



# Distance Learning in Nuclear and Project Management

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# DISTANCE LEARNING IN NUCLEAR AND PROJECT MANAGEMENT

The Manchester Nuclear Technology Management (N-PDP) and Project Management (PM-PDP) Modular Programmes

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## ABSTRACT

Manchester's Nuclear Technology Management programme (N-PDP) web-based 'distance-learning' part-time course is run in six-month's long modules. A few days at the University are required at the start of each module, followed by individual assignment work with university support by webinar and email. N-PDP is based upon a partnership with international companies. New build, operations and decommissioning are represented by the mature students\* currently in the programme. The teaching draws on speakers with long experience of nuclear projects and the Dalton Nuclear Institute's wide range of research between the university and the industry. N-PDP runs in parallel with the School's long-established Project Management Professional Development Programme (PM-PDP) so that delegates on the nuclear programme can take a module from that programme.

## 1. Introduction

Teaching and research in project management began in the University of Manchester in 1965 [1]. The firsts in research work with industry included case studies of contract payment systems, project organisations, cost modelling and risk assessment of major projects. Most recently the impact of professional development on human skills, urgent unexpected work and the management of uncertainty in nuclear and other safety-critical projects [2]. The Project Management Group is based in the School of Mechanical, Aerospace & Civil Engineering. It runs major full-time and part-time PhD and MSc programmes and industry distance-learning programmes with partners in Brazil, Dubai, Singapore and the USA. The Group has been employed by many companies to run dedicated development programmes for their project and technology leaders and was a UK partner in the European Institute for Advanced Project Management consortium.

In 1999 Rolls-Royce plc together with international construction, manufacturing and software companies formed a consortium to sponsor a development programme for their project and project-related staff. In October 1999 they selected Manchester as their preferred academic partner for this new professional development programme, 'PM-PDP'. Dedicated senior University and company staff developed the programme, supported by a team of work package leaders and specialist advisors. Intense discussions followed on objectives, content, delivery and structure. By May 2000 a full number of delegates from the companies were studying the first modules in the new programme. This speed of development and agreement shows that industry and academia can work together swiftly and effectively [3].

## 2. Objectives of the Professional Development Programmes

The objectives for the first professional development programme were agreed to be:

- Create a community of project management
- Share good practice
- Encourage professionalism

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\* The mature students from industry taking these programmes are called '**delegates**'

- Develop staff at all levels
- Raise the profile of project management and its importance to business performance.

To achieve these objectives the programme was designed to provide:

- Management education at a postgraduate level
- A ladder of opportunity for those seeking a postgraduate qualification
- Preparation for professional examinations
- Single modules in specific subjects that can be taken alone
- Flexible learning to suit busy professional staff

### **3. The Modular Professional Development Programmes**

A scheme of eight modules and learning outcomes was agreed as the vehicle for providing a flexible programme and enabling delegates to elect to follow only a single or selection of specific subjects. Each module is led by a member of university staff who is available to delegates by phone, email and a secure Virtual Learning Environment (Blackboard).

This web-enabled distance learning programme was designed so that busy professional staff need attend only a three day plenary session to start a module. The plenary events cover orientation, introductory lectures and guidance on learning skills, plus keynote lectures. Following that the delegates are supported by the tutors through the VLE, webinars and email as they work through the module reading, case studies, exercises and assignments. The programme is delivered in six-monthly cycles starting in April and October.

Each module requires some 150 hours of study and is worth 15 Credits. The delegates' work is assessed by assignments and an examination. The successful completion of four modules leads to a University of Manchester Postgraduate Certificate. Delegates who complete eight modules are awarded a University of Manchester Post Graduate Diploma. Those who go on to successfully complete a dissertation gain the University of Manchester MSc degree. To be eligible for the Diploma or MSc delegates are normally expected to have an existing qualification equivalent to that of lower second class Honours degree from a UK university.

The modules are subject to evaluation and review with the companies and an academic external examiner. Delegates are encouraged to complete feedback questionnaires to help the programme directors ensure that the programme continues to meet the needs and demands of industry and public services in the 21st century.

The programme is accredited by UK and US professional societies.

### **4. The Management of Nuclear Technology Professional Development Programme (N-PDP)**

Following this model the Manchester Nuclear Technology Management programme (N-PDP) has been designed for three groups of sponsored delegates:

- Graduates in nuclear industry organisations who are looking to develop their career into management
- Engineers and managers with experience outside the nuclear sector who are moving into it
- Established nuclear practitioners looking to widen their horizons

The modules for the N-PDP programme were designed by a team of members of the Project Management Group and the Dalton Nuclear Institute working in partnership with leading companies in nuclear new build, operations and decommissioning [4].

The scope of the modules is shown in Table 1. The programmes start with a foundation module. In N-PDP this module 'Essentials of Delivering Nuclear Technology' consists of sections on the challenges of delivering nuclear technology and the fundamentals of project management for the nuclear environment. It is a broad introduction providing the basis for progressing to the specialist modules shown in the tables. The final module includes preparation for the MSc dissertation.

N-PDP is endorsed by the IAEA.

N-PDP delegates can arrange to take one of the seven PM-PDP specialist modules.

| N-PDP MODULES                               | PM-PDP MODULES                             |
|---|--|
| Essentials of Delivering Nuclear Technology | Foundation Module                          |
| Decommissioning Nuclear Facilities          | Project Strategy and Risk                  |
| Fundamentals of Nuclear Energy              | Planning and Resource Management           |
| Nuclear Reactors and Nuclear Facilities     | Project Cost Management                    |
| Managing Nuclear Installation Safety        | Commercial and Procurement                 |
| The Nuclear Fuel Cycle                      | Systems Engineering and Project Management |
| Safeguards, Security and Safety Management  | People, Organisation and Culture           |
| Research Methods                            | Project Quality Management                 |
|   | Research Methods                           |

Table 1: The Modules in the N-PDP and PM-PDP Programmes

The expertise in reliability engineering and asset management required by engineers and managers in all industries are the subject of another professional development programme, REAM-PDP [5].

The modules available in these distance-learning programmes thus cover the life-cycle of a nuclear asset through to decommissioning illustrated in Figure 1.

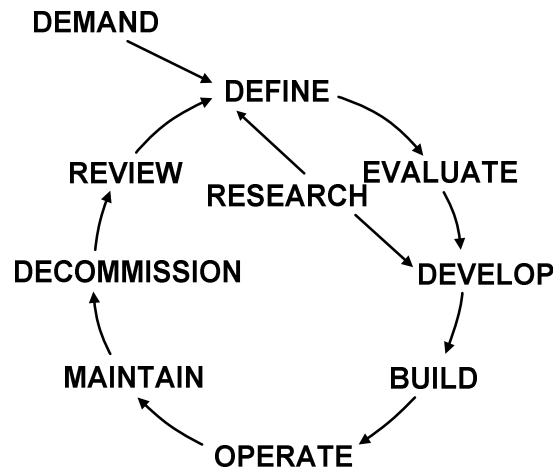


Figure 1: Asset Life Cycle

## 5. Conclusions

A combination of intensive residential events coupled with web-enabled learning appears to provide a robust learning and professional development platform. Flexibility in the work for a module has suited many delegates. Delegates who initially elected to take one module have then chosen to take more.

Attendance at Manchester requires only a few days away from offices and home per module.<sup>†</sup> It does require the commitment of delegates' time and their employers' support. The dedication of delegates to completing the modules shows that professional development programmes meet a great demand for advancing competence. Feedback from them confirms the value to them and their companies of the opportunities to reflect on how best to apply theory and the lessons of case studies to the challenges of their work.

The mode of delivery of the programmes is not complex but building these programmes requires the understanding and management of expectations for all stakeholders. Freezing the learning objectives, content and delivery of the first programme depended upon many meetings of industry specialists and academics. It all demanded their time. The meetings established a team spirit and common language between all levels concerned in the companies and the university that was very helpful through the continuing work of reviewing and up-dating the modules. Maintaining this is greatly helped by an active and empowered 'steering' group of company representatives and feedback to them from programme delegates.

Professional development does not come cheap, to employers or delegates. How its effectiveness and the return on the investment can be measured was demonstrated in independent research project [6].

Over 350 delegates from many different companies and government organisations have now successfully completed these Manchester programmes. The modular structure described provides a model for others to follow.

<sup>†</sup> Delegates from Austria, Brazil and Saudi Arabia are currently attending the programmes

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