'WHAT'S THIS GOT TO DO WITH ENGINEERING?'
GETTING ENGINEERING STUDENTS TO THINK ABOUT PERSONAL AND CAREER DEVELOPMENT

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ABSTRACT

Engineering students, particularly those who study part-time, often have no clear picture of where they are headed and why. For many, it's just the qualification which is their goal: they are reluctant to delve further into their motives and develop broader career aspirations. The benefits of Personal Development Planning are clear, but establishing credible structures requires imagination and commitment.

In 1997 the National Inquiry into Higher Education, chaired by Lord Dearing, recommended the introduction of Progress files. This has evolved into a requirement for Personal Development Planning to be operational across the whole of higher education by 2005/6 generating substantial activity across the HE sector.

This paper shows how Personal Development Planning has been incorporated into the engineering qualifications of the UK's Open University. More importantly, it relates some of the challenges and experiences that the courses have provoked, particularly in getting engineering students to 'navel gaze'

INTRODUCTION

The history of the personal and career development courses in the UK's Open University (OU) can be traced to a UK government initiative dating from 1987. This programme, Enterprise in Higher Education (EHE), was set up to promote the development of qualities of enterprise among those seeking higher education qualifications. The OU was among some 56 Higher Education Institutions (HEIs) to receive money over the period 1988 to 1996.

These 'qualities of enterprise' were interpreted as a set of intellectual, personal and group skills that could be transferred from education to work and from job to job. On a more practical note, it permitted the development of programmes for student personal development as well as problem-based learning, peer assessment and recording achievement.

From industry, as represented by the UK Engineering Institutions, employers, the Engineering Council UK and the UK government, there was perceived to be a significant demand for career and personal development for engineers. These were articulated in documents such as the 'A New Millennium of Learning for Engineering' (1) from the Engineering Employers' Federation and the Royal Academy of Engineering's report 'Engineering Higher Education' (2) The EEF's document outlined their view that engineers in the future would need to be multi-skilled and more flexible. This would require active management of their development by individuals. Similarly, the Royal Academy report emphasised the need for 'continuous learning and career development'.

With such important bodies pressing these requirements, Personal and Career Development was destined to become mainstream and in 1997 the Dearing HE report (3) recommended the introduction of Progress files. This recommendation has evolved into a requirement for Personal Development Planning (PDP) to be operational across the whole of higher education by 2005/6. To facilitate this, substantial money in the form of the Fund for Development of Teaching and Learning (FDTL) and directly from the Department for Education and Employment (DfEE now DfES) has been made available to HEIs by the UK government. These have generated projects such as the FDTL's Personal and Academic Development for Students in Higher Education (PADSHE) and the DfEE's Recording Achievement.

Reports on several of these initiatives make it clear that there is much diversity in them and that any scheme needs to take account of local and professional contexts. For example, the University of Manchester's Recording Achievement Project, *From the Periphery to the Mainstream* (4) identified three models within their seven pilot schemes. These reflected the diversity which is necessary to consider if progress is to be made .This was reinforced in their reflections when they concluded that 'in a large institution, imposing a uniform project method upon departments is unlikely to succeed'.

THE DEVELOPMENT OF PDP IN THE OU

From the EHE funding, the Open University developed a generic course, *'Personal and Career Development'* in two versions either as a pack (E530) or a tutor-supported version, E730. These free-standing courses were assigned 15 CATS points and started in 1991.

The core of the course was a workbook which guided students through a series of more than 20 activities. These were structured so that students systematically take stock, plan, implement their plan and then, review their progress. They were also introduced to key skills (though in those days, they were called core skills) as well other important concepts such as learning styles and Kolb's learning cycle. The assignments and final report required that students provide evidence. It was emphasised throughout the course that these would be needed for their portfolio which would continue to be developed throughout their study with the OU.

This generic approach, using a portfolio, led the Engineering Council to fund a project in 1994 to see how E730 could be adapted for engineering. The emphasis was for the formation of engineers to promote

- self-awareness
- context awareness
- decision making
- action planning and research
- analysis and critical reflection

And the course, *Personal and Career Development in Engineering* (T191) was the result in 1998.

T191
Personal and career development in engineering
Level 1 15 points No residential school
Computer required

DESCRIPTION

This is the first of two compulsory courses in the Open University's Master of Engineering degree programme. Taking an innovative approach, the course teaches and evaluates general skills associated with lifelong learning and career management. You will examine your career position, the qualifications you already have and your learning needs. Two of the course's main purposes are to help you in compiling a development plan and in working out a programme of courses that suit your needs. Taking into account your aspirations, your experience and your qualifications, you'll select a set of courses that will satisfy the University's regulations for the award of an MEng. If you are also aiming for professional membership of an engineering institution, leading to chartered engineer status, your programme will be designed to satisfy the educational requirements of the institution you've selected.

The course will enable you to integrate career management skills with the subject-based skills and knowledge you will gain from later study. It will help you to produce:

- a profile of knowledge, qualifications and skills you already have
- an assessment of your opportunities for professional development
- a description of your goals fro development, with plans for achieving them
- two reports of tasks based on parts of your development plan
- a reflective account of the learning, both technical and personal, that you have experienced
- a portfolio containing a structured record of your self-evaluation, planning and project work

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Key Skills for Professional Engineers (T397) followed in 2000. This allowed students to review their progress since T191 and to prepare their professional review for their application to become chartered engineers.

T397
Key skills for professional engineers
Level 3 15 points No residential school
Computer required

DESCRIPTION

This is the second of the two compulsory courses in the Open University's Master of Engineering degree programme. It is designed to be taken late or last in your MEng studies. Building on T191 *Personal and career development in engineering*, T397 maintains an emphasis on career development. It extends and assesses your reflective and key skills in the context of your continuing professional development. If you are aiming for corporate membership of an engineering institution, leading to chartered engineer status, the context will include the professional review requirements of the institution you have selected.

Like T191, the course is activity-based, and is presented in two printed blocks, together with supplementary material audio and software material. you are provided with the conferencing package FirstClass to communicate with your tutor and with other students on the course.

By the end of the course you should:

- have prepared plans for your career progression including your professional review if applicable and have extended your portfolio as evidence of your continuing professional development
- understand and apply the key skills assessment process
- have evidence to show that you are competent in the key skills of *Communication, Working with others, Improving own learning and performance* and *IT literacy*

These courses were also worth 15 CATS points each and were structured to provide highly personalised tutorial support. Tutor groups were limited to 15 students and each student received a nominal 3 hours of the tutor's time. The assessment was based on how well the student engaged with the *process* of development and not on the viability or suitability of that development. The assignments during the course were formative with all the summative assessment taking place at the end with

the final report. The importance of providing evidence was at the heart of all guidance and assessment. This raised many issues about the format of the marking schemes as qualitative judgements were demanded throughout. However, the use of a single pass/fail threshold reduced the complexity of the decisions. Tutors and the assessment board could concentrate on providing constructive criticism of work rather than worry about grade boundaries.

In 1999, the Open University's Faculty of Technology introduced its undergraduate MEng qualification. It had been planned that Personal Development Planning would be a continuous thread throughout the study, but it proved too difficult to maintain the continuity of the PDP due to the OU's modular course structure. This meant that as part of the programme of study leading to this qualification, students were required to take the two separate personal and career development courses: one near the beginning and one near the end of their study. These acquired the label *bookend* courses.

In addition, the emphasis in both T191 and T397 on students making contact with their chosen professional institution has meant that employability is a key theme within the courses.

Version One

Up till the end of 2002, some 1371 students have taken and passed T191 and of them 236 have gone on to pass T397. There have been 139 MEngs awarded. Since it takes part-time students many years to complete a MEng of 480 CATS points, there are still many former T191 students *in the system.*

As befits an organisation which takes systems and information management very seriously, The Open University actively seeks feedback from students. The most important of this feedback is taken from extensive surveys of students at different stages. For example, there are snap-shot questionnaires at three months into the course as well as the end. Similarly, students who withdraw are asked for their opinions of the course. The responses are collated and, one would hope, pored over! A random sample of 400 students is selected for each new course and some continuing courses or a census if the course population is below this figure.
It is probably fair to say that as courses, T191/T397 produce polarised reactions. For example, 23% of

T191 students said in the 1999 report that they wouldn't recommend the course to other students compared to an average of 17% of students on other courses surveyed. This was also reflected in the response that 14% of the same sample did not find the course at all interesting. Some of this can be explained by the comments given by students such that they felt the course 'unsuitable for older students' and 'tedious for experienced professionals'. There was also a question of how well the course was presented: for example, over 50% found the final assignment was not very well explained.

The identification of a body of students which does not fully engage with this type of course appears to be common in other institutions. For example, feedback from the University of Manchester's Department of Planning and Landscape showed that 20% of students did not find the personal and development planning useful (4).

When compared to institutions who have participated in the DfEE and FDTL projects the Open University or more specifically, its Faculty of Technology's courses in Personal and Career Development are as established as in other universities. The problem for most institutions, the OU included, is how to move from successful piecemeal developments to co-ordinated institution-wide structures. Understanding the differences and appreciating the strengths and weaknesses of different schemes is part of this. Here the three models defined in O'Connell and Coe (4) from their work with different departments in their institution are helpful. The differences between the three models can be the degree to which their personal and academic development is formally assessed. The Enhanced Pastoral Support System is a structured framework that formalises the student-personal tutor relationship, whereas the Synoptic module is a fully assessed and accredited module of study. In between, is the Virtual or Distributed module where there is a framework for the acquisition of skills but the formal assessment and accreditation are of the overall portfolio. Using these definitions then the courses T191 and T397, with their accredited status, personalised tutor and Learner managed learning accord most closely to the Synoptic module.

Version Two

With such a large number of students having taken T191 and T397 as well as a large number of tutors,

the course team has access to a large constituency when it comes to appraising the effectiveness of the courses. Over the five years that the courses have run, there have been several recurrent themes: student overload, student confusion over the assessment requirements and the variability of assessment. These contributed in part to the need to revisit the courses; however the main catalyst for change came from an external source, the Quality Assurance Agency for Higher Education (QAA). The move in question was to ensure that all Masters qualifications had a requirement for post-graduate study. This meant that along with all undergraduate MEngs, the OU's MEng was no longer permissible as it was entirely an undergraduate programme of study. The subsequent introduction of a BEng and of a post-graduate MEng required that T191, in particular, had to be rewritten. Similarly, T397 was going to be affected by the change in the Qualifications and Curriculum Authority's (QCA) rewrite of the requirements for Key Skills.

At the same time, it became evident that there were major changes afoot in professional engineering with the changes in the Standards and Routes to Registration (SARTOR) requirements. These affected some important parts of the supporting material, making changes necessary. By monitoring the situation and discussing it with the Engineering Council, it was possible to incorporate the likely changes. These were published in December 2003 as UK-SPEC.

So in 2002, T191 was redesigned to incorporate the changes and in 2003 T397 enjoyed a similar make-over. This also provided an opportunity to introduce work on ethics and on the international context of engineering into T397.

The main changes in the courses were in the format of the continuous assessment. This was changed from being formative to being summative. However, the thresholds were defined to encourage students to engage with the process. This was achieved in the marking scheme and in advice given to tutors that a serious attempt at the assignments should merit a pass grade. The date of the first assignment was brought forward to encourage earlier engagement with the course. In addition, the end of course assessment was redefined so that the confusion which had been reported in student feedback was removed. This move was confirmed as successful in the feedback of the 2003 cohort. The percentage of around 160 students surveyed who complained of a lack of clarity with the assignments has fallen from 42% in 1999 to 18% in 2003.

REFLECTIONS

One of the more enjoyable aspects of re-writing T191 was the requirement to revisit the audio interviews. These formed an important part of the first version because they gave an opportunity for students to hear the experiences of practising engineers. Since we now had a good number of MEng graduates, we had a ready-made source of students who, not only, were practising engineers but had also taken T191 and T397. From the names we had, we were able to set up individual interviews with a group of MEng graduates. Extracts from eight were then used on an audio CD-Rom as material for the new version of the course. Also we included interviews with an existing tutor, the managing director of a company which had sponsored students on OU courses and a past president of an Engineering Council affiliated Institution. These interviews give a clear insight into the experience, or more specifically the pain of students as they studied T191. For example, one student said, on opening the course material, that he felt 'absolute horror' and that he found the 'personal aspects very difficult'. Similarly another asked the question 'What's this got to do with engineering?' but later described it as 'getting you into the right mindset early'

Other students discussed the difficulties they faced when taking T191. For example, one said that it was 'like thinking for yourself'. One of the main criticisms from most of the students was the 'softness' of the subject, however, one former student made a plea to current students to stick with it as he can 'now see all the benefits of it and can't do without it'.

One area where we haven't changed is in the recruitment of tutors. The Open University recently changed the contracts of its Associate Lecturers (ALs) whereby they became salaried staff with enhanced conditions of service. However, the course team felt no need to alter the person specification of the AL, having been highly satisfied with the calibre of tutor. Currently, we expect that ALs are chartered or incorporated engineers who can demonstrate a broad understanding of the professional and educational requirements for chartered and incorporated status with an engineering institution.

CONCLUSIONS

The most overwhelming conclusion that can be drawn from the OU's experience of running personal and career development courses is that,

far from prospective engineers not engaging with such courses, they actually get a great amount from them. Yes, there is a significant minority for who such reflective practice holds little appeal, but most do learn. In our view, it is therefore essential that career development is built into degree programmes. We have seen a significant increase (about 16% between 2002 and 2003) in the numbers of students taking T191 once the BEng was launched. This, we put down to the BEng requiring it. Similarly, without credit being attached to the courses, it would be difficult to convince a prospective student of their worth.

As serious reflection and planning take time, then engagement with the process needs to be early and sustained. This, we feel, is helped by making the assignments summative: not punitively so, but certainly enough to concentrate the students' minds.

What is central to the success of T191 and, to a lesser extent, T397 is the personalised tutoring system with tutors who have experience of professional engineering institutions. This gives them a quasi-mentoring role which helps students over any reluctance they may have to analysing themselves.

Finally, it is essential that courses are kept up-to-date especially with respect to professional membership. In many ways, the goal of becoming a professional engineer is what inspires our students. It just takes a little time for them to realise that T191 and T397 help them to achieve it.

REFERENCES

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