

Effective project management education is essential for the development of a profession at the crossroads

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Biography

Barrie Todhunter is an 'accidental' academic, coming from a background of professional practice in architecture and project management in Australia and overseas. He currently coordinates the project management specialisation programs in the MBA program at the University of Southern Queensland, and is carrying out doctoral studies into the effectiveness of postgraduate project management education.

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Abstract

This paper asserts that there is a lack of a conceptual framework for the development of effective project management education. Formal education has been almost totally lacking for project management, which has 'emerged' as a profession from the hard disciplines of engineering and construction where management of large and complex undertakings necessitated high-level skills and competencies. Today, project management education is migrating to the postgraduate business schools where its application in softer environments for implementation of business strategy, technology programs, marketing campaigns and organisational restructuring requires students to learn an even wider range of skills and behaviours.

Practitioners have formed professional bodies and taken the initiative in producing bodies of knowledge and competency standards for professional practice. Accreditation by such bodies often does not value tertiary qualifications highly and focuses primarily on the demonstration of a narrow range of vocational competencies, and this places their approach at odds with the commonly held view of what constitutes a profession. As universities increasingly embrace project management education, there is a lack of a theoretical framework and empirical research into what constitutes effective education for project management and development of competent practitioners, and university-based educators and industry are at odds regarding the direction of education and accreditation.

To support the assertion, this paper provides an overview of the exploratory qualitative stage of doctoral research, and includes a review of existing literature on project management education, an analysis of semi-structured interviews with representatives of major stakeholders, and an outline of future stages of the research.

Key words

Project management, professional education, pedagogy, effectiveness, postgraduate

Introduction

This paper looks at the pedagogical issues associated with postgraduate education in project management. Often referred to as an 'accidental profession' because of the way that practitioners enter the field, project management is struggling to create an identity and a theoretical framework that can be used for professional practice and professional development. Initially the paper looks at the definition of effective education in a higher education context, and then considers the issues associated with project management education from the point of view of numerous stakeholders. As one of the major stakeholders, the Australian Institute of Project Management (AIPM) has had a strong influence since its inception over the development of a professional identity, professional development, and accreditation. However, the competency-based focus adopted for accreditation has led to a misalignment between the processes and objectives of project management training and those of higher education. This paper considers how a conceptual and theoretical framework could be developed that is suitable for 'competency-based learning' at all levels.

Research proposal

This paper asserts that:

- project management education lacks an adequate conceptual framework that is aligned with the objectives of valid professional development,
- the existing bodies of knowledge and competency standards developed by the professional bodies do not provide a suitable framework for evaluation of the effectiveness of educational programs, and
- such a framework must consider a broad range of higher-level outcomes.

Effective project management education

The first section of this paper looks at what constitutes effective project management education. Turner et al. (2000) observe that most project personnel hold a qualification or first degree in an area other than project management (so further education is approached at postgraduate level), fewer than fifteen percent of project personnel hold any form of project management certification or registration, and that the majority of project personnel have gained their knowledge through experiential learning.

Formal project management education is relatively new to the higher education sector and Master's level programs are still uncommon throughout most of the world. They are generally post-experience and aimed at professionals who are advanced in their chosen careers (Turner & Huemann 2000). Despite project management having its roots in the engineering and defence industries, Jaafari (1998, p. 514) suggests that it 'has tended to evolve into an independent discipline, even to the point of defining competency levels for project managers...', but there is still 'no coherent and systematic programmes for the preparation of project managers from an early age through to full professional status'.

More than twenty distinct delivery methods of project management education have been identified in the United States of America (Wirth & Amos 1996). Table 1 provides an overview of training and educational programs in Australia, ranging from vocational training programs offered by private training organisations and Technical and Further Education (TAFE) institutions, predominantly using a competency-based approach, through to doctoral programs. At this stage, there is no evidence of any undergraduate Bachelor programs in project management in Australia, consistent with the pattern internationally (Turner & Huemann 2000).

From articles in professional journals, the most common type of formal project management education is at Masters level in an on-campus part-time mode, and apart from the program at the University of Southern Queensland, most are offered through the faculties of engineering, architecture or construction, consistent with the origins of the discipline (Australian Institute of Project Management 2002).

The Project Management Institute (PMI) in the United States of America offers professional accreditation through their Project Management Professional (PMP) program, based on academic qualifications and a knowledge-based multiple-choice questionnaire. The Australian Institute of Project Management (AIPM) offers their Registered Project Manager (RegPM) professional accreditation program using competency-based assessment rather than academic qualifications. There are three levels of the RegPM program reflecting increasing levels of responsibilities—Qualified Practising Practitioner (QPP), Registered Project Manager (RPM), and Master Project Director (MPD).

Table 1: General Characteristics of Project Management Training and Educational Programs in Australia

Item	Training	TAFE	HE Undergrad	HE Master's coursework	HE Masters research	HE Prof doctorate	HE Research doctorate
Provider of education	Private training organisation RTO	TAFE	University	University	University	University	University
Location of student learning	<ul style="list-style-type: none"> • Training org'n • Workplace 	<ul style="list-style-type: none"> • On-campus • Workplace 	<ul style="list-style-type: none"> • On-campus • Off-campus 	<ul style="list-style-type: none"> • On-campus • Off-campus 	<ul style="list-style-type: none"> • On-campus • Off-campus 	<ul style="list-style-type: none"> • Off-campus 	<ul style="list-style-type: none"> • On-campus • Off-campus
Method of educator / student interaction	<ul style="list-style-type: none"> • Face to face 	<ul style="list-style-type: none"> • Face to face 	<ul style="list-style-type: none"> • Face to face • Distance 	<ul style="list-style-type: none"> • Face to face • Distance 	<ul style="list-style-type: none"> • Face to face • Distance 	<ul style="list-style-type: none"> • Distance 	<ul style="list-style-type: none"> • Face to face • Distance
Purpose of program	Vocational competencies	Vocational competencies	Learning competencies	Learning competencies	Research competencies	Research competencies	Research competencies
Professional role relevant to educational program	<ul style="list-style-type: none"> • Team member 	<ul style="list-style-type: none"> • Team member 	<ul style="list-style-type: none"> • Team member • Project manager 	<ul style="list-style-type: none"> • Team member • Project manager • Project director 	<ul style="list-style-type: none"> • Project manager • Project director 	<ul style="list-style-type: none"> • Project director 	<ul style="list-style-type: none"> • Project director
Applicability to professional accreditation by PMI (USA)	Medium	Medium	Medium	Low	Low	Low	Low
Applicability to professional accreditation by AIPM (Australia)	High	High	Low	Nil	Nil	Nil	Nil
Academic level suggested as a prerequisite for AIPM RegPM accreditation levels	<ul style="list-style-type: none"> • QPP 	<ul style="list-style-type: none"> • QPP 	<ul style="list-style-type: none"> • QPP • RPM 	<ul style="list-style-type: none"> • RPM • MPD 	<ul style="list-style-type: none"> • RPM • MPD 	<ul style="list-style-type: none"> • MPD 	<ul style="list-style-type: none"> • MPD
Suitable for workplace based learning	Yes	Yes	No	No	No	No	No
Utilisation for	Unlikely	Yes	Yes	Yes	Yes	No	Yes
<ul style="list-style-type: none"> • full time learning program • part time learning program 	Yes	Yes	Yes	Yes	Yes	Yes	Yes

From Table 1 and a review of the current literature, the following conclusions may be drawn about project management education in Australia:

- Private registered training organisations (RTOs) and TAFE colleges provide the bulk of project management education, and this is provided as vocational competency-based programs aimed at practitioners at team member level
- There are few, if any, undergraduate degree programs, and formal education is undertaken predominantly at postgraduate level
- Postgraduate programs are targeted at practitioners at a higher level of the professional community such as project managers and program directors
- Coursework Masters programs focus on a mix of knowledge, cognitive and functional competencies, whereas other postgraduate programs have an emphasis on personal, behavioural, values, ethical and research competencies (see the elements of professional competence in table 3).
- Higher education programs, which are not competency-based, provide little value for practitioners in achieving professional accreditation under current models.

The nature of professional education

Project management is often represented as a 'profession' although it is arguable whether it has reached that level of acceptance in the community (Turner 1999). Research indicates that professional practitioners should have a sound theoretical knowledge of the subject and that the provision of formal educational programs is an essential part of the development of a new profession (Turner & Huemann 2000). Based on the views of Schon (1987), Benson (2001, p. 92) suggests 'that the most important areas of professional practice lie beyond the instrumental boundaries based on technical expertise and go into the more indeterminate areas of practice that deal with uncertainty, uniqueness and value conflict' and that the 'outstanding professionals in all areas, including those with high levels of formal rationality, reflect wisdom, intuition and artistry beyond the instrumental'.

Dinham and Stritter (1986) differentiate professional education from trades or craft by its 'reliance on theory' (p. 952), and differentiate higher educational curricula by the inclusion of educational experiences and professional initiation through an apprenticeship. One of the distinctions of a profession is the requirement to 'set aside personal beliefs and preferences in favour of the client's best interests' (p. 953). They describe professional education in terms of 'transforming the student's gestalt from confusion to familiarity, so the student comes to inhabit the professional world'. Their conclusions include that there is no magical formula to predict a learner's academic nor professional performance, preparation must include more than merely cognitive knowledge, and that successful education requires both the 'art' of teaching and the 'science' of teaching'.

They raise valid questions about determining the effectiveness of professional education (p. 964) as indicated below:

- Are there student attributes that will result in better prepared professionals?
- What aspects of professional education must students master before entering the practical environment?
- Have the characteristics of effective practical instruction been fully identified?
- What are the most efficient and the most effective methods for evaluating a learner's practical performance?

Of importance to project management is their suggestion that professional education suffers from two versions of insufficient theory:

- Many professions are themselves loosely defined, and that their practice is based on models such as habit, the 'artist as hero', or craftsmanship—there is no 'theory of action'; and
- Professional education, resting on an already tenuous theory base, suffers further because there is little education theory of action for instruction – particularly practical instruction.

Objectives of learning and evaluation

Jones & Paolucci (1999, p. 9) suggest that 'assessment of learning outcomes provides the major feedback mechanism' and 'is critical in evaluating the instructional system and its effectiveness. The information that is collected as evidence of learning achievement will depend on the nature of competency being measured'. These consist of 'cognitive tests (measurement of intellectual skills), performance tests (measurement of capability) and attitudinal tests (measurement of disposition and perspective)'.

Bloom's (1956) taxonomy of learning in the cognitive domain provides part of an essential framework for understanding desirable educational objectives and skills and the processes necessary to achieve them. The hierarchy of learning outcomes for this domain is:

- lower order learning objectives of knowledge, comprehension and application; and
- higher order learning objectives of analysis, synthesis, and evaluation.

Jones & Paolucci (1999) suggest that 'learning is achieved when a permanent change in thinking, attitude, or behaviour is experienced' (p. 3) and that instructional objectives can and should be based on one or more of the following factors:

- learning domain—cognitive, affective or psychomotor
- learner profile—objectives should be appropriate for the learner's level of ability
- task characteristics—instructional objectives should be appropriate for the tasks associated with the subject matter that is to be learned, and
- grouping—instructional objectives should be appropriate for the grouping arrangement and learning situation.

Farivarsadri (2001) has researched the pedagogy of architectural education and asserts that 'education's purpose goes much beyond the mere transformation of knowledge; it aims at implementing changes in the patterns of behaviour of a social group in the desired direction' (p. 2). He also indicates that apart from preparing students for a profession, a university architectural education 'is different from training that is only giving knowledge and skills necessary to serve a profession' and that:

'a holistic university education aims at addressing the whole person, developing the personalities of students in different dimensions, making them know how to acquire knowledge, to communicate, to be aware of his own values, and those of the other's as well. So does a holistic architectural education. This education in one end should prepare student for the profession with necessary abilities and skills and on the other end should educate them as people aware of social realities, being able to see the problems, to find solutions, have critical thinking, have their own values, etc' (p . 2).

This is consistent with the views of tertiary educators from interviews carried out by the author, but appears to be in conflict with the limited range of competencies considered for professional development and accreditation by professional bodies.

Conner et al (1996, p. 33) remind us that 'what might be effective when we're novice learners, meeting complex bodies of information for the first time, may not be effective, efficient, or stimulating for learners who are more familiar with the content'. Consideration of competencies in the affective domain becomes increasingly significant as higher levels of education are reached, such as those in postgraduate studies. The importance of competencies in the psychomotor domain varies from discipline to discipline. They may be of considerable importance to professional activities in medicine (surgery) and architecture (design and drawing), but may be of marginal importance to project management and many other business disciplines.

Learning effectiveness

Research into the effectiveness of educational programs recommends consideration of the learning outcomes over the entire program, rather than perceptions of the effectiveness of a single component of the program, or of the learning processes themselves, and research into distance education suggests a consistent lack of a theoretical or conceptual framework in such evaluation (Perraton 2000; Phipps & Merisotis 1999; Saba 2000). The conceptual framework of project management education must consider the significant components of learning outcomes mapped to an existing overall framework of professional competencies, and these are considered later.

Kretovics and McCambridge (2002) have indicated that the research focus 'has now shifted to value-added measures that assess what students have actually learned as a result of their participation' and that 'one systematic way to measure student learning would be to compare measures of student competencies at the beginning and end of their educational experience' but concede that 'few schools of business have conducted outcome studies that compare their graduates to their newly admitted students'. They conclude that 'there are no significant differences in the learning outcomes of students enrolled in distance courses as compared to traditional face-to-face classroom settings'. Their framework involved measurement of twelve learning skills grouped into four major skill areas:

- interpersonal skills—helping, leadership, and relationship skills
- information gathering skills—sense-making, information gathering, information analysis
- behavioural skills—goal setting, action, initiative, and
- analytical skills—theory, quantitative, technology.

(Kretovics & McCambridge 2002)

Exploratory research into project management education

To confirm the conclusions drawn from the literature review discussed above, the author has carried out interviews with representatives of major stakeholders in project management education including academic staff from three universities offering Masters level programs in project management, a Government project manager responsible for providing project management services and training in the public service sector, a senior consulting project manager who is also an executive office holder of a major professional body in Australia, a senior project manager providing consulting and contractual services to the Department of Defence, and a postgraduate project management student.

Data reduction and analysis of the interview material has identified the following themes and categories relating to postgraduate education in project management:

- The incorporation of ***autonomous learning processes*** including:
 - reflective and self-referential learning skills
 - deep learning
 - the academic role to be one of facilitation
 - mapped to an overall competency framework
 - incorporating a range of assessment techniques including self-assessment and peer-assessment
 - high levels of communication among educators and students
- ***Personal transformation*** outcomes to include:
 - change mindset and perspective
 - generate new visions
 - change platform of thinking
 - development of personal competencies and soft competencies
 - becoming a lifelong learner
 - challenge and address prejudices
 - qualifications, recognition and status
- ***Professional transformation*** outcomes to include:
 - development of professional competencies
 - become self reflective with regard to ongoing professional development
 - involvement in the definition and development of the profession
 - provide a positive influence on changing the professional culture
 - establishment of professional standards and best practice

These conclusions are consistent with the views of Jarvis (1998, p. 77) who suggests a focus on such concepts as 'self-determination, self-actualisation or self-transformation as the underlying concepts of all education for adults'.

Table 2 provides a comparison of the pedagogical issues associated with the project management programs identified in table 1. From the comparison in table 2, the following conclusions may be drawn with regard to postgraduate programs:

- The '*approach to learning*' changes significantly for postgraduate programs from one of directed learning to one of independent learning
- Although the *assessment media* for postgraduate coursework programs are similar to those of undergraduate programs (assignments and examinations), the recommended *assessment methods* change significantly to incorporate self-assessment, peer-assessment and group-assessment.
- The emphasis for *learning objectives* changes from lower order to higher order
- The nature of *communication* changes from an emphasis of instructor/student to one of student/student, involving a high level of collaborative learning.

Table 2: Pedagogical Dimensions of Project Management Training and Educational Programs in Australia

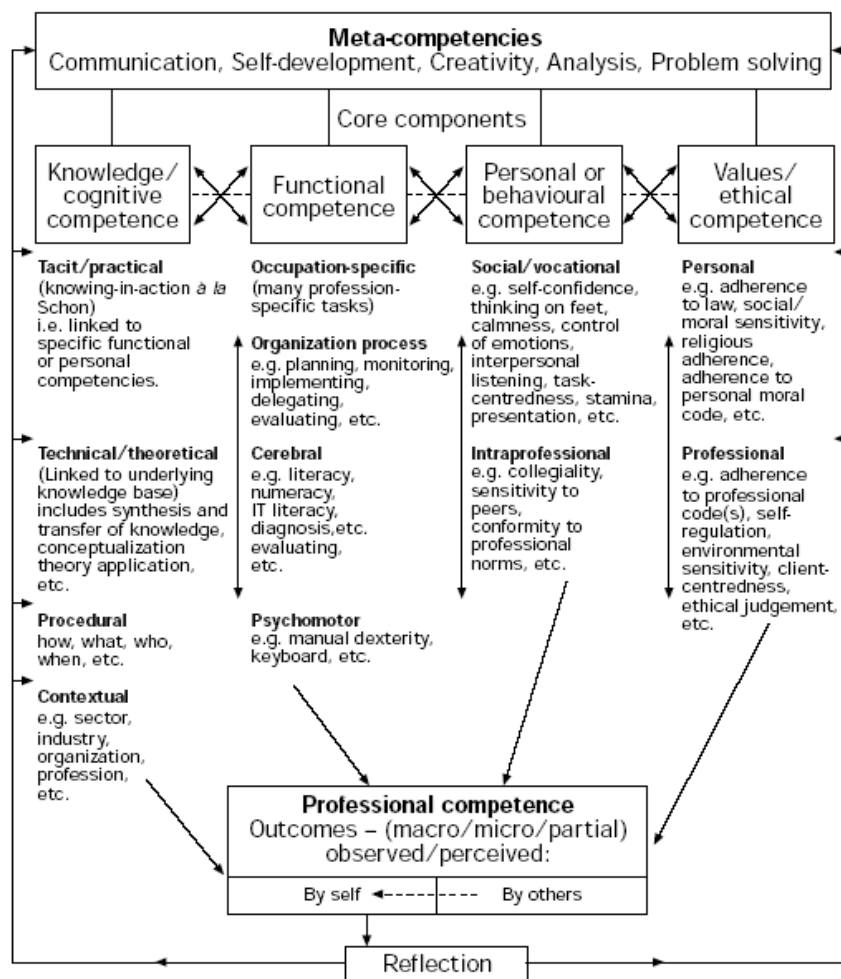
Item	Training	TAFE	HE Undergrad	HE Masters Coursework	HE Masters Research	HE Prof Doctorate	HE Research Doctorate
Academic qualification outcomes	Ranges from <ul style="list-style-type: none"> no qualification up to Diploma in PM 	Ranges from <ul style="list-style-type: none"> Certificate to Diploma in PM 	<ul style="list-style-type: none"> Diploma PM Undergrad Degree eg BPM (Note: no courses in Australia) 	<ul style="list-style-type: none"> P/G Certificate P/G Diploma Master of PM MBA (PM) 	<ul style="list-style-type: none"> Master of PM 	<ul style="list-style-type: none"> Prof doctorate (eg DPM, DBA) 	<ul style="list-style-type: none"> PhD
Assessment basis	Either <ul style="list-style-type: none"> None or by competency based 	<ul style="list-style-type: none"> by competency based 	<ul style="list-style-type: none"> Knowledge based 	<ul style="list-style-type: none"> Knowledge based 	<ul style="list-style-type: none"> Research based 	<ul style="list-style-type: none"> Knowledge and research based 	<ul style="list-style-type: none"> Research based
Assessment methods	<ul style="list-style-type: none"> None or competency assessor 	<ul style="list-style-type: none"> Competency assessor 	<ul style="list-style-type: none"> Institutional assessment 	<ul style="list-style-type: none"> Institutional assessment Self assess't Peer assess't Group assess't 	<ul style="list-style-type: none"> Self assessment 	<ul style="list-style-type: none"> Self assessment 	<ul style="list-style-type: none"> Self assessment
Typical assessment medium	<ul style="list-style-type: none"> None or competency tasks 	<ul style="list-style-type: none"> Competency tasks 	<ul style="list-style-type: none"> Assignments examination 	<ul style="list-style-type: none"> Assignments examinations 	<ul style="list-style-type: none"> Dissertation 	<ul style="list-style-type: none"> Dissertation 	<ul style="list-style-type: none"> Dissertation
Level of prior learning required	<ul style="list-style-type: none"> None required 	<ul style="list-style-type: none"> None required secondary school 	<ul style="list-style-type: none"> Secondary school 	<ul style="list-style-type: none"> Undergrad degree 	<ul style="list-style-type: none"> Research undergrad degree 	<ul style="list-style-type: none"> Coursework Masters degree 	<ul style="list-style-type: none"> Research Masters degree
Duration of learning program	Short courses <ul style="list-style-type: none"> 1 day upwards 	From <ul style="list-style-type: none"> a few weeks to 1year full time 2 years part time 	<ul style="list-style-type: none"> 3 years full time 6 years part time 	<ul style="list-style-type: none"> 1.5 years part time 3 years full time 	<ul style="list-style-type: none"> 1.5 years part time 3 years part time 	<ul style="list-style-type: none"> 1.5 years part time 3 years full time 	<ul style="list-style-type: none"> 3 years full time 5 years part time
Educational objectives in cognitive domain (Bloom 1956)	Lower order only	Lower order only	Lower and middle order	Lower to higher order	Higher order	Higher order	Higher order
• Knowledge	High	High	High	Medium	Low	Low	Low
• Comprehension	Medium	Medium	High	High	High	High	High
• Application	Low	Low	Medium	High	High	High	High
• Analysis	Low	Low	Medium	High	High	High	High
• Synthesis	Low	Low	Medium	High	High	High	High
• Evaluation	Low	Low	Medium	High	High	High	High
Approach to learning	Highly directed	Highly directed	Directed learning	Partly directed but	Highly	Highly	Highly

• on the basis of:	learning	learning	and independent learning	mostly independent learning	independent learning	independent learning	independent learning
• Collaborative learning and group work	Negligible	Negligible	Low	Medium to high	Low	Medium	Low
• Level of independent learning	Low	Low	Medium	Medium to high	High	High	High
• Level of reflective learning	Negligible	Negligible	Low	Medium	High	High	Very high
• Level of content delivery	Very high	Very high	High	Medium	Low	Low	Low
Instructor/student communication	High	High	High	Medium	Low	Low	Low
Student/student communication	Low	Low	Low to medium	Medium to high	Low	Low	Low

Framework for evaluation of project management education

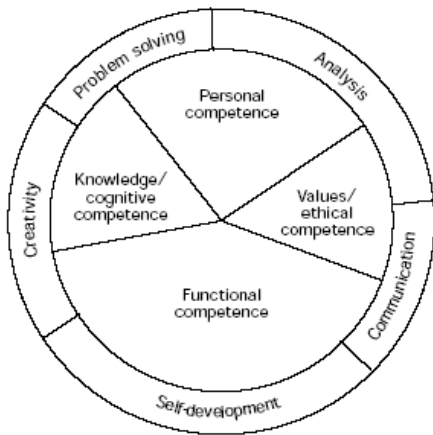
In order to carry out a more quantitative analysis of the likely effects of technology on project management education, it is essential to derive a suitable framework for evaluation. In the mid 1990s, Cheetham & Chivers (1996) developed a framework for evaluation of professional competencies. They indicate that competence can be a difficult concept to pin down when it relates to professional occupations, where roles can be complex and the knowledge and skills involved are many and varied. They suggest that the components of professional competence are those indicated in figure 1, comprising functional competence, personal or behavioural competence, knowledge/cognitive competence and values/ethical competence (p. 24).

Figure 1: Provisional model of professional competence



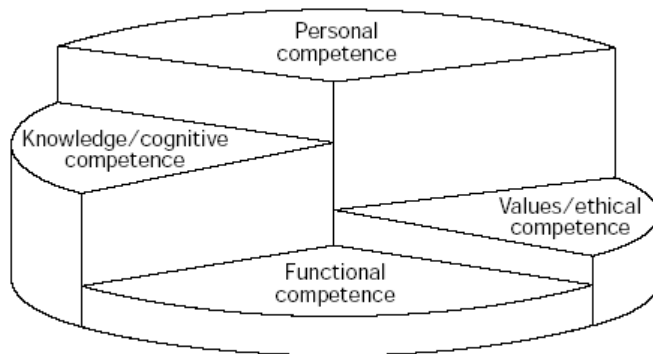
Source: (Cheetham & Chivers 1996, p. 27)

Figure 2: Typical example of occupational competence mix (including meta-competencies)



Source: (Cheetham & Chivers 1996, p. 28)

Figure 3: Typical example of individual competence mix (excluding meta-competencies)



Source: (Cheetham & Chivers 1996, p. 29)

Using this framework, a comparison of programs is illustrated in table 3. Numeric values have been allocated for the likelihood of the competence element to be facilitated or enhanced by the respective program. At this stage, there is no empirical basis for the allocation of these values and they are based on personal judgement by the author.

Table 3: Comparison of learning environments for project management education (based on the Cheetham/Chivers Competence Model)

Elements of professional competence based on framework by Cheetham & Chivers (scored from 0 to 5, ranking in brackets)	On-campus learning	Online	Traditional distance education
Suitability of program to develop or demonstrate professional competencies	Face to face	Internet/ email	Paper based education
Meta-competencies (generic & overarching)	25 (1)	24 (2)	16 (3)
• Communication	5	5	2
• Self-development	5	4	3
• Creativity	5	5	3
• Analysis	5	5	4
• Problem-solving	5	5	4
Core skill 1—Knowledge/cognitive competence	20 (1)	17 (2)	15 (3)
• Tacit/practical (knowledge embedded in functional / personal competencies)	5	4	4
• Technical/theoretical (underlying knowledge base of the profession, theories & principles)	5	4	4
• Procedural (the how, what, when of routine professional activities)	5	4	3
• Contextual (background knowledge specific to an organisation or industry)	5	5	4
Core skill 2—Functional competence	19 (1)	17 (2)	15 (3)
• Occupation-specific (tasks that relate to a particular profession)	5	4	4
• Organisational/process (tasks of a generic nature, planning, delegating etc)	4	4	3
• Cerebral (skills involving mental activity—literacy, numeracy, etc)	5	5	5
• Psychomotor (skills of a physical nature)	5	4	3
Core skill 3—Personal/behavioural competence	9 (1)	8 (2)	6 (3)
• Social/vocational (behaviours relating to performance of professional tasks—self-confidence, task-centredness etc)	5	4	3
• Intra-professional (behaviours relating to interaction with other professionals, collegiality, professional norms etc)	4	4	3
Core skill 4—Values/ethical competence	9 (1)	8 (2)	6 (3)
• Personal (adherence to personal moral / religious codes etc)	5	4	3
• Professional (adherence to professional codes, client centredness, environmental sensitivity etc)	4	4	3
Professional competence—outcomes	18 (1)	16 (2)	12 (3)
• Macro outcomes (competencies developed over a period of time through a combination of core components)	4	3	3
• Micro outcomes (indicate proficiency in single competencies)	5	5	4
• Perceived by self (reflection)	4	4	3
• Perceived by others	5	4	2
TOTAL SCORE	100	90	70
OVERALL RANKING	1	2	3

Source: Adapted from Cheetham & Chivers (1996)

Note: there is no empirical basis for the allocation of numerical values to the respective elements, and no weighting has been allocated to the various elements.

Analysis

Based on the evaluation framework, the comparative analysis above suggests the following possible conclusions with regard to the development of competencies in professional project management education:

- Face to face education may be measurably superior to other educational environments
- A web-based learning environment supplemented by email communications and electronic discussion boards (such as those supported by Blackboard and WebCT) may provide a better learning environment than paper-based distance education (which ranks last of the three environments considered)
- Paper-based distance education may be particularly poor in developing the meta-competencies defined in the framework
- There may be little difference between the various modes in the development of the knowledge/cognitive competencies
- There may be marginal differences between the modes in the development of the functional competencies
- There may be noticeable differences between the modes in the development of personal/behavioural competencies and values/ethical competencies
- There may be significant differences between the modes in the overall development of the professional competencies insofar as they relate to the concept of the 'reflective' practitioner.

Conclusion

This paper has looked at the effectiveness of project management education based on a review of recent literature, interviews with major stakeholders, and review of the framework for development of professional competence suggested by Cheetham & Chivers (1996). Comparison of various modes of delivery of project management education suggests that face-to-face education may be measurably superior to online delivery and print-based distance education, however, empirical research is required to confirm or refute the values attributed to the respective elements of competence in the analysis above, and this will form part of further research to be carried out by the author. Of particular interest will be how the deficiencies suggested in the learning environments associated with distance education and the Internet can be overcome or minimised.

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