in engineering to students in schools and colleges.

The London Engineering Project is a partnership of schools, colleges, universities, science and engineering education charities, industry and Government. It is actively led by The Royal Academy of Engineering. At full strength, the project has a full time staff of 16 people and a budget of over £4M

for the first two years of a five-year mission with subsequent funding depending on ongoing success.

Further details on the mission of the LEP are found in Appendix 6

#### **LEP Project aims and objectives**

- To radically alter the student uptake into engineering courses
- To provide tomorrow's diverse and flexible engineering workforce
- To allow London students to claim their place in the technology-based future of London

Two objectives of the project are to create a network for the delivery of activities in schools and a mentoring program to encourage students to go into higher education, with a good proportion of those students counting a STEM subject as a subject choice.

In school, the project will include a series of organised STEM activities at all levels, drawing on existing good practice and a series of trial STEM activities conducted within the pilot schools involved in the pilot phase.

This will include the following activities, in association with LEP Partners:

- A series of in-school STEM activities for whole year and individual groups;
- A series of STEM activities run at universities in London and the UK;
- CPD for support of STEM activities within school;
- Support for running Young Engineers Clubs within each school;
- Saturday technology clubs for students and their parents;
- Support for introducing, assessing, and awarding the Crest Award Schemes;
- Careers advice and information;
- An e-mentoring and mentoring scheme for young people.

With the participation of each school, their staff and students, the LEP aims to bring coordinated STEM activity to schools, which will run in parallel with the current curriculum and support good practice that already exists within each school.

In parallel and linked with the LEP, a number of pre-existing initiatives include:

**The WISE campaign:** WISE aims to attract more girls and women into SET (Science, Engineering and Technology) and Construction, to support other organisations that enable girls and women to advance their careers and to support other organisations that ensure girls and women stay in the SET and construction sectors.

Through its initiatives, the campaign has helped to double the percentage of female engineering graduates from 7% in 1984 to 18% in 2006.

To achieve its aim, the WISE Campaign works with:

- Girls and Women
- Parents
- Teaching Staff

- Careers Advisers
- Employer
- Politicians
- Media.

**The UK Resource centre for Women in Science, Engineering and Technology, UKRC:** Through the facilitation of Yvonne Prendergast, and Liz Rasekoala of ACNST the LEP has been informed of best practice developed by the UKRC and a checklist was developed within the LEP/HEI Group for consideration in Engineering curricula. (See '**LEP HEI Good practice checklist to promote inclusive engineering courses**' in Culture and Diversity, below.)

### **National and International Trends**

Though participation in Engineering in HE remains predominantly male, there has been a steady growth of female participation in many areas of UK HE in the last decade. Female graduates have risen from 27% in 1997 to 36% in 2004 (Ref. DTI report, 2004). At LSBU, some engineering courses such as Civil Engineering have a noticeably higher proportion of females participating.

Curriculum development definition, including employability, retention, engagement  
Academic staff concerns  
Schools and FE concerns – including over assessment  
Public and employee concerns in the media – incl. dumbing down  
Recent breakthroughs in Engineering education – FabLabs, CDIO

### **5. OUTREACH**

The London Engineering Programme pilot of the National Engineering programme is designed to reach the following communities:

- Minority groups with no prior family involvement with HE
- Girls, principally from the Pakistani and Bangladeshi Moslem community
- Afro-Caribbean boys
- Adult students

These communities are under-represented in engineering disciplines in UK Universities.

Outreach teams to selected schools in Southwark and Lambeth include Student Ambassadors and outreach workers offering activities of engagement with engineering. These include Young Engineers Clubs.

### **6. TRANSITION**

In the transition from school or FE to HE principal stakeholders are:

- Students
- Academic staff
- Schools
- Employers
- Parents

All have a part to play to ensure that students succeed in HE and do not feature in drop-out statistics. Encouragement should be given to take part in FAST TRACK PROGRAMMES offered in the summer vacation before entry in the key skill areas of Maths, English and ICT skills. At LSBU some 330 students participated in Summer 2006. Courses were delivered mainly by part time lecturers from the FE sector engaged by the University. The completion and success rate

amongst participants was high. Research is needed to match this success with outcomes of the degree programme.

## 7. CURRICULUM DEVELOPMENT

Nationally, 14-19 post-Tomlinson report innovations include a range of new Diploma courses including an Engineering Diploma, and a Combined Science GCSE course.

**The new Engineering Diploma** is described as:

*'a rigorous future oriented program that offers the leading edge thinking from across the engineering sector'*

In Appendix 2, a report on an IoE meeting details the provisions of the Diploma, due to roll out during 2007 in Southwark and Lambeth with the support of the Southwark Education and Business Alliance.

**The Combined Science GCSE** proposals have attracted controversy. In an interview, Baroness Warnock said the new 21st Century Science GCSE will reduce the subject to a series of debates 'more suitable for the pub than the schoolroom'. The report continues:

*"Most of the time, the Combined Science GCSEs are studied in state schools, whereas grammar and independent schools tend to encourage pupils to take Chemistry, Biology and Physics as separate subjects. There are concerns that the majority of state school students will be denied the opportunity to study science at degree level, since most universities require A-levels in the individual disciplines as a course prerequisite. "*

Another comment on Combined Science GCSE was found on the DT Gender and innovation website.

*"The changes in the National Curriculum may in part explain the different results of young men and young women in different subjects and at different educational levels. The combined Science GCSE as a compulsory element of the National Curriculum may explain why some young women are rejecting science subjects. The Opportunity 2000 study (1996) stated that the combined Science GCSE did not actually give students 'the knowledge, skills and confidence' to choose an A level in a specific science area, such as Physics or Chemistry. For female students prior knowledge and skills in a subject are important factors in the decision making process. This returns to the idea that men and women have different attitudes towards education."*

It is an aim of the LEP to facilitate alternate pathways to HE, so Combined Science followed by an Engineering Diploma may well become a valid pathway to Engineering in Universities such as LSBU.

## 8. DEMOGRAPHICS

The LSBU Diversity website gives the following profile for the University, taken from 2003/4 data:

- 21,000 students
- 59% female, 41% male
- 85 countries
- 60% black and minority ethnic backgrounds
- 66% 25 years+
- 71% of full-time under graduates not required to pay fees

- 4.7% 1 of 9 forms of disability
- only 1 in 5 have traditional qualifications on entry
- 1700 staff

An initial study of 2005 intake profiles in engineering courses at LSBU confirms these findings, with very few Engineering students arriving age 18/19 directly from schools. An initial study of 2006 intake profiles in engineering courses at LSBU shows that a substantial majority of students in the Faculty of Engineering, Science and Built Environment arrive with A-Level grades. Appendix 5 details the range of entry qualifications that may be found in the Faculty. A recent report by Action on Access, (Connor, Sinclair et al, 2006) gives national data from UCAS for 2004 entry. For Engineering, 76% of students nationally offered one or more A-Level grades, in a cohort of almost 12,000 engineering students entering HE that year. For the London area this was even higher at 84%.

## 9. STUDENT COURSE REPRESENTATIVES FEEDBACK

A number of Course Boards were attended in late 2006 and early 2007. Findings are summarised as follows:

The following, largely generic, issues were identified in Course Boards. Those in Section A are from First Year sources. Section B includes issues raised by mature student reps from Y2, 3 or Masters Courses. Italic text in bold indicates a response minuted by the Course Administrator.

### SECTION A: First Year students

- The LSBU Fast Track summer programme is only 6 weeks and of below GCSE standard in scope
- Coursework feedback slow, due to lack of staff/staff absences
- Communications skills Unit modified to be more relevant by including 33% drawing/AutoCAD and renaming Unit as Professional Skills 1
- Staff need to react more quickly to complaints submitted by email.  
**Agreed by all.**
- Need more time for maths topics, coursework etc
- Some students find maths in fluid mechanics difficult
- It is difficult for students not accomplished at maths
- Attendance falling in maths Units as more explanation, examples and handouts are needed
- Drop off in attendance on some lectures due to excessive amount of coursework for PT students.
- Drop off in attendance due to gross departure from Unit Guide (e.g. Unit delivered theoretically instead of practically in a workshop, due to resource/timetabling issues)
- More class notes needed in some Units. **Not all Units will provide notes in class; some offer them via the Unit VLE site.**
- Professional Skills Unit of very variable use to Part Time students; many would prefer additional maths and mechanics instead. Unit previously adjusted to include more drawing.
- Diagnostic session early in session is needed to identify gaps in professional skills
- Time wasting using attendance register in a v. large class. ***Policy to be reviewed.***
- Some lecture rooms short of furniture

- Need more opportunities for public speaking in Prof. Skills Unit. Difficult with large classes.
- Some students want a fast track to BEng from BSc. ***Need to build up maths and fluid mechanics, get good BSc, and then take Masters plus professional institute exams to obtain professional status.***
- In group or teamwork some students are not making effort and the rest have to cover. Unit Coordinator needs to address this issue. ***Courses must have Group Work, otherwise not acceptable by accrediting bodies/external examiners. “Nobody, not even I.K. Brunel, builds anything by themselves”.***
- Not enough textbooks in the library for coursework use. ***Ratio is usually 1:10 students, but more may be provided if excessive use of the catalogue reservation system is made.***
- Part time students have some (unspecified) equality and diversity issues. ***Students reminded about LSBU support services for dyslexia via CLSD, and also provisions for a personal development plan. LSBU is committed to achieving a ‘level playing field’ for all students.***
- Concern expressed over additional cost of the required field trip
- One-to-one sessions with tutors needed after some tutorials
- Architecture/Design students need space and facilities to do their work properly
- Lecturer (whose first language is not English) is delivering at too fast a pace
- LRC crowded and noisy at times with inappropriate use of IT facilities (e.g. music downloads)
- LRC 3-North IT facilities unattended by staff in the evenings

## SECTION B: Year 2 and above students

- Students were getting mixed messages regarding the structure and content of the unit and the requirement.
- The criteria for assessment of the assignment had been unclear
- Students were concerned about finding placements and felt the University should help students in finding placements. CD said currently there was a lack of resources in the Department but would try and see if more assistance in this area could be provided in future.
- Students were having difficulties understanding the lecturer. Although the handouts were very good, there was very little explanation in class. ***The Course Director will speak to the lecturer concerned.***
- Students had not received results of their mini test. Some students found that the time given was not long enough
- Students were having problems with the Study Skills Unit – they felt were not being challenged (sufficiently). (K. Teidy suggested that students pick up a booklet on Study Skills available from the Student Support Unit at Caxton House. There are other services also available e.g. additional maths and workshops on writing essays, reports, etc.)
- There were problems with the Study Skills Unit taught on Monday afternoons. Problems identified include not enough computers and lack of technical support in the large class size. ***The Head of Department will endeavour to get additional Tutor.***
- Students said it was difficult to get to know each other due to the large class size.
- Students were struggling to complete the experiments and writing them up for the Chemistry lecture. The Unit co-ordinator had told them not

to worry about it too much. The Course Director confirmed that this was just an introduction and that from next year the students will have to carry out proper experiments and keep a logbook.

- One student complained that she was locked out of the classroom because she had arrived late on one occasion.
  - A lack of flexibility in timetabling courses to take account of student commitments. For both genders, full day 10am -5pm core teaching periods and hence minimising the number of days attendance is essential for retention
  - The students had missed two maths classes due to absence of the tutor.
  - Appeals for more tutorials
  - Unclear start and finish dates of projects
  - Discrepancies between Unit Guides and handouts
  - Class notes available only 2 weeks after a lecture
  - Unit guide out of date and misleading
  - Rooms too cramped
  - More contact with CD required
  - Subject too fast pace; need open book assessment to avoid high failure rate
  - Course information on VLE websites needed
  - Some Units without VLE websites
  - More resources and guidance needed on some VLE sites. However, Construction Technology -2 site is “brilliant”
  - Practicals set before theory covered
  - IT kit inadequate for specialised software
  - Coursework briefing paper unclear
  - Need more AutoCAD and design methods lectures
  - An HPL is offering extra AutoCAD training on Monday evenings in the LRC for an extra fee.
  - Coursework lost in corrupted folder on server
  - Some assessment/exams without associated lectures
  - Lack of guidance on exam form, as style different from previous years
  - HND to BSc transition needs more guidance
  - Acoustics Unit expensive to run; cut another unit to keep it
  - Field trips in vacation time contentious (because some working part time?)
  - Field trip linked to Coursework cancelled owing to expense
  - Need more site visits in term time. ***Become a student member of the ISE and go on their site visits to avoid H&S issues if LSBU were to try to arrange. BSc cohort also encouraged to go on optional trip to HAN in the Netherlands, which includes site visits.***
  - Project work needs more time due to fill-in staff without design experience and time allocation only 20 mins. pw per student with larger group
  - Open ended all-units integration of knowledge projects favoured
  - There was need for supervision in the laboratory since it was not possible to carry out all the experiments within the given time due to the large class size.
  - Computer facilities too slow due to network for working maths assignments. ***IT Network replaced and due for rollout early 2007.***
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- Timetable date changes no good for PT students with work commitments.
- Surveying Unit needs continuous assessment, as new topics every week. *Possibly address through VLE self-testing quizzes; integration of topics expected in new term.*
- Uncertainty over maths content of new exam paper
- Need to split a large class to improve quality of teaching
- Need to split a large class due to lack of suitable computers, limiting timely access to critical software
- Students really want personal tutors. *Programme & Course Directors to address by end term, as appointed tutor coordinator not functioning*
- Courses disrupted due to NATFE industrial action
- Accommodation problems regarding design studio, where a fixed base is essential “for the health of the course”

It should be noted that the absence of a feedback comment does not necessarily imply that no action was taken, only that it was not specifically minuted on that occasion. However, it was clear from some long-standing staff in Course Boards that many of the issues re-occur year after year. The Boards attended are detailed as follows:

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DES – Environmental & Building Services Engineering 15 Mar 2006 & Mtg on 15 Nov 2006

DES – Civil Engineering Cluster (BEng, BSc, HNC) 28 March 2006 & Mtg 27 Nov. 2006

PSC - Architectural Technology & Construction Management BSc

ES – Undergraduate/HND Mech Eng an CAD /Mechatronics cluster 10 Jan 07

ES – Post graduate Mech Eng an CAD /Mechatronics cluster 10 Jan 07

AS – Extended Degree Programme in Science

## 10. MATHS WORKING GROUP

A Maths Working group was set up in ESBE at LSBU in 2006, to address concerns over wide variability in maths ability amongst incoming students. A number of online resources were evaluated, including Mathwise and Transmath. However, these did not address more fundamental issues, described by Prof. Fradkin as follows:

*While any of these or other commercial packages provide an additional resource, a large number of LSBU freshmen have problems understanding the simplest maths symbols, such as = , and do not necessarily distinguish between addition and multiplication, subtraction and division or exponentiation and multiplication, sometimes due to various disorders such as dyslexia and dyscalculia. Students like this require a great teacher effort to bring them to the level when they can begin self-study effectively. For this reason, we propose a novel teaching solution in the form of a software package entitled the Intelligent Feedback Algebra and Calculus Tutor (FACT). The Tutor will be based on the maths teaching methodology that has been*

*developed at LSBU for the past thirteen years: This is a combination of the Socratic dialogue with the approach to mathematics teaching that can be traced back to Euler: It emphasises understanding of basic principles rather than knowledge of tricks, ensuring that students are taught rather than trained while simultaneously learning the art of technical discussion, as appropriate to BEng courses.*

A Learning & Teaching Fellowship to develop a graphical user interface for an intelligent Feedback Algebra & Calculus Tutor (FACT) was approved in September 2006. The revised project description from Fradkin, et al is as follows:

*FACT is a mathematics computer tutorial designed to enable students to practice their skills at their own pace. Topics covered by FACT are Simple Algebra, Simple Trigonometry, Simple Differentiation, Simple Integration and Sketching Graphs by Simple Transformations. For each topic, on each level of difficulty, FACT is designed to generate at random and solve a practically unlimited number of problems. If the user inputs an incorrect solution to a problem, an interactive HELP facility is designed to guide them through the solution process step-by-step using a dialogue mode. In particular, in response to each input the user will receive a specific message generated by FACT, which will either stipulate that their answer is correct or else inform them precisely what went wrong, including discussion of symbols used. Thus, FACT is meant to provide an extra resource to deepen students' appreciation of basic mathematical topics on the GCSE – A – 1st year BEng level and improve their exam pass rates without additional teacher involvement. L&T Fellowship funding will be used to develop a Graphical User Interface (GUI) for the software.*

Implementation of the FACT system is anticipated for the 2007/8 Session. It should address one of the key areas to successful transition. However, not all maths teachers at LSBU share enthusiasm for the approach, favouring face-to-face teaching alone. The FACT facility, however, is intended to supplement face-to-face teaching, as is much of e-Learning provision in LSBU, thereby recognising diverse learning styles of students. Finally, it should be recorded that HEFCE see a need for reform in maths teaching in HE Engineering courses and questions whether all the maths currently taught is really required for a career in many modern Engineering disciplines (Ref. 'Bridging the Divide' Conference, March 2007).

## **11. CULTURAL & DIVERSITY FACTORS**

A workshop entitled 'Working towards inclusive engineering' was held at LSBU on Nov. 6, 2006 for the LEP. Facilitated by Liz Rasekoala and Yvonne Prendergast the programme addressed issues that put off women entering engineering and gave pointers to inspire and retain students. Good practice in gender equality HE Academy report Oct 2006. The key guidance points for HEIs on gender and cultural diversity, which emerged out of this meeting, are summarised as follows in a draft recommendation

### **“LEP HEI Good practice checklist to promote inclusive engineering courses”:**

#### **Curriculum**

- Relate to a range of day-to-day and life experiences
- Demonstrate how engineering relates to society and answers societal questions.
- Use a broad range of up-to-date examples including e.g. household, leisure,
- Teach general skills e.g. communication skills, problem solving, negotiation, project management, project planning, teamwork skills, report writing, presentation skills.

- Provide open-ended problems for group project work or labs.
- Include problems which consider human, social, environmental and global considerations.
- Enable discussion of the social, political, historical and cultural factors that influence engineering practice.
- Discuss value conflicts and uncertainties relevant to the subject.
- Use course materials that are inclusive in terms of gender, culture and ethnicity e.g. language, images, role models and examples.
- Maximise use of visiting lecturers, exchange programmes, industry visits and work experience to promote inclusion.
- Show links to a range of potential career opportunities
- Consult widely on course design and research areas including feedback from a diversity of students and within industry.

### **Teaching practice**

- Include interactive teaching techniques, demonstrations and practical examples in lectures.
- Create a supportive learning environment e.g. treat all students equally; encourage questions; use a range of ways to explain principles; enable students to identify strengths; encourage students.
- Have high expectations of all students, with clear feedback mechanisms to praise achievement and enable improvement as required.
- Encourage collaboration among students e.g. formation of peer study groups.
- Provide links between lecture materials and lab activities.
- Define and clarify technical terminology and jargon when it is introduced.
- Organise relevant field visits to enhance students' awareness and to see engineers at work – ensure contact with a diversity of female and male engineers.
- Beware of the potential for stereotyping and build in ways to avoid this, e.g. use inclusive language and challenge discriminatory comments.
- Set an example for fair treatment of all students by enabling all students to participate equally e.g. in asking questions, answering questions, practical work and taking lead roles.
- Incorporate group work and plan groups to enable all students to participate equally and to increase their ability/confidence in a range of skills e.g. where groups are not self-selected, rotate group roles.
- Cluster women/BME students in groups, e.g. a few women and a few men in a group is preferable to spreading them between all groups. Provide opportunities for women/BME students to work together.
- Monitor Group engagement of women and BME students and review methods for Group selection to ensure equal opportunities for developing a range of skills e.g. technical, analytical, communication, leadership and design
- Use a range of teaching methods to accommodate students' varied interests, values, perspectives, prior experiences, ambitions, learning styles and home circumstances.
- Set open-ended investigative-type problems.
- Incorporate a range of assessment methods and make explicit the grading scheme.
- Include student self-assessment and review.
- Implement anonymous marking.

### **Culture**

- Take account of student feedback on the informal learning environment as well as the formal parts of the course.
- Participate in equality training to increase staff awareness of gender and culture related differences in learning styles, educational experiences and self-confidence of students, and to practise ways of avoiding inadvertent stereotyping.
- Ensure that induction processes for students and staff actively promote equality of opportunity for all students.
- Promotional material and recruitment events actively promotes equality of opportunity e.g. using role models, positive images of diversity students, demonstrates the potential for engineering to be a rewarding career for a diversity of people.
- Enable clear, accessible routes for all students to approach lecturers.
- Encourage interaction between staff and students.
- Offer a range of support mechanisms to students e.g. mentoring, support groups, flexible allocation of tutors, access to professional networks.
- Support a range of ways for students to mix socially that appeal to a range of interests and backgrounds.
- Build inter-disciplinary links.
- Create a welcoming physical environment for the department e.g. by having clean, well-organised areas; providing sufficient women's facilities; providing study areas for students; displaying current work and achievements of a diversity of students; using positive images of a diversity of engineers; promoting contribution of a diversity of staff.
- There is openness in departmental management and communication.
- Evaluate and review curriculum, teaching style and culture based on feedback from a diversity of students.

The above checklist has emerged from the November 2006 workshop at LSBU and earlier work by Cronin, et al and Nafasli et al., as well as a RSC Report (See References). It has been distributed to Academic Development staff in ESBE for prioritisation and implementation on new courses, initially.

**Salford University Report: Equality and Diversity: Making your curriculum inclusive:** This excellent report is included in **Appendix 1**. It poses many questions which should be addressed in curriculum development debates, on compliments the recently developed checklist detailed above.

## **12. CONCLUSION and RECOMMENDATIONS**

This study has identified many recent studies and resources to aid understanding of transition issues in STEM subjects. A few have been detailed to show the wide range of issues which need to be addressed if transition is to become smooth and satisfying experience for both students and staff in HE. Allowing for diverse pathways to HE requires an understanding and training of HE admissions tutors as well as first year lecturers. The challenges may well require that more experienced staff need to engage with first year students, perhaps diverting these experienced hands from research agendas important to the survival of their institution. They may also imply that a personal tutor is the only way to guarantee success. We may conclude that to properly address STEM transition will require significant resources if over stretched academics are to engage with widening participation in HE.

Following more general recommendations to engage in best practice specified in the Executive Summary, specific recommendations for the ESBE Faculty Academic Development Committee, FADC have been tabled on February 14, 2007 as follows:

The FADC is requested to select by the Easter break 2007 an Engineering course *for each Department* in the Faculty in which to monitor progress in the incorporation of some of the above listed features in the first year components of the course from September 2008. The course may be an existing offering or a new Foundation course (e.g. FdSc in Science in Building Services Engineering or in Engineering Infrastructures). Once a course has been selected, it is envisaged and expected that initially the teaching team, the CD and student Course Reps work closely with the LEP Curriculum Development Officer in examining existing provisions and working up appropriate enhancements using the ideas listed above. At a later stage an accrediting body may also engage with the transformation of the course, to ensure that standards are upheld while making the chosen course more relevant and inclusive.

Evaluation of student feedback after implementation of the above will inform the LEP and the National Engineering Programme. It is expected that all students taking the revised courses will benefit from better and more engaging and relevant approaches to teaching, leading to increased enrolments from all ethnic and gender groups including the target groups and better retention. In order to monitor outcomes, complete and accurate data must be gathered and managed, ensuring that the institutional records retention policies understand the need.

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## **APPENDIX 1 – Checklist of questions for curriculum development: University of Salford Workshop**

The questions set out below are designed as prompts for course teams involved in the design of new courses, or in testing existing modules and programmes for inclusivity. Some of the questions are generic – because of the commitment to inclusive practice as good practice for all – and Schools may wish to work with the Research and Development Officer (Equality & Diversity) in the curriculum to develop a framework that is more specific to the provision in that School/subject area, and to discuss some of the barriers to developing an inclusive curriculum.

### **1. Curriculum design**

Is the curriculum flexible, both in terms of delivery and student choice?  
Does curriculum content reflect an appropriate range of cultural perspectives?  
How has new scholarship on disability, gender, race, disability, sexuality, etc in relation to the subject/discipline been incorporated into the curriculum?  
Who has been involved in planning and developing the curriculum?  
How do you ensure that the intended learning outcomes are communicated effectively to students?

### **2. Course information:**

Is it comprehensive and accurate, and offer a realistic account of the provision and the commitment required from students?  
How is it communicated to students?  
Is it available in a range of different formats and languages?  
Is a representative range of case studies, positive images and appropriate language used in all course documentation to present an inclusive image of the school/subject?

### **3. Admissions:**

Are entry criteria clear, for example are English Language requirements explicit?  
Do the criteria and selection process have the potential to disadvantage certain groups?  
Are pre-requisites expressed in terms of knowledge and skills rather than specific modules or qualifications?  
Does the admissions process (including open days) include some form of analysis of learning styles, expectations, and the support a student may need?

### **4. Induction:**

How long does induction last, and is it directly related to the students' programmes of study?  
Does it include diagnostic tests, study skills, assessment of support needs etc?  
Are ways of working that will be experienced on the course introduced (e.g. group work)?  
Are expectations (on both sides) negotiated and clearly articulated?

### **5. Teaching and Learning:**

Are a range of approaches to L&T employed to accommodate and value a variety of learning styles and experiences?  
Does the teaching and learning strategy for the programme enable the intended learning outcomes to be achieved - through a range of alternative routes, if appropriate - and offer opportunities to practice the methods by which students will be assessed?  
Are strategies in place to engage all students in class activities and integrate with one another?

Are the teaching methods flexible enough to cater for students who have difficulties with fieldwork, and to offer a range of placements?

Are placement providers committed to offering an equitable experience for all students, consistent with University policy, and how is this monitored?

6. **Assessment:**

Is the assessment strategy designed to promote learning?

Is appropriate use made of formative/continuous summative assessment, and is timely and comprehensive feedback given?

Are a range of assessment methods employed to do full justice to a diverse body of students and enable an appropriate range of skills to be developed?

Does the programme's assessment strategy enable the intended learning outcomes to be demonstrated?

Are the assessment criteria explicit, specific to assessment tasks, and understood by students?

What provision is there for approving alternative forms of assessment where necessary?

Are assessment results and appeals monitored and are mechanisms in place for reviewing assessment processes?

Are students and assessors prepared to deal with the voicing of cultural and hierarchical differences?

7. **Student support:**

How are support needs identified and met?

Do all students have regular access to tutors?

What provision is made to support students when learning off-campus?

What provision is made for developing skills to support their learning?

Is appropriate use made of learning technology?

8. **Learning resources:**

How accessible are learning resources?

Are they available in a range of formats?

Do they reflect an appropriate cultural range and use inclusive language?

Are they reviewed regularly for bias?

Is appropriate use made of technology?

9. **The student voice:**

Is provision made for enabling the student voice to be heard, both formally and informally?

How are student views sought on E&D issues?

Are the issues raised by students responded to quickly and appropriately?

10. **Staff development:**

What are the support needs of staff to enable them to provide an inclusive learning environment?

Are they aware of the need to consider adjustments to the curriculum /assessments where appropriate?

How do they know what they are responsible for and what they can seek help for elsewhere?

11. **Employability:**

Are there any work-based learning/placement issues for particular groups of students?

Are first destinations being monitored?

What action is being taken to support groups of students who are known to be disadvantaged in the job market?

12. **QA and monitoring:**

Are resources and teaching materials regularly reviewed?

Who has responsibility for reviewing?

Are E&D issues part of programme approval, annual programme monitoring/periodic review?

Is recruitment, retention, progression, achievement and employment monitored for different groups of students to identify areas where discrimination might be occurring?

How does this information inform teaching and learning, student support, admissions policies, etc?

Have impact assessments been carried out on School policies relating to teaching, learning and assessment?

13. **Organisation:**

Are course timetables sufficiently flexible to accommodate students with domestic responsibilities/part-time jobs, religious festivals etc?

Is the teaching environment arranged in an inclusive format and fully equipped with a range of facilities for disabled students?

What other questions would you add to this checklist to make it more relevant to your provision?

## **APPENDIX 2 – Report on the IoE Seminar on changes to the 14-19 provisions for science and engineering**

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### **Engineering & Science Staff Development Day September 27, 2006**

Institute of Education Centre for 14+ Innovation and Reform with the Learning and Skills Network - Summary by Paul Sandford, LEP

#### **Introduction**

The event was facilitated by Paul Grainger, Research and Development Officer for the London Region Post-14 Network. He is combining this post with work on developing a Centre for 14+ Innovation and Reform, an academic Centre at the Institute which will work closely with the Network. The Centre will undertake research and dissemination at a global level, but will take an active interest in regional issues.

Paul has spent 30 years in teaching and FE Management. From 1990-95 he was TVEI project manager for Wandsworth, and was chair of the, then, post 16 Network 93-95, before moving on to a vice principal role in the north west. As Director of Curriculum at S E Essex College he formed a partnership with Essex University for the provision of Higher Education courses in Southend. Most recently, as Principal, he created the Widnes and Runcorn Sixth Form College, building a new, second campus in Runcorn. This is now to merge with Halton College.

Paul was, for many years, Vice Chair of the Forum for the Advancement of Continuing Education (FACE). He chaired the RIBA/LSC Forum, leading developments in innovative learning environments, and joined the Education Experts panel of the Design Council, looking at issues around the Building Schools for the Future programme.

**The London Region Post-14 Network** is based in the School of Lifelong Education and International Development at the Institute of Education, University of London. The Network was launched in 1989 to develop links between those concerned with post-16 education and more recently, 14+ education and training. The Network's agenda is to provide a forum for sharing information about new developments and to analyse and discuss policy issues addressing all sectors of post-14 education and training.

Network members include Schools, Colleges, Universities, LEAs and many other organisations in the London region, including LSCs, Connexions and the Voluntary Sector. Network activities include seminars, conferences and research and development groups. Members receive regular mailings about Network activities, contribute to the planning of events and receive preferential rates for attendance at conferences and events.

A series of staff development days to look at teaching strategies for the new applied A-Levels were held from September 25-29 for different subject areas. Engineering was combined with science on September 27 and this session also addressed the new developments towards the new Engineering Diploma.

#### **Issues & Concerns**

Following an introduction, the specifications of vocational programmes were reviewed briefly, followed by a workshop of brainstorming issues arising from these new government initiatives. Many issues were identified in the workshop breakout groups, including:

- Lack of suitably qualified staff including lab technicians
- Lack of resources, labs, equipment
- Lack of time to implement properly
- Lack of training
- Too much innovation overloading teachers
- Diversity issues incl. learning styles, language, impact on standards
- Earlier BTEC was considered useless, lacking content; the GNVQ had lacked 'purity of esteem' (i.e. credibility) amongst employers
- Uncertainty of industry response to the new Diploma
- Uncertainty over HE Admissions response to new Diploma
- Need to identify knowledge gap with Y1 curriculum in HE
- Need to develop strong industry links early
- Poor public perception of Engineering; students want 'clean' jobs
- Need to reconcile with present exam led teaching in KS4
- Need to follow up on visits e.g. Science Museum
- The Diploma viewed by some as a gimmick
- There is a plethora of Science and Engineering qualifications already – "the money would be best spent on specialist schools"

The discussion revealed that many colleges had reduced their engineering capability in recent years and no longer had staff with practical and innovative skills required to engage young people in engineering.

### 14-19 Diploma in Engineering

Paul Turnbull presented a status report on the development of the diploma, covering LV1, 2 and 3. This fast track initiative is billed as

*'a rigorous future oriented program that offers  
the leading edge thinking from across the engineering sector'*

If this vision is attained, it may well be a hard act to follow for HE.

The programme due to go to the QCA at the end of 2006, with a view to a cautious introduction in the 2008-2013 period. At first, there was no provision for phasing it in or piloting. After consultation a pilot phase was agreed. The underlying themes of the Diploma are:

- Creative and innovative thinking
- Maths and science, involving functional skills
- Problem solving
- Communication
- Technology
- Health and Safety

In essence, the Engineering Diploma involves learning by doing or hands on learning with an engineering context or situation.

Paul Grainger warned that the Diploma would only flourish in the UK exam system if the first rounds of deployment were *of very high quality*, delivered through gateways

and consortia, pooling resources. Few institutions could contemplate delivery on their own. The diploma requires access to all subject areas, requiring a student pool of at least 1200 as critical mass to ensure this. A week link identified is the likely requirement of set vocational days for schools in FE colleges, perceived as likely to play havoc with their facilities and timetabling.

Since this meeting, discussion has taken place with Lorraine Lawson who is leading in the rollout of the Diploma in Southwark and Lambeth Colleges. ESBE staff on the Steering and Curriculum Groups for the Diploma included initially Rob Best, Esther Perea and Mary-Jane Rooney. Esther Perea withdrew in early 2007 on account of increasing workload as Admissions Officer at LSBU.

**APPENDIX 3: Interviews with 14-19 practitioners****A - LEP Call Report by Paul Sandford: Meeting with Alan Watts, LB Tower Hamlets, Aug. 16, 2006****INTRODUCTION**

On the recommendation of Anna Paczuska, an invitation was extended to Alan Watts to visit ESBE to discuss the HE expectations of school and FE college leavers in Tower Hamlets. Alan has been involved with the Aim Higher project for several years. He had prior contact at a conference with LEP coordinator Heather Hawthorn, with whom negotiations were under way to include LEP mentoring in selected schools in that area, as the target schools had subjects (Bangladeshi females) ideally matching the profiles set in the LEP.

The information gathered from the interview would inform curriculum development in the Engineering Departments of ESBE. An informal 1:1 meeting was set up commencing with lunch on August 16. It was preceded by a fact-finding visit by PS to Caxton House to discover the latest provisions of the Support Unit for enrolled students. In particular, details of Fast Track programmes and sample careers data sheets for engineering from Prospects were obtained. These latter had a statement of the current takup of engineering by women, averaging around 15%.

**FINDINGS**

Alan outlined the demographic profile of Tower Hamlets, with a different ethnic mix to that of Southwark. The school population contained some 20% white and 60% of Bangladeshi origin with two schools having 100% Bangladeshi pupils (Mulberry School for Girls and Stepney Green School for Boys). These young people have strong family ties and influences with English as a second language. They were generally led by their close family networks to careers in medicine, law, financial services and business management. With the City of London adjacent, there were many opportunities presented to them for careers in the City. They had excellent access to aspirational information and mentors, but post 16 needed to raise attainment. This was improving, with a rise from 40 to 120 pupils having 300+ points (= 3 Bs at A-Level). There were few taking NVQs in the 16-19 colleges. Many pupils had reduced their opportunities by taking soft options and only 2 A-Levels, often dropping maths and science. A further maths project was trying to address this, run by Pat Moreton. I outlined the work of our maths Working Group, seen as a key component of LEP curriculum development. Alan referred to Sybil Cock, head of maths at Tower Hamlets College.

One employer had offered generous bursaries for students entering Construction and Civil Engineering, spurred by the large projects planned for East London in connection with the 2012 Olympics. However, the take-up in the Borough had been very low, with only 6 applicants.

Information obtained from Caxton House was given to Alan. This included copies of the recent Fast Track brochure, Information on the Clearing Fast Track, programmes of courses for English and Maths and the 'What students have said' brochure. My meeting with Ahmed Mohamed at Caxton House had revealed that there were 327 students fully enrolled on the Fast Track this year. Of those, there were 124 Maths

students and 96 English students, and 107 were Communications students. Alan's comments were as follows:

- Make aware to the 14-19 sector the range of remedial provision on offer in HE
- It is not easy for staff in schools to discover resources provided by HE
- Courses need to build on actual skills incoming students have, (i.e. not on those they were supposed to have.)
- There was a need for collaboration between HE, FE and 6<sup>th</sup> forms over remedial resources. Could staff delivering courses at Caxton House also deliver the same in the 14-19 sector, say under contract?

### RECOMMENDATIONS

- Contact Sybil Cock and put her in touch with the FESBE maths working group
- Investigate possibilities of remedial Maths and English courses being run in schools with participation of HE FT or HPL staff.
- Obtain further data from Caxton House
- Discuss likely LEP collaboration/mentoring in Tower Hamlets with team
- Approach a local contact from the British Bangladeshi community (the daughter of my neighbour) known to work in engineering journalism, for a profile which may be useful in LEP work.

### MATTERS ARISING

Further enquires of Sue Starkings of Caxton House showed that most of the classes during the year are taught by HPLs and these staff are free to teach at other institutions. Most of them already teach at other institutions as well as LSBU. The Fast Track staff, particularly, already work in FE full time and do the summer course in their leave time.

### CONTACT INFORMATION

Alan Watts: [alan.watts@towerhamlets.gov.uk](mailto:alan.watts@towerhamlets.gov.uk) Tel: 020 7364 6395

Sybil Cock: [sybil.cock@towerhamlets.gov.uk](mailto:sybil.cock@towerhamlets.gov.uk)

Ahmed Mohamed, Course Administrator, Skills for Learning:  
[mohameac@lsbu.ac.uk](mailto:mohameac@lsbu.ac.uk)

**B - LEP Call Report: by Paul Sandford Interview with Fran O'Neill, LB Wandsworth Aug. 23, 2006****INTRODUCTION**

On the recommendation of Anna Paczuska, an invitation was extended to Fran O'Neill to visit ESBE to discuss the HE expectations of school leavers in Wandsworth. Fran has been involved with the Aim Higher project for several years and more recently with the Excellence in Cities (EiC) Project. She had prior contact with Anna Paczuska with whom she is working up a report on likely areas of collaboration between schools in Wandsworth and LSBU.

The information gathered from the interview would inform curriculum development in the Engineering Departments of ESBE. An informal 1:1 meeting was set up commencing with lunch on August 23.

**FINDINGS**

The Borough of Wandsworth has a very mixed community, with no predominant ethnic group. Attainment in schools is higher than areas such as Tower Hamlets but very variable, with adjacent schools having very different A-level results (e.g. 4-6 A-grades vs. 90 in an example cited). The recent attainment across the Borough in A-E grades at A-Level is higher than the natural average. Attainment is improving amongst the most deprived sectors, partly due to learning centres set up under the EiC project. While a fair proportion of the 14-16 population are well equipped in ICT skills, a significant proportion are not.

The expectations of young people from Wandsworth on entering HE are summarised as follows:

- Library and Information resources will far exceed those they have been used to in schools, so induction to information seeking will be expected.
- IT induction should be designed to increase confidence in the use of IT, making it less daunting
- Young people have a tendency to exhibit impatience with IT, making it vital to offer smooth running and quickly accessed facilities.
- A more independent and flexible approach to learning will be encouraged
- There will be large lecture theatres with different approaches to teaching and attendance. Some fore-knowledge would be helpful (e.g. a video on LSBU website of the 'lecture theatre experience')
- A Virtual Learning Environment, VLE, will be new to most students, requiring induction including statement of benefits.
- If English is not the first language, online facilities for translation of Y1 technical documents/lecture notes from English to a native language will aid understanding (and hence help to reduce the dropout rate). The use of a translation Google toolbar might be promoted.

Fran was shown typical Blackboard VLE sites in ESBE, which can be used to support diversity and choice and address certain learning styles. In a VLE initiative in Wandsworth 6<sup>th</sup> forms, feedback from students suggests that at that level they prefer the personal touch from staff. The Bb demo included an introduction to the RDN resources using Fran's field of Sociology, demonstrating how these online resources can be deployed in coursework. Mention was made of our ESBE initiatives in e-

assessment and online submission of coursework. Fran was also given copies of the Fast Track and associated brochures from Caxton House. She saw merit in the idea of offering much of the fast track modules in school 6<sup>th</sup> forms, for example. ( i.e. carry out the remedial phase earlier).

The discussion moved to pressures on students to take on paid work while studying, making it even more desirable to provide alternatives to traditional lecturing. This pressure will increase as higher fees start to bite.

#### **RECOMMENDATIONS**

- Seek close personal involvement in collaborative ventures with Wandsworth Schools, following forthcoming report (AP/FO)
- Obtain and study a copy of the forthcoming report
- Continue dialogue and obtain more quantitative data from Wandsworth 14-19 provision
- Suggest more AV material on 'The HE Experience' be provided from the LSBU website.
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#### **MATTERS ARISING**

Researched the provisions of the 'Excellence in Cities' programme.

Carried out a trial translation of a Wikipedia document from English to Arabic using a URL of a document and Google Language tools at:

[http://www.google.co.uk/language\\_tools?hl=en](http://www.google.co.uk/language_tools?hl=en)

#### **CONTACT INFORMATION**

**Fran O'Neill: EiC Development Officer and Aspire Coordinator**

foneill@wandsworth.gov.uk Tel: 0208 871 8111

## **APPENDIX 4 – Report on the HE Academy ‘Innovations for enhancing the first year experience conference’, Aston University, Birmingham July 2006**

Report by Paul Sandford, LEP Curriculum Development Officer

### **Introduction**

It is increasingly recognised that the transition into higher education is central to success in HE. The first year integrates students into their universities and colleges academically and socially, it develops students as HE learners and it creates motivation and commitment to their field of study. Furthermore, the majority of students who leave higher education early do so during the first year.

The May conference on this theme in Edinburgh proved to be so popular that it was decided to rerun this event in September with only slight changes to the original programme. Professor Mantz Yorke and Professor Bernard Longden gave keynotes including updates on initial findings from their surveys. Professor Lee Harvey presented further findings from The Higher Education Academy's literature review on the first year experience. The discussion and workshop groups providing delegates with opportunities to learn about how other institutions are enhancing the first year experience, and to share practices from their own institutions.

### **Research Evidence**

There is a wealth of research evidence in literature from many countries on the first year HE experience, much of it subject specific. Some 300 publications were included in the study by Professor Lee Harvey, all post-1986. Some participants felt that the cut-off date should have been 10 years later, as the situation in HE with diversity agendas and widening participation is changing rapidly. However, some trends persist throughout the past 20 years. They include:

- Student expectations of HE are often ill conceived or naive as a result of poor guidance in schools or in University prospectuses. However, they appear to acquire rapidly a sense of realism on issues such as personal tutoring and library resources.
- Students may arrive with little concept of self-motivating independent learning
- Part-time student employment up to 18 hours pw is not generally detrimental to academic outcomes
- Students who live in Halls of Residence may have a slight advantage over those burdened with domestic issues living elsewhere.
- Students living in the family home may benefit from a support structure, but may not participate in University life

### **The First-Year Experience Survey outcomes**

The recent survey by Professor Mantz Yorke, Visiting Professor, Lancaster University & Professor Bernard Longden, Liverpool Hope University had been largely conducted in 9 broad subject area over 25 institutions in February/March 2006. Some 75% of students taking part were aged 18-21., with 61% female and 81% white. Some 30 questions were offered in class time to be answered in 10 minutes, suggesting that some answers may be ill-considered. Those obviously

perfunctory were rejected, leaving a healthy proportion of reasonably reliable results.

The Survey had yielded challenging results, especially in the field of science and engineering, where students seem to be struggling most. Ability in maths seemed to be a key issue especially in the application of maths to practical problems. The survey confirmed earlier findings that a wide range of factors influence the first year experience and that differing reasons for considering dropping out emerged. They include:

- Financial
- Child care
- Balancing paid work and study
- Health
- Strength of peer support network
- Strength of family support
- Cultural
- Travel time from home
- Written English language ability

The most common single contributing factor in retention appeared to be financial.

For the conference, a few key trends had been extracted from the survey results with a fuller treatment of the data expected in the final report due out in October 2006. For instance, no attempt had been made to relate ethnicity and cultural background or qualifications other than traditional A-Levels to the trends emerging. Each participating institution in the survey was to be given the results from their student population to examine in whichever way they saw fit. A qualitative analysis of survey results from written comments of 74% of those surveyed was considered a significant outcome. They were asked to comment on the best and worse aspects of first year experience and give suggestions for change. Results were summarised, in order of frequency of response, as follows:

#### A) Best Features

- Meeting new people
- Gaining confidence personally and academically in a new level of independence
- Meeting people with differing backgrounds yet with shared experiences
- Benefiting from social interaction in a campus environment
- Getting helpful feedback on assignments
- Learning at a higher level and free to ask questions/seek explanations

#### B) Worse Features

- Modules not explained enough
- Too much to write down in lectures
- Seminars often better than lectures for imparting knowledge
- Some lecturers not listening to concerns
- Staff turnover disruptive
- Poor or no feedback on assignments
- Poor communication with staff

### C) Suggestions for Change

- Better time management to avoid rushed work
- Accommodation
- Change course
  
- More focus on student needs rather than staff needs
- Better organised staff
- Better timetabling of seminars/practicals back to back with lectures
- More concentrated lecture programme to minimise days required for attendance
- Manage time for more productive periods of staff contact

The brainstorming following this presentation produced a range of interesting questions put to the principal researchers. When asked what single factor would positively impact the first year student experience, the panel responded that *more face-to-face contact between students and lecturers in tutorials would make the most impact*. How this was to be achieved with growing class sizes and academic and technical support staff cuts was not addressed.

### Case Studies

The case studies revealed a wealth of innovation in UK Universities designed to engage students in active learning. Of particular note was the work of the Centre for Enquiry Based Learning (CEEBL) based at Manchester University. Of the case studies they presented by CEEBL, the one in Engineering was most relevant to the LEP (see Appendix 2). The use of online learning tools and modern modes of communication were showcased in the final panel session, to inspire the audience.

**In ‘Stepping Stone 2HE- Bridging the Transition Gap’**, Christine Keenan of Bournemouth University Institute of Health & Community Studies offered solutions designed to increase retention in Year 1. Their successful programme has been running for 5 years and was described as follows:

- Easing transition to HE
- Engaging students with learning immediately in arrival (i.e. not wasting the first lecture going over a Unit Guide)
- Making Induction meaningful and relevant
- Linking pre-induction activities in the design of an induction programme
- Learning about new students through a self-profiling questionnaire, then
- Providing an opportunity to identify students most at risk of early withdrawal

Regarding delivery, *Stepping Stones2HE* is a web based resource using Blackboard and QuestionMark Perception. It is made available to students when they receive an unconditional offer. It gives an introduction to

University life, study skills, support facilities and imparts much of the information normally crammed into induction week. It introduces PDP and gives staff an opportunity to enthuse about their subject. The resource tries to pre-empt familiar questions through publishing a FAQ page. Above all, it is about giving time and space to confidence building.

**‘Innovations in the First Year Experience @ SSU’** by Helena Lim presented a context of a large vocational portfolio at Southampton Solent, diverse student backgrounds and a good track record of turning students with modest entry profiles into graduates. Research findings showed that common experiences of their students included:

- Unsure of standards expected
- Independence and responsibility can be frightening
- Expect more support and guidance
- Difficulty understanding lectures jargon
- Desire to learn new skills, but unsure how
- Lost, lonely and confused
- Information overload
- No prior family HE experience
- Facing financial realities
- Unsure what to expect of University life
- Transition difficulties

Helena referred to the ‘lottery of personal tutoring’, with many seeking support from each other. The programme was introduced in 2002 to address this comprises *ongoing spiral induction* over some 6-10 weeks and *a visible access point for all support services*, in a network of support of well trained people. Information is drip fed to students at an appropriate pace, in relaxed informal sessions encouraging peer support. The logo of the initiative is ‘Students First’, with banners prominently displayed. After two full years of operation, reported transitional difficulties fell by a third without bringing in extra resources, just deploying existing ones better.

**The ‘Peer Guide Scheme’** at Bangor presented by Kim Davies showed how student volunteers made a real difference when piloted in sports Science in 1994-96. Today, with an intake of 2000, some 450 peer guides are deployed under Departmental Peer Guide Coordinators. All are screened and trained for their role and supplied with appropriate T-shirts, handbooks etc. Through ‘meet and greet’ and social participatory events Peer Guides have made a real difference. Recently, though some 16% of supported students had thought of withdrawing none actually did so. Some 14% had serious welfare issues, assisted by backup services.

**In City University ‘First Year Experience – Innovations in Midwifery’** Margaret Lane reported a typical intake profile of age 38, black African, with 5 GCSE or equivalent. Most were in part-time work trying to cope with a demanding prescriptive curriculum and 45% had another language than English as their first language. Through PADIR (Personal Academic Development Informatics & Research) programme learning needs were identified and research skills are imparted.

Healthcare Informatics are addressed through the ECDL programme to develop IT skills. They adopt the model 'The Gym of Learning', where the University provides the opportunity and students provide the effort. The key is pre-assessment to find out what is needed to reach the goal of academic success.

In '*Two generations: from Blowing in the Wind to Blowing in the Breeze*' Prof. Anne Carlisle PVC of the University of Wales, Newport reported trials with:

- Mass text messaging between lecturer and students for interactive learning, collaboration and reflective learning
- Use of digital images in teaching and assessment, in project galleries
- Use of web logs/blogs and wikis
- Online forums including threaded topics, knowledge sharing and discussions
- Use of Macromedia Breeze for instant messaging, developing a virtual community and lecture archiving

### **Conclusions and Recommendations**

The event gave an excellent overview of recent research and hands on experience in the first year student experience suitable for informing the LEP. The full survey report from Prof Mantze Yorke had not been published at end 2007. One finding that should be noted, however, is that the 2006 survey was largely conducted amongst white students (81%) with traditional 'A' Level background. Some 61% of the 7109 students submitting usable returns were female. The full report should indicate other ethnic details.

The case studies were the most rewarding part of the conference. From these a number of recommendations can be drawn for consideration by the LEP.

### **References**

HE Academy Conference papers website: <http://www.heacademy.ac.uk/4901.htm>

Centre for Enquiry Based Learning - CEEBL :  
<http://www.campus.manchester.ac.uk/ceeb/>

Stepping Stones 2HE : <http://ihcs.bournemouth.ac.uk/steps/index.html>

Kim Davies, 'Peer Guide Scheme' [peerguiding@bangor.ac.uk](mailto:peerguiding@bangor.ac.uk)

City University Learning Support: <http://www.city.ac.uk/s4s/learningsupport.html>

**Attachment 1 – Conference Programme**

- 10.00** Registration and coffee
- 10.30** Welcome – Allan Davies, The Higher Education Academy
- 10.35** Keynote 1: **Enhancing the student experience – research evidence from a literature review on the first year experience**  
Professor Lee Harvey, Sheffield Hallam University.
- 11.05** Keynote 2: **Students’ perspectives on the first year experience – findings from the first year experience survey**  
Professor Mantz Yorke, Visiting Professor, Lancaster University & Professor Bernard Longden, Liverpool Hope University.
- 11.45** Small group activity to identify and discuss issues arising from the Keynote papers
- 12.10** Panel Session: Mantz Yorke, Bernard Longden & Lee Harvey – to respond to issues arising from the groups
- 12.45** Lunch
- 13.30** Keynote 3: **Enquiry-based learning and the first year experience**  
Bill Hutchings (Director) & Karen O’Rourke (Associate Director) Centre for Excellence in Enquiry-Based Learning, University of Manchester
- 14.00** Workshop activity based on Keynote 3
- 14.45** Break
- 15.00** **Panel Session: Innovations in Relation to the First Year Experience - 5 case studies**  
Margaret Lane - Associate Dean of Students, City University  
Christine Keenan - Learning & Teaching Fellow, Bournemouth University  
Kim Davies - Central Peer Guide Co-ordinator, University of Wales Bangor  
Helena Lim – Senior Research Fellow, Southampton Solent University  
Anne Carlisle – Pro Vice Chancellor (Academic) Newport University
- 15.45** Plenary
- 15.55** Closing Comments:  
Allan Davies, Higher Education Academy
- 16.00** Close

## APPENDIX 5 - HEFCE Checklist on Highest qualification on entry

This extract indicates the wide range of qualifications which HE needs to be familiar with in order to conduct a fair admissions policy.

### Status

Compulsory.

### Valid Entries

- 01 Higher degree of UK institution
- 02 Postgraduate diploma or certificate, excluding PGCE
- 03 PGCE with QTS/GTC Registration
- 04 PGCE without QTS/GTC Registration
- 05 Postgraduate equivalent qualification not elsewhere specified
- 10 Undergraduate qualifications with QTS
- 11 First degree of UK institution
- 12 Graduate of EU institution
- 13 Graduate of other overseas institution
- 14 GNVQ/GSVQ level 5
- 15 NVQ/SVQ level 5
- 16 Graduate equivalent qualification not elsewhere specified
- 21 O.U. credit(s)
- 22 Other credits from UK HE institution
- 23 Certificate or diploma of education (i.e. non-graduate initial teacher training qualification)
- 24 HNC or HND (including BTEC and SCOTVEC equivalents)
- 25 Dip HE.
- 26 GNVQ/GSVQ level 4
- 27 NVQ/SVQ level 4
- 28 Professional qualifications.
- 29 Foundation course at HE level
- 30 Other HE qualification of less than degree standard
- 31 Foundation Degree
- 39 'A' level equivalent qualification not elsewhere specified
- 40 Any combinations of GCE 'A'/SCE 'Higher' and GNVQ/GSVQ or NVQ/SVQ at level 3
- 41 ONC or OND (including BTEC and SCOTVEC equivalents)
- 43 Foundation course at FE level
- 44 Access course (QAA recognised)
- 45 Access course (not QAA recognised)
- 47 Baccalaureate
- 48 ACCESS course (Code only available if COMDATE before 01/08/2002).
- 55 GCSE/'O' level qualifications only; SCE 'O' grades and Standard grades
- 56 Other non-advanced qualification
- 92 Accreditation of Prior (Experiential) Learning (APEL/APL)
- 93 Mature student admitted on basis of previous experience (without formal APEL/APL) and/or institution's own entrance examinations
- 94 Advanced Modern Apprenticeships
- 97 Other non-UK qualification, level not known
- 98 Student has no formal qualification
- 99 Not known

### Description

Used to indicate the highest qualification *on* entry, not necessarily that applicable *for* entry to the programme of study.

HEFCE use qualification on entry data to inform funding. For 2006/07 funding we expect that ***students with unknown entry qualifications will receive zero weighting***. In particular, where students have entered via UCAS with qualifications that should have a Tariff score but the Tariff score is not recorded on the HESA record HEFCE expect them to receive a zero weight.

## APPENDIX 6

### **The London Engineering Project:**

The London Engineering Project (LEP) is the first phase of a National Engineering Programme (NEP) to be run in London and 6 other cities. The NEP receives significant funding from the Higher Education Funding Council for England (HEFCE) through the strategic subjects fund (a sister to Aimhigher).

In 2004, there were a number of high-profile closures of science and engineering departments in universities around the country. HEFCE commissioned a review in late 2004. The finding was that, whilst there wasn't a crisis in our universities, there were certain problems with some subjects. One outcome was a list of strategically important and venerable subjects. Engineering was prominent in the list of subjects deemed of strategic importance to the health and prosperity of the nation. Another outcome was the setting up of the strategic subject fund.

Success with of the LEP will be a significant increase in the number of students and the diversity of students engaging in STEM activities; leading to an increase in the uptake of STEM subjects within higher education as well as widening participation of students in higher education in general. This would also mean creating more exciting and relevant opportunities for students to consider higher education as a career path and ensure students are making an informed choice about their future career.

**The project will target four main groups of students** to increase participation of the groups to include women, students from families with no experience of higher education, students from minority ethnic groups under-represented in engineering and adult learners.

The LEP also aims to work with universities and colleges to create new and attractive science, engineering and technology courses, which are both gender appropriate and culturally relevant to these target groups of students.

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