

Formal Education in Project Management: Current and Future Trends

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Introduction

It is now widely accepted that competence comes from knowledge gained through formal education and experience (Boytziz, 1982). Elsewhere, we have written about experiential learning (Turner et al., 2000; Huemann, 2000). In this paper, we describe global developments in formal education in project management.

Project Management is becoming established as a profession, and an essential part of that is practitioners should have a sound theoretical knowledge of the subject, from which they can make predictions about which approaches will lead to better outcomes for their projects. Hence, the provision of formal education programs are an essential part of the development of the new profession. In this paper, we give an overview of the current state of formal education in project management throughout the world. We start by reviewing the role for education programs in the competence development of project management professionals. We then describe current education programs globally. Issues facing project management education and possible solutions are considered, and we review current trends in project management education. The paper derives from the work of the Global Working Party on Education and Training and a workshop at pm-days in Vienna in November 1999.

The Role of Education in Competence Development

The development of competence in a trade or profession requires the individual to gain a mixture of knowledge, skills, attitudes,

and behaviors to be able to deliver consistent and desirable results (Boytziz, 1982; Frame 1999; Heywood et al., 1992). Knowledge will be gained from a mixture of formal education and experience; the skills attitudes and behaviors through the experiential application of the knowledge. However, their acquisition will be more effective if the gaining of experience is guided by the science. Turner (2000) defines a profession as *a vocation requiring higher learning*.

Thus, in a profession there will be greater emphasis on the attainment of pure knowledge and an understanding of the underlying theory, whereas in a trade there will be a greater focus on the development of skills, with the need to know what works without the need to know why.

The Development of Individual Competence in Project Management

There are several ways of viewing the project management competence of individuals (Crawford & Gaynor, 1999). The German Project Management Associations (GPM) defines PM-competence as consisting of knowledge of the science, experience of project management gained in projects, and social capabilities and behaviors (Motzel, 1999). The Australian Institute of Project Management (AIPM) applies a performance-based approach (AIPM 1996). A third approach (Huemann, 2000) uses the concepts of explicit and tacit knowledge developed by Polanyi (1967) and Nonaka and Takeuchi (1995). Thus, experience of project management, whether viewed directly as experience (GPM), performance enhancement (AIPM) or the gaining of implicit knowledge (Huemann), is an essential part of PM-competence

Exhibit 1. Levels of Project Management Competence Development

Stage (Level)	Role	Scope of Management	Competence Development
1 (D)	Team member Project Specialist	Single discipline	Knowledge
2 (C)	Manager in a project role	Multi discipline Single company	Knowledge and 4 years experience
3 (B)	Manager of complex projects	Multi company	Knowledge and 8 years experience
4 (A)	Programme Director	Multi project	Knowledge and 12 years experience

Exhibit 2. Matching Qualification to Levels

Stage	UK Tertiary	UK NVQ	Germanic Tertiary	IPMA Certification	PMI	AIPM
1 (D)	Certificate	NVQ4		PM Practitioner		
2 (C)	Diploma	NVQ5	Fachhochschulen	PM Professional	PMP	
3 (B)	Masters		University	Project Manager		Reg PM
4 (A)	Doctoral			Programme Director		

Exhibit 3. A Selection of Masters Programs in Project Management

Country	Institution	Comments
Australia	University of Technology, Sydney	See New Zealand
Canada	University of Calgary University of Quebec	
Pan-European	EPCI EPPE Programme	1 Erasmus University Rotterdam 2 Wirtschaftsuniversität Wien 3 UMIST 4 Aberdeen University 5 University of Bremen 6 CERAM 7 Norwegian School of Management ? Stavanger Technical College
France	CERAM	See EPPE
Germany	University of Bremen Esslingen Graduate School Applied Sciences University of Konstanz Applied Sciences University of Nürtingen	Specialist MBA programme International industrial management IS project management
New Zealand	Unitech, Auckland	Run by UTS
Switzerland	Graduate Business School of St Gallen	Linked to IPMA Certification
South Africa	Henley Management College University of Pretoria University of South Africa	Distance learning, see UK
Ukraine	University of Kiev	Explicitly linked to IPMA certification, with government recognition
UK	Cranfield University Henley Management College Imperial College Lancaster University Loughborough University Reading University UMIST	Specialist MBA programme Construction project management Construction project management Engineering project management
USA	George Washington University University of Western Carolina	

development. This stress on the experience has two impacts. The first is project management education must be a process of life-long learning that follows the stages of development of an individual's career (see Exhibit 1) (Caupin et al., 1999). It is not possible to gain the experience to progress from a project team member to the manager of complex projects in one step. The second, as we shall see later, is on the teaching methods to be used in project management education, which must be able to enhance the participant's project management competence.

Education vs. Training

Based on the definitions in the Oxford English Dictionary, we define education as structured extended programs to impart

knowledge and develop competence and training as *short courses to develop specific skills*.

The Oxford English Dictionary says specifically that training involves practical experience to develop skills, and so relates to experiential learning, whereas education is formal teaching of the science. The gaining of implicit and explicit knowledge, or knowledge and experience, requires extended, structured programs—education by the above definition. Here, we focus on education programs to develop project management competence, and give an overview of various programs. We only briefly mention project management as components of other education programs, and we do not discuss individual project management training elements.

Matching Educational Qualifications to the Levels

In many countries, educational and professional qualifications exist to match the stages of competence development. Formal education programs result in qualifications linked to stages of career development. Professional associations globally have also developed certification programs to provide markers for the career development of people following private or in-company education programs. Exhibit 2 gives:

1. Qualifications awarded in the U.K. tertiary sector
2. National vocational qualifications awarded in the U.K.
3. Institutions offering qualifications in German speaking countries
4. Certification offered by the International Project Management Association
5. Certification offered by the Project Management Institute
6. Certification offered by the Australian Institute of Project Management.

Tertiary Education

Masters programs in Project Management have been offered in the U.K. for over 20 years, since the Engineering Construction Industry Training Board (ECITB) started programs at Cranfield University and Henley Management College. They are now offered by universities worldwide (see Exhibit 3) although they are still relatively rare. Delivery methods vary, with full-time, part-time, and distance-learning programs. The duration of the programs last from one to two years or longer. Most European programs include a dissertation element (Levene, 1999). The programs in Exhibit 3 are all essentially post experience. They are aimed at people who have already progressed through the first two stages of their career development and are now embarking on the third. There are, as Exhibit 2 indicates, programs offered at certificate and diploma level. These are offered by some, but not all, of the institutions listed in Exhibit 3.

To our knowledge, there are no Bachelor programs in project management in countries operating the Anglo-Saxon educational system. There are programs at Fachhochschulen in German-speaking countries, (Germany, Austria, and Switzerland). Training in Project Management is carried out below masters' level in bachelor programs as part of degrees in business or technical studies. In Austria, several Fachhochschulen have included project management in their curricula. The attendees of these courses may or may not have (working) experience. Some people are of the opinion that project management is practically oriented and so cannot be taught to students without any practical experience. However, the trend can be observed that basic project management is being taught at an earlier and earlier age. In Austria, it is being taught in some schools to pupils of the age from 16 to 19 years, and we believe even down to primary school in some countries.

National Vocational Qualifications

In the U.K. and Australia, National Vocational Qualifications (NVQs) have been developed to provide qualifications to people

following more independent education programs. In the U.K., these are aimed at people at the first two stages of project management competence development. NVQs were initially aimed more at people following a trade rather than a profession, and hence are very practically oriented. They measure the outputs from education programs (i.e., the gaining of competence and the increased job performance). The University sector tends to measure the inputs to the process, that is the gaining of explicit knowledge. Because NVQs are aimed at a wide range of people from artisans, (trade) to young professionals, those aimed at young professionals start at Level 4. Hence, there are no NVQs at Levels 1, 2 or 3 for project management professionals.

Certification Programs to Mark Competence Development

Certification programs have been developed to provide markers for people following independent or in-company programs. Variants of the IPMA programme are offered in European countries from the Ukraine to the U.K. The Ukraine is the one country in Europe where it has official government recognition, although the program offered by AIPM in Australia also has government recognition (but is not related to the IPMA program). Exhibit 1 shows the knowledge and experience requirements of the IPMA four-stage process. A requirement of the program, which follows the standard EN45013, is that the certifying body should be separate from the training body. The certification truly represents an assessment of an individual's competence development through an independent educational program. This program also illustrates that education and competence development are life long by requiring recertification at each level.

Issues Facing Project Management Education

Against this background, there are several issues facing educators. These issues were identified at the Global Working Party in Project Management Education, at the 8th Global Forum, held in Philadelphia in October 1999, at the time of PMI's 30th Seminars and Symposium. The issues fall into six areas:

- A: Commonality and difference
- B: Structure of the education process
- C: Practical relevance of the education and training process
- D: Support of top management and other stakeholders
- E: New trends in project management education.

A: Commonality and Difference

A problem in developing education and training programs is that differences exist in the use of terms and the application of methodologies. These differences arise from differences of:

1. *Language:* Differences in language can occur between organizations, between countries speaking the same language or between languages. Organizations use the words "promoter," "sponsor," and "champion" differently; Americans and English

Exhibit 4. Reasons Why Top Management Support May Be Lacking and Ways to Win It

Reason	Solution
Ignorance about the organizational cost of unsuccessful projects	Orient senior managers 1 about business practices 2 with testimonials and benchmarks 3 with documented disasters 4 with practitioner involvement
Distinction between ongoing operations and projects	Present project management as a way to do business
They themselves have no knowledge or experience of project management	Further orient senior managers ? demonstrate skills required of project manager ? recommend the need for certification ? highlight the benefit to themselves
They have the engineers misbelief that technical knowledge is enough	As above
They think that all projects regardless of technology and functionality use common processes	Show successful projects and results

have different meanings for the word “budget”; and the Germans have no word equivalent in meaning to “scope.”

2. *Culture and Values*: Differences in culture and values can occur between types of project, types of resource (Payne & Turner, 1999), between legal systems and, of course, between people (Rees, 2000; Turner 1999).

The use of standards will help to overcome differences in language. However, people writing standards must recognize the difference between the concept and use of vocabulary. They must define the concept carefully, but allow different people to attach different words to the same concept. Indeed the people developing standards would perform a service by including a thesaurus of different word usages. Perhaps English needs to be adopted as the *lingua franca* of project management, which has already happened by default in many areas.

Education programs need to recognize differences in culture and values, but to impose one approach as superior would not only be cultural imperialism, but may lead to inferior outcomes (Payne & Turner, 1999).

B: Structure of the Education Process

There are several issues relating to the structure of the education process, and to how its efficacy is measured. These issues fall into three broad categories:

1. *Education as life-long learning*: We have seen above that project management education needs to follow career development. But when should it start. As part of the move to the project-oriented society, project management is now being taught in primary school. The process should continue throughout the individual’s professional career, linked to qualifications as shown in Exhibit 2, and to continuing professional development to maintain professional status. It is felt necessary to provide people with the motivation to partake in life-long learning.

2. *Measuring performance*: In order to constantly improve education programs and their contribution to the profession and individual development, it is necessary measure their per-

formance and efficacy. Techniques for doing this are not well developed.

3. *Balancing conflicting needs*: There is a need to balance conflicting needs. Different outcomes are required by the individuals following programs, the organizations they work for, and the societies in which they work. There are also conflicts between for short-term, specific improvements and longer-term, broad competence development, and between the needs of organizations and requirements of universities for pedagogical and academic rigor. We have already seen that programs need to be culturally diverse.

C: Practical Relevance of the Education and Training Process

We saw above the need to balance conflicting demands between the short-term and long-term development of individuals, and between the need for academic rigor in universities and the development needs of organizations. This raises issues of the relevance of education and training programs:

1. *Conceptual vs. Practical*: Do you teach knowledge for its own sake, or develop competence required to fulfil the job. If project management is a profession some teaching of knowledge for its own sake must be part of the education process. However, people paying for the education or training will be looking to reap the benefits of the improved competence of those they are putting through the programs.

2. *Academic vs. business*: A related issue is the balance between academic and business. Some academic programs (business schools, Fachhochschulen, or technical colleges) are oriented to competence development. But universities are more oriented to the teaching of knowledge for its own sake. In American universities, there is a trend toward scientific management. Project Management is viewed as being almost impossible to pull within that framework. It is rejected by the American Academy of Management as a subject worthy of study. Another dimension of this issue is that many universities have specific requirements

that must be met by degree programs, and these sometimes require the incorporation of elements of no practical relevance to business. Project management is an applied science.

3. *Long-term vs. short-term:* This is by definition of the difference between education and training. The sponsor looks for immediate gains from training programs with immediate improvement in specific skills. Sponsors assigning people to an education programme take a longer-term view, expecting more substantial competence development. However, they may not want to wait to the end of the program before seeing benefit, expecting immediate improvements in some skills following individual elements.

4. *Education as part of the change process:* Some training elements can be linked to tactical change within an organization. Individual training packages can be offered as project start-up workshops. Taking a strategic view, education processes can be designed as part of the conversion an organization from a functionally oriented one to a project-oriented one. Taking a wider perspective, government and universities can be involved in leading a change to a project-oriented society.

5. *Teaching of soft skills:* One reason why project management does not appeal to the University sector is it is an eclectic, polymath subject. You need to be a jack of all trades and a master of none. It requires programs to range over operations research, human resources, organizational design, organizational behavior, finance and economics, law, information systems, etc. The teaching of soft skills is just one component of the wide panoply of subjects that an education program in project management must cover.

D: The Support of Top Management and Other Stakeholders

Organizations and managers that employ project managers need immediate returns from their investment in education and training. Like any project, for the programs to be effective they need a sponsor from top management. Five reasons why top management support may be lacking, and possible ways to overcome those problems or win top management support are shown in Exhibit 4.

E: Future Trends

The last set of issues deals with trends in project management education. These are covered in the next section.

New Trends in Project Management Education

New trends in Project Management education include new modes of delivery and cross-border cooperation.

New Modes of Delivery

Different education programs use different teaching methods. A good education program will always be designed in a way to use

a multiple-method approach and design the learning process according to the target group of the program. Traditional and modern teaching methods are often used in combination. Examples of more traditional teaching methods are theoretical inputs and discussions, which are applied in all education programs. However, we saw at the start of this paper that the gaining of experience is an essential component of project management education to aid the development of tacit knowledge. Teaching methods that allow the participants to apply the concepts introduced and so help the gaining of experience are the following.

Case Studies: Cases can be predesigned case studies for which the participants should develop solutions, or cases provided by the participant. As an example of the latter, at the University of Economics and Business Administration Vienna, teams of three to five participants are asked to draw up of a project management handbook for a project provided by one of them. This guides the participants through a whole program as a golden thread. At the end of the program each team has a very comprehensive project handbook that can be used as a model case in their daily work, and the group has gone through the experience of applying project management tools. There can also be sharing between teams as well as within teams. This can be supported by reflection settings, and feedback settings, whereby both the educator and other teams give feedback.

Shared Experiences: Teaching methods used in project management education depend on the project management experience the participants already have. In an education program like the EPPE program, described next, involving participants with vast project management experience, the educators can use the group as a strong tool and support the sharing of experience between the participants. In other words that would support the transformation of implicit knowledge into communicable explicit knowledge.

Simulations: Other teaching methods that have recently become available are simulations of project work, (Cano et al., 1999; Graham 1998). These simulation come in form of business games played in small teams or IT-supported simulation games to be “played” either individually or in small teams on a computer.

Web-based Training: Using the World Wide Web to reach students wherever they are. While some universities are hesitant to develop such tools, some private providers like the International Institute for Learning and ESI have online courses, which are already used in university programs. These programs often use different teaching methods like theoretical inputs, case studies, and reviews. However, their shortcoming for experienced participants is that they miss the exchange of experience in a peer group.

Cross-Border Cooperation

In Europe there is growing cross-border cooperation in project management education. One such program is the European Programme for Project Executives involving eight universities from across Europe (see Exhibit 3). Delegates study seven

modules from a list of nine, giving them exposure to shared experiences of a range of cultures both from the delegates and from the universities.

Conclusion

Formal education is essential for the development of the competence of individuals operating within a profession. Formal education is best suited to developing the scientific, or explicit, knowledge, associated with the profession, although techniques are being developed for using formal education to develop implicit or tacit knowledge (what Plato called intuition or “right opinion”). On the other hand, experiential learning is more suited to developing tacit knowledge, although it can contribute to the development of explicit knowledge.

The development of project management competence is a life-long process, requiring formal education and experiential learning, tracking the increasing levels of competence required for the increasing complexity of more senior project management positions.

Up to now, formal education in project management has essentially been post-experience. Masters degrees are offered around the world. In the U.K., National Vocational Qualifications are also offered. However, there is now a growth of project management training offered as part of undergraduate programs or even at school.

The Global Working Group on education has identified several issues relating to project management education:

- The need for standardization of project management education globally, both in the method of delivery and in the knowledge taught, while still recognizing essential cultural difference.
- The development of appropriate structures for the education process to meet the needs of all the stakeholders.
- The practical relevance of education programs to meet the needs of business and individuals for applicable competence development, while still meeting pedagogical needs and the quality standards of university teaching.
- Obtaining the support and commitment of senior management to the need for the education of project management professionals, and the relevance of project management as a career and profession.
- Developing new models and techniques of project management education to enable the development of tacit knowledge in the classroom.

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