
Engineering your workplace advantage: Personal Development Planning resources for undergraduate engineers

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Abstract: *This paper describes the potential of discipline-specific Personal Development Planning (PDP) support to contribute to learner engagement, and to increase understanding of the benefits of these processes. Students' appreciation of how academic and work-related learning are interrelated and link with future progression, is essential for both the widening participation and retention agendas. Development of transferable skills such as time management, teamwork, project management, report-writing and presentation skills, needs to be articulated and applied in different contexts. Students need to perceive the ongoing value of their learning tasks, which will help promote motivation, self-efficacy beliefs, and self-reliance.*

Discipline-based support has been shown to be more effective in engaging students in reflective activity, whilst also potentially increasing staff ownership and encouraging integration. This approach is promoted in the Engineering Subject Centre's Guide on PDP for Engineering Students, and the revised Guidelines on PDP from QAA (2009) stress the benefits of curriculum integration, highlighting customised approaches as examples of successful PDP implementation.

The on-line materials from this project help fill an identified gap in support for engineering students' personal and continuing professional development, encouraging skills articulation, critical reflection, self-awareness, and self-presentation skills, thus enhancing their employability. Responses in workshops have been very positive and it is expected that access to discipline-specific materials will provide a catalyst for more explicit PDP activity linked to curriculum tasks, and greater engagement with these processes. Particularly encouraging is the impact on the wider Applied Sciences department, which has resulted in collaborative work to develop similar materials for Computing.

Background

This paper describes a small-scale development project funded by the UK Higher Education Academy Engineering Subject Centre at Loughborough University. The project is based on the potential of discipline-specific support for personal and professional development planning activity (PDP) to contribute to learner engagement. Student appreciation of the benefits of these processes, and their understanding of how academic study and work-related learning interrelate and link with future progression, are essential for maximising the student experience of HE, and have positive implications for both the widening participation and retention agendas.

Engineering and technology sectors have long recognised the importance of softer skills for successful career development, as indicated in most job vacancy specifications, and in professional competency standards, for example, those of the Engineering Council UK. HE programmes in these fields however sometimes provide minimal support for the personal and professional development processes which encourage student awareness and articulation of such skills. There can be a tendency to regard reflection and self-analysis as low priority, yet students readily acknowledge their need for support in gaining a clearer understanding of personal strengths and qualities, and presenting themselves more effectively to others.

Discipline-based personal development planning activity has been shown to be more effective in engaging students in reflective processes, and encourages curriculum integration and staff ownership. This approach is promoted in the Engineering Subject Centre's *Guide: PDP for Engineering Students* (2005) while the revised guidance from the *QAA Personal development planning: guidance for institutional policy and practice in higher education* (2009) stresses the benefits of integrated support, highlighting customised approaches as examples of successful PDP implementation. Many such examples have been compiled by the Centre for Recording Achievement (CRA) and some course-based case studies are highlighted in *Personal Development Planning & Employability* (HEA 2006 Learning & Employability series 2)

Based on the positive response both locally and nationally to other discipline-specific PDP resource packs produced at The University of Northampton in association with four other HEA Subject Centres, it was hoped that a similar resource would help to engage our engineering students with PDP activity relevant to their modules and interests. In addition - again from experience with other departments where staff initially complied only reluctantly with the PDP agenda, it was hoped the materials would help enthuse staff in the Engineering division within the School of Applied Sciences of the benefits of establishing more explicit support.

Methodology

The focus of the project therefore was to produce web-based materials specific to engineering students to support their personal development and increase employability awareness. The resources have been designed to encourage greater engagement with Personal Development Planning processes such as skills articulation and transfer, critical reflection and self-evaluation, career planning and self-presentation skills.

They particularly support work-based experiences, helping students maximise the value of these, and encouraging clearer links between placement learning and the demands of academic study. In addition the materials build on existing research in our engineering department (*Adams et al, 2007*) into the development of graduate skills, in particular problem-solving and creativity. The activities equip students to present themselves more effectively through CVs, applications, and selection processes, and to refine skills in managing their ongoing professional development. Students are encouraged to start thinking as professional engineers, through links with the skills competency framework of the Engineering Council, and to develop regular habits of review, reflection and planning, in order to become effective professionals.

Preliminary research

A review of available resources was conducted focusing on the Engineering Subject Centre (ESC), and other relevant sources such as the resource bank compiled by the Centre for Recording Achievement (CRA) to support PDP, employability, and work-based learning, and employability materials on the Higher Education Academy web-site assembled by ESECT. This preliminary research into available subject-based resources confirmed that the sector had published guidance on PDP support for engineering departments, for example *Personal Development Planning for Engineering Students*, Engineering Subject Centre (2005) and recommended frameworks for tracking student progress, such as that developed through the Subject Centre's EASIMAP project. A number of previous papers produced by the UK Centre for Materials Education and the Engineering CETL at Loughborough relating to professional skills development and guidance on maximising the value of work placements were also identified, but the search identified a lack of student-facing PDP support materials. This confirmed that the project proposal would fill a gap in the ESC resources database, and suggested we should concentrate on producing templates and prompts which would encourage students' PDP activity through making the purpose explicit and using practical tasks.

The local context

The following features of the context of PDP practice at The University of Northampton provided some anchor points for the development of the resource:

- The project would build on well-established generic PDP tools developed at the University of Northampton, customised and extended for engineering students, and linked to curriculum content and support systems.
- Second year BSc students at Northampton are all on work placements with local employers such as Cosworth, and Wykes and Wealdstone, as part of the Northants Engineering Training

Partnership (NETP). This provided a suitable cohort with which to test the materials. They all have a first-year interview with employers, and are expected to keep a reflective log when on placement.

- The materials would be designed primarily for students' use - to maximise the benefits of work-based experiences, supporting pre-placement learning through to making applications; templates and prompts would encourage brief but regular reflective logs
- The tasks devised could be downloaded or saved into e-portfolios (an important feature for the future, both locally as our e-portfolio use is developed through Expo LX, part of Campus Pack in the Blackboard VLE, and nationally with ongoing research into effective practice with e-portfolios for personalised learning eg projects conducted by JISC)
- Materials would be signposted to staff to support seminar workshops and tutorials, and would facilitate PDP for students on programmes across the discipline
- A selection of reflective tasks could continue to be refined in seminar workshops at different levels as appropriate, with an emphasis on discussion and paired activities to help embed the PDP activities. It was envisaged that increasingly these workshops would be attended by academic staff to influence long term ownership of PDP practice.
- The material would include relevant careers resources including links to professional associations and options for further study, allowing students to broaden their aspirations and explore alternative routes. These would also support curriculum-based projects, context cases, or research tasks.

Several meetings were held with tutors to gain an understanding of current PDP practice and support for engineering undergraduates in terms of assignment briefs, tutorial support systems, and placement practices, including logs and recording mechanisms. Another early task was to explore the Engineering Council's (ECUK) sector framework of skills and competencies and those of associated professional bodies to identify a working list of graduate/ transferable skills relevant to engineers. Attending a presentation by the IET on professional development for student members was useful here, and this was followed by a close analysis of the on-line CPD framework and initial materials provided on-line to support members (Quick Start guide, and Career Manager) It was important that the language and style of the activities produced ensured that they were perceived by students as informing and contributing to this process of professional development.

Student views of professional skills development

In October 2008 first year students (37) were surveyed on their perceptions of skills needed by professional engineers, their ability to evidence and articulate personal examples, their experience of keeping PDP records, their understanding of the benefits of PDP, and areas where they would value support. This was followed in the following year with a similar survey of post-placement students. Results highlighted some interesting attitudes to the relative importance of 'softer' skills. For example while analytical, technical / theoretical skills, and creativity, were all rated as very important, on a scale of three, by at least 79%, oral and written communication, teamwork, and commercial awareness were only rated at this level by 40%, 47%, and 20%, respectively. (In the survey of post-placement students, proportions placing high importance on interpersonal and communication skills did seem to have increased, though the sample was very small). Views on the anticipated benefits of the placement focused on learning more about engineering (70%) rather than benefits for personal development or skills in relating to other people, (again this ranking appeared to have shifted for the post-placement students, who rated learning about self as most significant) On keeping records 58% had experience of tracking progress mostly for technical purposes, but there were positive comments on the benefits for personal development: 'demonstrates gradual progression of experience and responsibility, 'identifies key strengths and areas for improvement', 'proves the skills I have when moving departments' In terms of their understanding the purposes of PDP, it was again the more functional rather than insightful aspects which were identified: 'planning next steps' was selected by 29, while 'understanding yourself' by only nine.

In contrast however, support for becoming more self-aware was highlighted by 74% as a specific need, followed closely by help with planning and managing study tasks, and presenting themselves more effectively to others in applications. This provided a focus to the development of specific PDP tasks which would meet these needs, together with three areas identified by engineering tutors as linking with skills important in the curriculum: presentation skills, understanding team roles/peer evaluation, and project planning and management.

Development and piloting of materials

In response to students' expressed needs (and congruent with data gathered from students in other disciplines) the content of the materials were focused on the following areas:

- tasks to develop greater self-awareness and deeper reflection on self-development through work-place experiences
- materials to help gather and organise information for self-promotion and selection processes, in particular focusing on the need for concrete exemplars of personal and professional development
- oral communication skills needed in presentations, and in interviews
- planning tools to manage projects at work and also study assignments
- activities to help link placement and study, and appreciation of the transfer of generic skills

Twelve personal development tasks strongly linked to employability in engineering and were produced and trialled in workshops with level 4 pre-placement students (a mixture of HND and degree programmes in electrical/electronic and mechanical/production engineering) and level 6 post placement students at two stages of the final year of their programme. Practice in using critical incidents from the workplace to analyse their skills and behaviours, paired dialogue using prompting questions, and the opportunity to record thoughts and ideas in writing, helped encourage greater self-awareness and confidence. Typically workshops consisted of three selected tasks related to personal and professional development, but also linked to a forthcoming assessment task.

Outline of PDP tasks, linked to employability skills

Section 1: Connecting Study with Work-based Learning

1. *Making the links*: analysing selected academic assignments in terms of skills developed and relating these to workplace tasks; exploring the transferability of learning from one to the other, and the impact on professional development
2. *Gaining value from current workplace role*: Identifying key aspects of work role and responsibilities, and the personal skills and qualities being developed; improving awareness of current and potential contribution
3. *Placement Log*: Hints and suggestions on keeping regular records and articulating experience in terms of skills in addition to technical progress; templates for placement objectives, progress, achievements and evidence.
4. *Placement Summary record*: to help inform final report

Section 2: Essential skills for Study and Work (focus on planning, teamwork, and presentation)

5. *Project and Assignment Planning*: Briefing notes and exercise on project planning, with SWOT analysis and time management tips
6. *Evaluating team performance*: assessing and analysing varying contributions and roles in teams
7. *Presenting your work to others*: preparing outlines and summaries for reports, discussions and formal oral presentations
8. *Professional Engineering Skills Checklist*: identifying evidence and monitoring development of the competencies devised for incorporated and chartered engineers by the Engineering Council UK

Section 3: Becoming more Self-aware

9. *Critical incidents*: questioning and analysing examples from sport and work-place situations for greater understanding; consideration of different approaches
10. *Collecting personal evidence*: building a collection of specific examples to evidence softer skills; summarising key points to make an impact
11. *Drafting and Refining the CV*: translating experiences into employers' language and articulating skills to meet requirements; composing a personal profile

Section 4: Career planning and further resources

12. *Graduate Case study exercise*: consideration of engineering graduate roles and factors determining career paths, ease of getting started, tips on preparation.

Time available with the level 4 students was very limited so only informal feedback was possible initially, but the tutor is keen to embed such activities in future years. Feedback was gathered from the level 6 students on the benefits of the workshop exercises, and this was very positive. For example, workshop evaluation forms were received from the end of year level 6 group (16), and revealed that around 90% of the group felt the activities in the session had helped their understanding of how to:

'identify your strengths and skills' 15/16

'present yourself more effectively (in viva/interviews)' 15/16

'improve the impact of your CV' 14/16

'make sense of reflecting and recording your experiences' 15/16

'Good presentation and activities to participate in which kept us interested' Additional comments included asking for such input earlier in the programme *'this would be useful earlier as the viva presentation is a few weeks away - could have benefited earlier as have already done 3 presentations'*, and for more specific examples of CVs.

The materials were then adapted and converted to an on-line web format, with particular attention given to making these tasks purposeful for students and student-friendly. Practical, diagrammatic and paired activities help to avoid purely written methods of reflecting and recording progress.

In addition the transferability of the activities to other areas was also explored, selected activities being used with levels 5, 6, and 7 (Masters) Computing students within the department. This has now resulted in a similar pack being produced for this discipline area.

Benefits and Issues

The development of transferable ('soft') skills such as time management, teamwork, project management, report-writing and presentation skills, needs to be articulated and applied in different contexts. Students also need to perceive the ongoing value of their learning tasks, which will help promote positive engagement with learning and the development of professional attitudes and behaviours. The on-line materials from this project help provide a language for engineering students' personal and continuing professional development, supporting skills articulation, critical reflection, self-awareness, and self-presentation skills, thus enhancing their employability. The dialogic reflection encouraged in the workshops uncovers new perspectives on different learning experiences, and helps clarify strengths and the transferable nature of skills, resulting in greater self-awareness and self confidence.

As stated above and emphasised in literature from the QAA and HEA on the key role of PDP to support employability, staff involvement and ownership of PDP processes is essential if students are to fully participate in these activities. Support tools available in a familiar discourse and customised to fit with curriculum tasks help staff appreciate the benefits of providing space for practice in softer skills and self-awareness, and the close links with professional development and self-presentation. Most of the workshops were scheduled to coincide with an assignment requiring presentation, teamwork, or project management skills. For example, a session just prior to the final year project voce viva was used to practise summarising, outlining and presentation techniques, and these were all then applied to the challenges of presenting oneself in selection interviews.

While not all tutors in the department are yet fully engaged with use of the materials, it has been encouraging to see how those attending the workshops (2 from engineering, 3 from computing, approx 35% divisional staff) have been positively surprised at the enthusiastic response of the students, and are certainly willing to continue with the activities in this context. It is hoped that increasingly they will take more ownership and use the resources in tutorial support and for placement monitoring processes.

Evidence of success

Internal departmental involvement

Most workshops were attended by the tutors, who were enthusiastic, and expressed interest in continuing such support with all year groups next year, linked to curriculum activities involving teamwork, presentation, and project management skills. Initial feedback on the web-pages is also very positive - many tasks could be used by tutors in conjunction with academic assignments or for tutorial

preparation, while other materials support placements or professional and career development. It is hoped that access to discipline-specific materials will provide a catalyst for more explicit PDP activity and greater enthusiasm by both staff and students.

Student Evaluation

Student feedback and response in workshops has been very positive and the resulting on-line materials not only fill a gap in resources, but address specific needs identified by students at Northampton. These relate in particular to becoming more self-aware, evidencing specific transferable skills, and helping to develop self-presentation strategies. The final selection of tasks is actually more comprehensive than originally planned in order to provide a wide range of activities to cover these requests.

Clearly it is too early to say how these activities might influence graduates' ongoing employability and professional development, but early evaluation suggests they have helped them start to clarify what is involved in managing their personal progression effectively. Professional reflective practice is a high level skill which needs time to develop before it becomes habitual.

Wider impact locally and in the HE community

A particularly encouraging outcome is the impact on the wider Applied Sciences department, which has now resulted in collaborative work to develop similar materials for the Computing division. Workshops have been delivered at the request of staff for level 5, 6, and 7 students and these all received positive feedback from both students and the staff observing. Surveys with students have identified similar gaps and needs, which is helping to give a clear focus to the development of a relevant resource.

Dissemination of the on-line resource: 'Engineering your Workplace Advantage' which is accessible at <http://pdp.northampton.ac.uk/Engineering/home/index.html> has included a workshop at the CRA National Residential Seminar in Manchester, November 2009 and an overview at the January 2010 meeting of the recently – formed national Employability Developers Group, meeting at the University of Central Lancashire in Preston. Links to the materials have also been placed on the [Centre for Recording Achievement](#) web-site as well as the Engineering Subject Centre's site. It is hoped that initial high level of enthusiasm will result in this open-access material being used widely within the subject community.

An abstract 'Soft Skills for Scientists: not a Soft Option' has also been submitted for the forthcoming 'Learning Dialogues' Learning & Teaching conference in May 2010 at the University of Northampton.

Reflections and future plans

Establishing committed support for personal and professional development can typically be a long and sometimes arduous task, not least due to the misunderstandings and misconceptions of what this involves, plus a sense of it being an added burden for both students and staff. Essentially much of what is needed is a more explicit articulation of what is already happening, and some space provided to students for practising of these skills.

The availability of meaningful discipline-specific resources linked to the demands of professional roles and practice can help overcome these hurdles and encourage more enthusiastic engagement, especially when the processes involved are seen to support assessment activities. The project outcomes therefore might be considered as a lever for increased ownership of PDP support by staff and willingness to embrace the need to teach and support softer skills development. In addition provision of such resources has been shown in several cases to attract interest from other teams generating recognition of gaps in their own support structures.

As indicated above, the QAA Guidelines and current research into effective PDP practice emphasises the benefits of integration with curriculum activity and the significance of the process being valued by programme teams. The strong links with employability and professional practice are also important motivators for students and it is hoped that using such materials will help them make those essential connections between past, present, and future learning in different contexts.

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