Reflection at work: making a positive difference to PDP modules

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Abstract:

The compulsory personal development planning modules, T191 *Personal development in engineering* and T397 *Key skills for professional engineers*, have acted as 'bookends' for the Open University's BEng(Hons) since 1998. Students undertake a structured programme of self-appraisal and planning activities to help them define and then follow an appropriate study plan of modules leading to their BEng(Hons). They are supported by an individual tutor, who is generally a chartered engineer, so that they can receive advice and guidance on their professional aspirations. Since its introduction, the HE level 1 module has had over 9000 registrations leading to around 2000 students progressing to the HE level 3 module.

As the recent successful accreditations of the MEng and BEng(Hons) by the Institution of Engineering and Technology and the Institution of Mechanical Engineers as well as the re-accreditations by the Institution of Engineering Designers and the Chartered Institution of Building Services Engineers attest, the emphasis on PDP within the qualifications is welcomed and endorsed by the Professional Engineering Institutions.

While the Open University can point to excellent levels of student satisfaction, both generally and in the Engineering programme, the PDP modules do not meet student expectations. This paper looks at improvements made to the PDP modules in recent years and presents evidence of significant success. It discusses the form and philosophy behind these changes to the modules' structure and assessment strategy. It goes on to consider the changes required by the move to the new funding regime and how these affects the implementation of PDP within the engineering qualifications.

Introduction

This paper is a sequel to a paper presented by the author at the Engineering Education Conference of 2004 at the University of Wolverhampton (Hush & Weidmann, 2004). In that paper entitled 'What's this got to do with engineering?' we covered the various difficulties and challenges that arose for part-time engineering students studying at a distance on a module of personal development planning (PDP).

The Open University modules, T191 *Personal development in engineering* and T397 *Key skills for professional engineers* have each been running for over 12 years now. They act as 'bookends' to the OU's BEng(Hons) preparing students for their time with the OU and then guiding them in planning for their post-graduate professional development. They have both been updated in form and content as well as being re-branded using the OU's new templates. These changes have allowed the modules to keep pace with the changes in the external world of professional engineering. So major changes in the Engineering Council UK's regulations, such as the withdrawal of SARTOR 3 and the introduction of UK-SPEC, have been accommodated.

The Open University is the leading provider of part-time general engineering higher education in the UK and has over 7000 students registered for its BEng (Hons) programme of whom around half will be currently studying. Over the past 4 years, the average cohort size for T191 is nearly 700 students starting.

The Open University's engineering programme

The OU has, since the establishment of its Technology Faculty in 1971, presented engineering modules. However, these generally were used by students to make up their BSc(Open) degrees and it was only with the introduction of an undergraduate MEng in the 1999 that a specialised engineering qualification was available. Further developments led to a BEng(Hons) being available in 2002 and with the QAA requirement that an MEng must have study at postgraduate level, the OU launched its postgraduate MEng, PGDip in Engineering and MSc in Engineering in 2003. Each has a core of personal and professional development as compulsory study.

The National Student Surveys (NSS) have generally provided very positive feedback for the OU and its educational offering with the university appearing in the top 5 nationally in every year so far. Within this, the engineering qualifications have also performed well with the BEng(Hons) appearing in first place in 2009 and 2011, and second in 2010 for overall satisfaction. However, we, along with many academics, view these surveys with scepticism. The OU is aware that its modular structure means that only students, who are pursuing a qualification for a number of years, are surveyed. This necessarily biases the results to those who are content to continue. In addition, the OU's engineering qualifications are categorised, accurately in our view, as General Engineering but this is a small field so the top ranking has to be seen in this context. The constant 90+% satisfaction is more significant.

However, once the individual questions are considered then the personal development question reveals less satisfaction with the OU's BEng(Hons) attracting an average of 74% over the years 2009-2011 and a much lower placement among comparator institutions.

Role of reflection in the OU's engineering programme

Reflective practice is central to the PDP's modules. It isn't always referred to as such but the activities such as *Taking stock* and *Planning for development* indicate the role of reflection. It is equally so with the production and presentation of the modules. All the OU's modules are subject to regular review during which the module team considers the performance of the students as well as their feedback. These reflections lead directly to the planning for changes in the presentation.

T191 and T397 operate on the high support/low direction model such as described by Hoyle and John (1995). Here the three legs of professional practice are identified as autonomy, knowledge and responsibility. The key to success for students is the ownership of the results and the processes, so the advice is about students learning for themselves about themselves.

Throughout our work with the BEng(Hons) at the Open University, we have been aware of the type of hurdles that our students need to cross both in the field of learning and in their chosen discipline of engineering. For example, if we consider an archetypal OU engineering student who has worked as a technician for ten years or so, then we can see that one of the learning challenges is that for many questions there is no right answer. So, as in design, different possibilities need evaluating against criteria which often need defining first. It is this process of identification and evaluation which the PDP modules propose.

Similarly, there is often the persistent but limiting notion that people have fixed intelligences and these can't be changed. This viewpoint can seem credible if your school record was one of modest achievement, but fortunately the very act of signing on for OU study reveals an intention to challenge it. Our PDP modules look to support students in that quest. Many of the activities and exercises require students to consider their achievements and to question their beliefs so that they can come to understand what is limiting their development. We seek to promote a serious reappraisal of their learning approach and their system of beliefs

The OU operates at such a scale (200,000+ students take modules each year),that there are automated questionnaires sent out for end of modules surveys. Additionally, we have access to routine data such as the retention rates and the completion rates. This gives us access to a significant amount of numerical data and it is proposed to make use of this information.

In the first part of this paper a straightforward 'before and after the changes' approach has been adopted. In addition, a three stage reflective structure has been adopted.

By comparing the responses of students from the before and after cohorts it should be possible to assess the impact of the changes. Then by comparing the responses from students in the equivalent survey from the 2010 October presentation, it can judged as to whether the improvements have been

sustained. Then these results will be compared to the pass rates of the students. Finally these comparisons will be discussed and some conclusions will be drawn.

Reflection on action

Review of version 2 of T191 and T397

Before we present those findings it is important to describe the changes and the justification for making them. There were several prompts to change, among them was the internal driver that the OU was rebranding its text based material (this meant that funding was readily available).

The principal reasons for change were:
* Negative responses from some students ('kindergarten approach', 'what a strange course')
* workload (seen as more than expected for 15 credits)
* style, pacing, repetition
* too abstract and intangible in places; too simplistic ('noddy') in others
* should explicitly require useful deliverables such as CV, programme of study, job application letter
* relevance to engineering needs more emphasis

The main changes were:
* word count in main text reduced by ~40% (49,100 → 30,800) – repetition and trivialtext removed
* *Activity Sheets* reduced from 59 → 26
* Module supported by a module website using the Virtual Learning Environment, so relevant links, documents and references are stored there
* two main text bindings replaced by a single one
* *Prologue* rewritten to increase emphasis on engineering context and relevance
* learning outcomes overhauled
* ECA in *Assignment Book*, not in Part 3 (and comes after Part 4, not before it!)
* *Study Guide* updated
* new format

The full list of changes is given in Appendix 1, but can be grouped around 3 main themes.
* Simplification
* Better introduction and support
* Organisation

While nothing in the list could be described as revolutionary or even radical, it would be hoped that even minor modifications produce positive outcomes. However, for some students there is a long way to go. This was an extreme example from one of recent feedback questionnaires,

Awful. I wish I had asked for my money back. I did after all pay for this badly formatted repetitive drivel. I can fully understand the intention of the course, but I think it needs to be taken down and the content revised extensively. I didn't finish the course and don't really regret it. Only now after several months have I come back to kickstart my study with something fresh. I will side step T191 for now (being a compulsory element of BEng) and hope that it goes away and is replaced by something useful and interesting. None of this I should say, is a reflection on my tutor, who was very supportive and helpful throughout the course.

Gathering the data

The main data relating to the success of the students are the pass rates. As can be seen in figure 1 these have been increasing very steadily over the past ten years with particular improvement in the success rates for new students. From the days of the first version of T191, this rate has increased and is now more than double. While the overall numbers of students taking T191 each year have increased by nearly 25% over the past 5 years, the number of new students per year has remained almost static; they now make up only just less than a third. In one sense this is a success as the advice being given to new students is that they should start with a module other than T191. However, it is still too high and their lower rate of success is largely attributed to the unfamiliarity of studying at a distance.

The new version of T191 was introduced in time for the 2008 October presentation (2008-09) and it can be seen clearly that the overall effect was positive with a resumption of the upward trend in the pass rate from 2008-09 onwards.
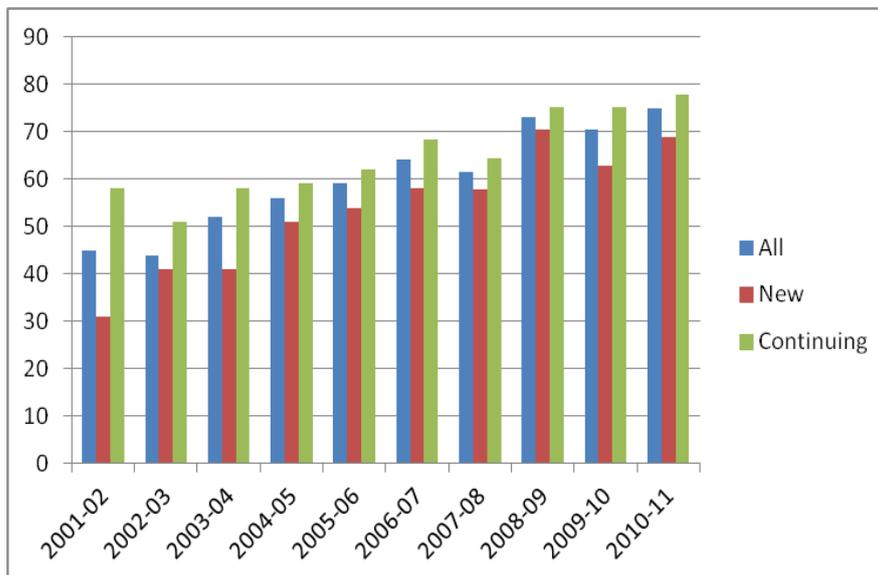
Figure 1 Percentage pass rates for T191 students (all, new and continuing students)

When we look at the pass rates and the recruitment, it would be easy to feel that the overall response to changes inT191 is positive and that the outlook is optimistic. Students are attracted to the qualification (and therefore the module), they are achieving well and continuing onto the later modules. However, when we look at the satisfaction rates as expressed in their feedback we see a different picture. Achievement and satisfaction are not necessarily synonymous.

For the main comparison we have used the 'end of module survey' which takes place every year for a selection of modules in the Open University. These surveys largely follow the same format year on year. This means that the answers to the 57 questions provide comprehensive data on students' views as the student body changes. Students can respond on a standard Likert scale of five responses from *Definitely agree* to *Definitely disagree*. The overall module questions are contained in Appendix 2. As can be seen there are a large number of questions but only a subset of five, related to the overall satisfaction ,has been considered for this paper. The combined 'definitely' and 'mostly' responses are given in Table 1 with the full breakdown given in Appendix 3.

The presentations that are being considered are the 2007 October presentation which finished in May 2008, the 2008 October which finished in May 2009 and the 2010 October which finished in May 2011.

Question	2007 Oct Agree and Strongly agree	2008 Oct Agree and Strongly agree	2010 Oct Agree and Strongly agree	2007 Oct Disagree and Strongly disagree	2008 Oct Disagree and Strongly disagree	2010 Oct Disagree and Strongly disagree
I would recommend this course to other students	36.9%	47.8%	32.5%	43.2%	32.2%	37.5%
This course met my expectations	39.6%	63.7%	40%	27.0%	16.5%	28.8%
I enjoyed studying this course	32.4%	49.5%	35%	44.1%	29.7%	40%
I had a clear understanding of the standards required in my assessed work.	54.1%	59.3%	52.9%	27.9%	27.8%	25.9%
Overall I am satisfied by my study experience	63.7%	67%	57.5%	19.7%	18.7%	26.3%
Number surveyed	291	230	401			
Responses received	112	91	90			
Percentage of responses	38.5%	39.7%	22.4%			

Table 1 Summary of satisfaction rates to T191

Reflection in action

Looking at the way the satisfaction figures have varied over the four years (07-10), then the changes have been consistent and can be summarised as an improvement in the October 2008 presentation from the October 2007 presentation, but a general deterioration across the measures by October 2010 to almost the same level as October 2007. However, when this is compared to the pass rates, it can be seen that the pass rate has not fallen back. So it can be concluded that students are passing but some unhappily. There must be a caveat to this interpretation in that students self-select after being invited to respond. While the absolute numbers replying have remained constant the rate of response has dropped as the number surveyed has gone up.

If the changes between those agreeing and disagreeing are considered then the drop between October 2008 and October 2010 in those who would recommend the course (-15%) is not matched by the increase in those who wouldn't recommend the course (+5%). This can be seen in figure 2. Whereas the increase between October 2007and October 2008 in those recommending the course (+11%) and the drop in those not recommending (-11%) is the same. There is an issue, therefore, in those who are ambivalent which is expressed in not responding or not giving an opinion. Overall the percentage of those respondents who didn't express an opinion stayed constant between 2007 and 2008 before rising by 10 percentage points between 2008 and 2010l.
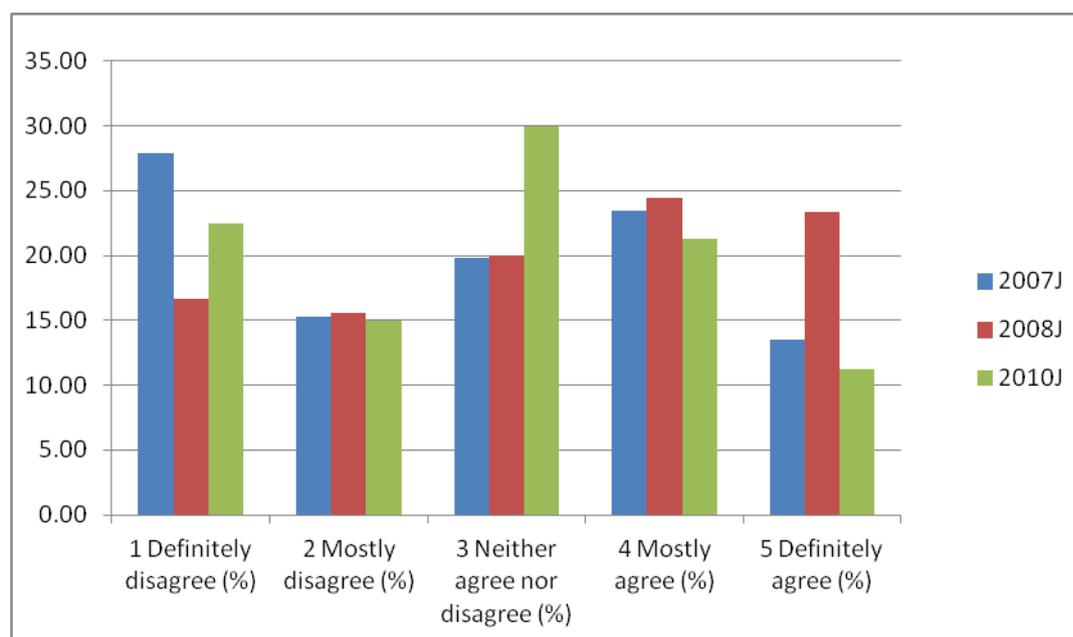

Figure 2 Full breakdown of responses to question 'I would recommend this course to other students'

If the responses to the end of module surveys are taken at face value, ie the responses are representative of the total population, then it can be concluded that the change in the look and feel of the module improved both the pass rate and the satisfaction levels. However, this effect on the satisfaction levels was not sustained to the October 2010 presentation.. If the National Student Survey, which has a question on whether students are satisfied with their personal development during their studies, is considered then there is contradictory evidence. There is a slight increase in the level of satisfaction going from 2009 at 73% to 2011 on 75%. It is noted that although these are similar size samples, they are not necessarily drawn from the same cohort as these students will normally be further on in their studies than the T191 sample.

So the question is, 'what has happened?'

One possible explanation is that the expectations of the OU's students looking to complete a BEng(Hons) have been shaped by the engineering accreditations that the OU have gained since 2008. With an automatic link between achievement of the qualification and professional recognition then it could be that students no longer feel they have to develop a suitable pathway or consider their skills development. In other words, the open ended reflective activities of T191 are not seen as relevant if you become eligible by completing the qualification.

Over the past 4 years, we have seen a significant increase of around 40% in the numbers of students taking our introductory module for the BEng(Hons.), *T173 Engineering the future*. It is thought that a large part of that increase can be attributed to the gaining of accreditation.

However, there have always been some strong adverse opinions about the PDP modules which many students do not refrain from expressing.

In trying to understand why there is such a strong reaction from some students, Herman and Kirkup (2008) related in their study of OU women returners undertaking PDP that some didn't like personal

reflection because it 'highlighted the barriers they faced'. However, they also found that, while students initially found the experience uncomfortable, they recognised the beneficial effects' once they had experienced the process'. This echoes the earlier findings on T191.

It has to be concluded that while students are succeeding in completing we are not getting the levels of satisfaction that are expected at the OU.

Reflection for action

What is the purpose of reflection in engineering education?

If there is one question that comes up with unremitting regularity it is this. 'Why do I have to do this navel-gazing?' When this does arise, then the answer is normally short and to the point. 'To help you make the choices which will support you in your career'. However, a much longer and theoretically more defendable response would draw on the extensive literature of self-development. For example, in Dweck, (2000) she describes a study where two groups of school students were either given a performance goal or a learning goal as part of a series of tasks. The difference being that the former would be used to evaluate their ability whereas the latter was an opportunity to learn some valuable skills. As the study progressed the similar performance in the early, easier tasks gave way to a distinct difference when more difficult tasks were encountered. The performance goal group became clearly more disheartened and helpless whereas the learning goal group responded by trying harder.

T191 endeavours to provide learning goals. The assessment is based on the extent to which students engage and their handling of the process. It is not about the quality of their plans or assessments. The learning is predominantly understanding their own motivations and the some of the learning outcomes are highly personal. For example,

You should have shown that you are able to assess your current abilities in some key skills areas and the factors that are likely to help or hinder your further learning and development

While a good number do struggle with the highly reflective nature of the module, many make significant and lasting use of the activities and outcomes. This experience is in keeping with others in the field.

Another approach would be to propose that knowing yourself is a prerequisite to being able to communicate. For example, an appeal to their desire to become a professional could be used.

> Lack of self-knowledge and an unwillingness to resolve our own internal conflicts make it harder for us to communicate with other people   (McKay, 1994)

Overall though, these esoteric responses are unlikely to be immediately persuasive. Generally, our explanations are couched in an argument of pragmatism which says that if you don't know why you want to study various modules then in the long hours of study ahead you may find it difficult to motivate yourself. Similarly, and possibly more successful, are those which make the link to the professional engineering institutions' requirements.

What is there to be done?

There is a sense that the PDP modules have been modified as much as they can be in their present form. Any further changes would amount to tinkering and so it is fortunate that an opportunity to recast them has emerged. This is because the funding changes in England's higher education system have required that the OU move from a module registration system to a qualification based registration system. Without a desire to seek a qualification, all OU students would be obliged fund their own study without subsidy. By opting for a qualification, part-time OU students based in England will have access to the student loan scheme for the first time. To establish a consistent and understandable approach, the OU has decided that each qualification has to have clearly defined pathways of modules bearing a minimum of 30 credits. Since T191 and T397 are currently 15 credits each, the programme needs to reconfigure the PDP modules.

In addition, the OU is moving away from its historic geographic based student support to a curriculum-based structure. This will present some significant opportunities, particularly in the management of student cohorts.

Comparing others' experiences of introducing PDP to engineering programmes such as Dravid and Duncan (2010) we can see that there are several potential improvements to consider. Notable among

these are the *introduction, induction and indoctrination* approach where the students are brought through a series of workshops which require them to present themselves to their peers and attend sessions with alumni and other professionals . Similarly, the idea of forming students into businesses with products to promote can be used facilitate engagement with PDP. This could be extended to include the discussion by peers of CVs and job applications.

Eliot and Turns (2011) described a number of structured workshops. In these, students worked together to produce professional statements. What is clear is that peer involvement aided both the creation of a professional identity as well as addressing some of the longstanding doubts expressed by students of the role of personal development.

What will be done

The current proposed structure for the programme's PDP modules is to incorporate them into new Engineering professional practice modules which include the mandatory residential elements. By combining the team working and professional development activities it is planned to expose students to the engineering profession in a tangible way early on. This approach is highlighted by Godfrey et al (2010) as a way to improve retention. It is intended to use peer working as a way of fostering a professional identity and to create a sense of shared career development. This will, in turn, require a way of communicating which specifically identifies skills and competences. Before long it is hoped that the benefits of reflective practice will be apparent.

References

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Hoyle, E and John, P (1995) *Professional knowledge and professional practice.* London: Cassell.

Mackay, D (1994) *Why don't people listen? Solving the communication problem,* Sydney: Pan Australia.

Dravid, R and Duncan, A (2010) Engineering Soft skills development to avoid hard knocks. *2011 IEEE Global Engineering Education Conference EDUCON 2011,* 4-6 April 2010, Amman, Jordan.

Godfrey,E. Aubrey, T. and King, R.(2010) Who leaves and who stays? Retention and attrition in engineering education *Engineering Education 2010: Inspiring the next generation of engineers EE2010* 6-8 July 2010 Aston, UK.

Hush, M & Weidmann, G (2004) What's this got to do with Engineering? Getting engineering students to think about personal and career development' *Innovation, good practice and research in engineering education*, June 2004 Wolverhampton, UK.

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Herman, C and Kirkup, G (2008) Learners in transition: the use of ePortfolios for women returners to science, engineering and technology *Innovations in Education and Teaching International* Volume 45, Issue 1.

Appendix 1

Changes made between version 1 and 2 of T191 and T397

The changes made

1. Rewritten **T191** to remain at Level 1 and count for 15 points, but requires updating to reflect changes (UK-SPEC) and progress on accreditation.

2. It should include an introduction to engineering study at the OU and the engineering programme (brochure provided).

3. There should be a strong introductory rationale for studying T191.

4. It is important to retain the reflective and key skills components of the current version.

5. A three-block structure is suggested.

6. Reported problem areas concerning workload should be tackled by reducing the number of Activity Sheets from 59 to around 20, by cutting out unnecessary repetition, and by omitting some of the less challenging aspects of current version.

7. The number of Learning Outcomes should be reduced by refinement and amalgamation (NB need to check that revised LOs are consistent with UK-SPEC).

8. Learning styles component should remain, but avoid ~£10k rights costs by either using North Carolina questionnaire (as T885 does). In any event, validity (or lack of it) should be exposed.

9. The End of Course Assessment (ECA) should be removed from the its position in the main text and appear in the Assignment Book; it should be simplified to a single task, namely that of producing a development plan; preliminary sections should be based on work already done for TMA01 (Tutor marked assignment 01) and TMA02 (modified in the light of tutor feedback).

10. The issues of sustainability and engineering ethics should be introduced (assessed as part of ECA).

11. TMA01 to consist of reflection (including analysis) on path taken to current position PLUS planned profile of courses in engineering (include credit transfer) to achieve BEng, MEng, or whatever, using Qualifications Planner and engineering website together with requirements of target engineering institution.

12. TMA02 to contain self-assessment of own key skills competencies (same four KS as in current version) PLUS copy of learning styles analysis PLUS own CV based on advice/guidance on OU Careers website.

13. One target is to reduce the amount of study text from its current 2.5 units-equivalent to about 1.5 (though the Study Guide would be expanded somewhat).

14. The overall aim, apart from necessary updating, is to increase student satisfaction and also improve retention.

15. **T397** would retain its current structure, but the Study Guide would be updated to reflect new material in T398 plus any progress on accreditation.

16. TMA01 in T397 would include requirement for a CV updated from T191 plus a letter of job application for one of four or five fictitious engineering jobs to match person specs supplied and based on advice/guidance on OU Careers website.

17. There should be an option for students on both courses to submit eTMAs, with evidence scanned in as attachments (NB 2 Mb limit).

Appendix 2

Q5 Course Overall

| *(Please select one for each statement)*	Definitely agree	Mostly agree	Neither agree nor disagree	Mostly disagree	Definitely disagree	Not applicable /used
Overall, I am satisfied with the quality of this course	☐	☐	☐	☐	☐	☐
Overall, I am satisfied with my study experience	☐	☐	☐	☐	☐	☐
The course provided good value for money	☐	☐	☐	☐	☐	☐
I was satisfied with the support provided by my tutor/study adviser on this course	☐	☐	☐	☐	☐	☐
Overall, I was satisfied with the teaching materials provided on this course (e.g. printed text, CD ROMs audio-visual materials, online materials delivered online)	☐	☐	☐	☐	☐	☐
The workload on this course was higher than I expected	☐	☐	☐	☐	☐	☐
The course met its stated learning outcomes	☐	☐	☐	☐	☐	☐
I would recommend this course to other students	☐	☐	☐	☐	☐	☐
The course met my expectations	☐	☐	☐	☐	☐	☐
I enjoyed studying this course	☐	☐	☐	☐	☐	☐

Appendix 3

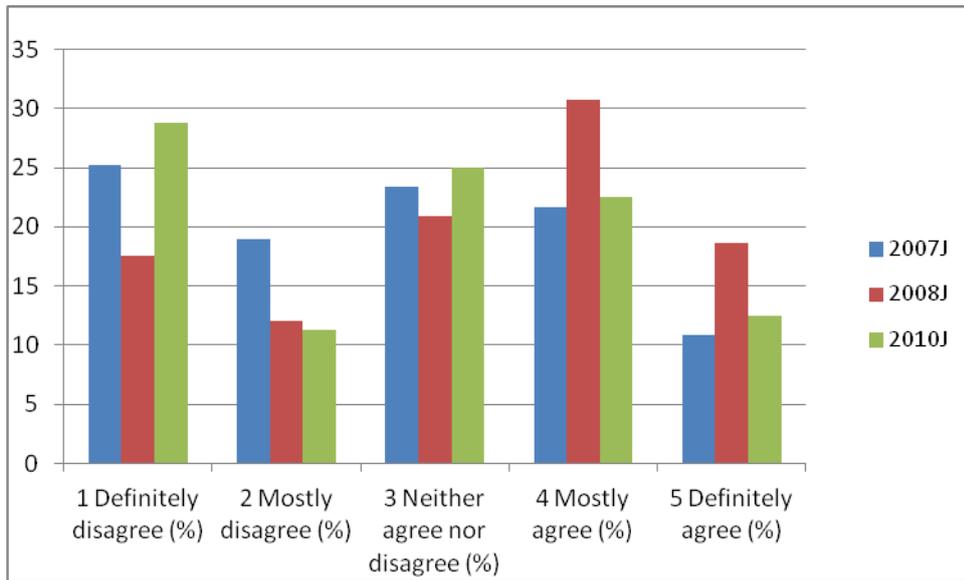Breakdown of the End of module surveys for the 5 questions considered

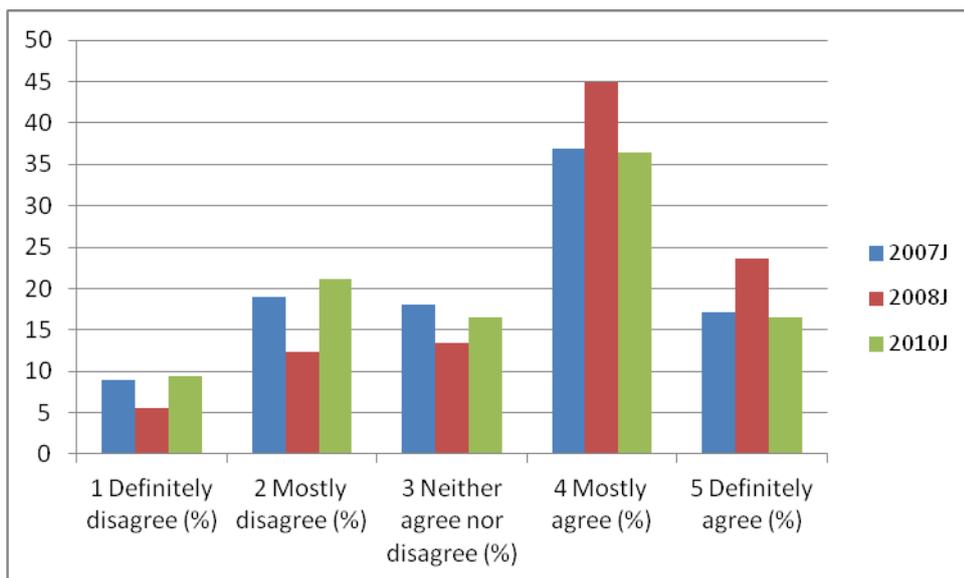I would recommend this course to other students
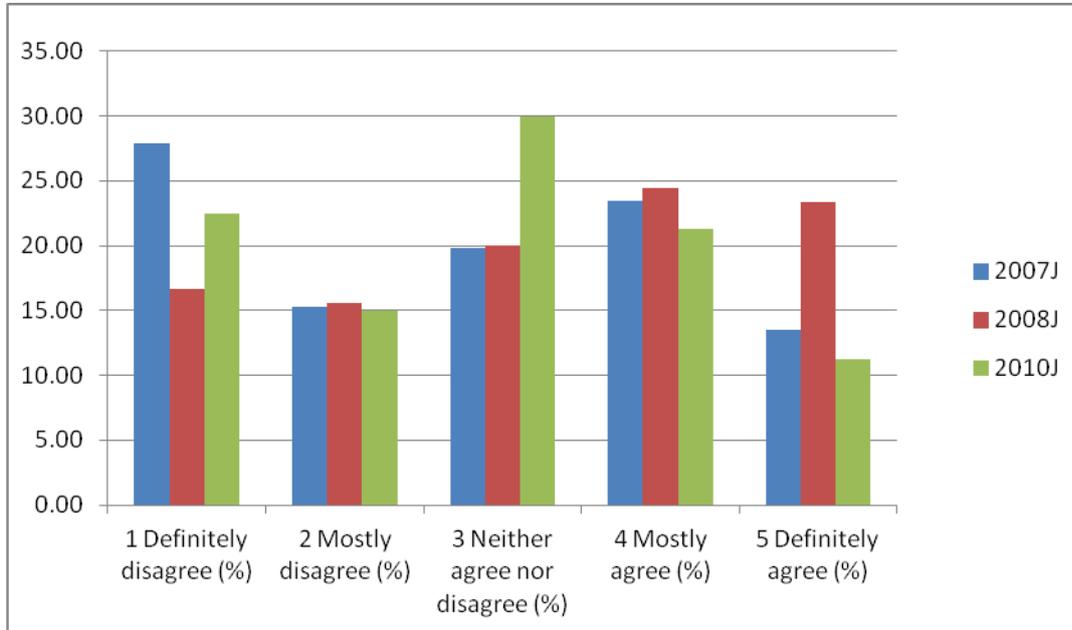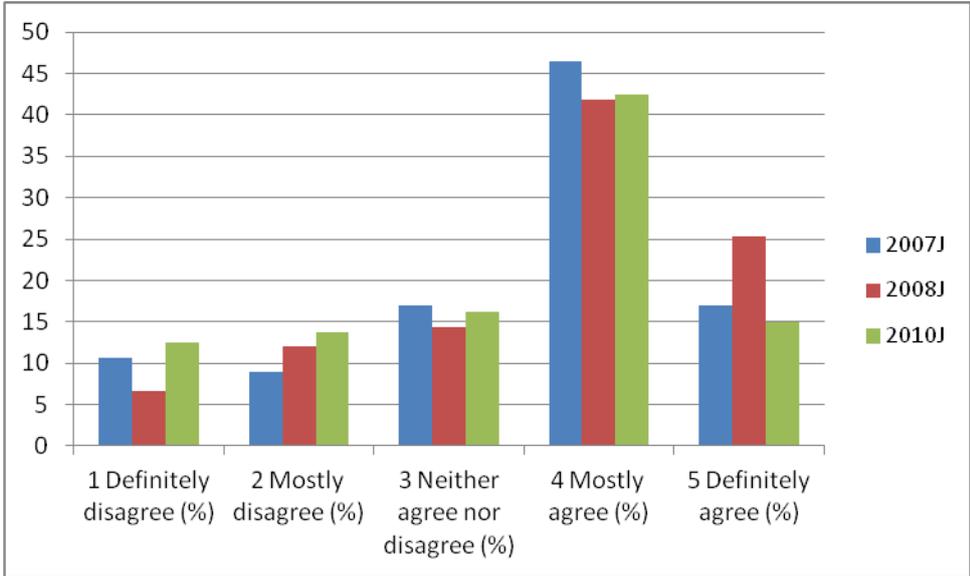

The course met my expectations
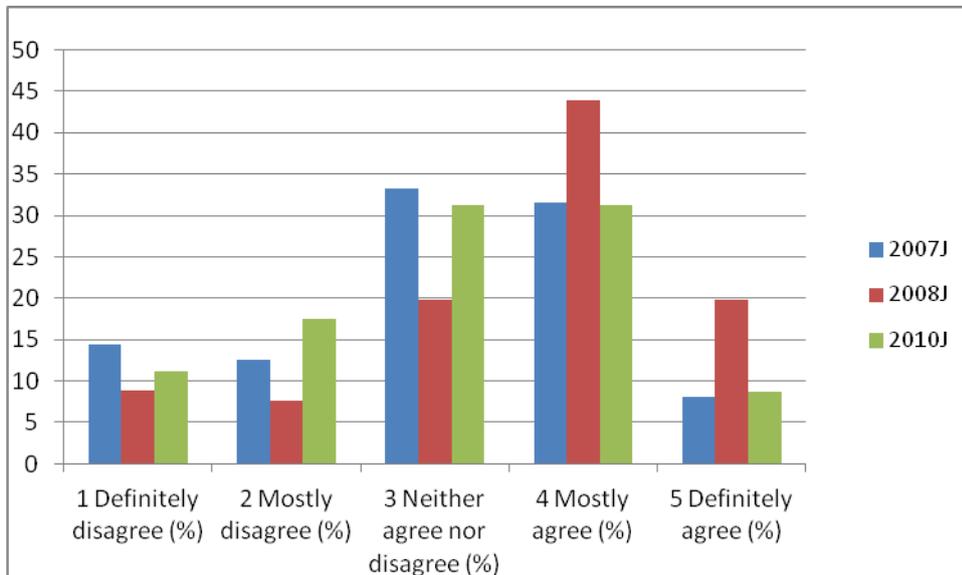
I enjoyed studying this course

I had a clear understanding of the standards required in my assessed work.

Overall, I am satisfied with my study experience.