



FOCUS ON A “STANDARD” PROJECT MANAGEMENT METHOD IN A E-LEARNING PROGRAM

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1. Introduction

ITIN is an IT Institution of Higher Learning, preparing students for different national Masters. ITIN is a professional institution equivalent to technological Universities or European polytechnic schools.

Among the main missions of ITIN (Virtanen I., 2002)(Wolfe D. 2002) one is to prepare excellent technical engineers, but also project managers capable of working efficiently within teams. In addition, it also means preparing up-and-coming engineers or even future business creators¹. For this reason, ITIN uses an inductive pedagogy, a “learning by doing”, “project-based” approach.

Observing the economic globalization (Friedman Th., 2007)(Stiglitz J., 2003) as well as Information Systems globalization (Raivola R., 2001), we clearly see that it is vital to prepare our students for international and intercultural team work. For this reason, ITIN has developed a pedagogy based on virtual mobility also called e-learning.

2. The EMIM Project Management Module.

The “New technology Project Management” module is one of the asynchronous distant learning modules of the EMIM program ITIN is in charge of.

The participants are students of the EMIM partner Universities (Great Britain, Austria, Estonia,

Romania, Turkey, France). Exchanges are made using a Moodle platform.

2.1 The Pedagogical Objective

Organizing, structuring and monitoring projects from a distance are the objectives of the “Project Management Module” taught as part of the EMIM program. This brings individuals with very different skill bases together to work on joint projects.

2.2 Previous Experiences and Public

The EMIM Project Management module has been carried out twice.

The first experience took place from February to July 2007, the second one from October 2007 to February 2008.

Both sessions involved students of various nationalities (English (GB), Romanians (RO), French (FR)) with different training/academic backgrounds (IT, Multimedia and Design, etc.).

3. Why Focus on a Standard Project Management Method?

3.1 Why Teach a Project Management Method?

First of all, what is the benefit of using a method for managing projects and why teach it? A project is a set of activities realized by actors having different expertise who interact and cooperate to produce a result within certain constraining limits (time, finances, legacy, human resource...).

A project management method is useful for coordinating and controlling activities, for forecasting alternative actions in case of certain events². To be concrete, one has to normalize activities and define:

- Types of sub-activities, types of actions...
- A common vocabulary, roles, instances (decisions, validations...)
- Deliverables, documentation

A project management method should allow actors to cooperate in a rational and efficient way, to take over a project at any time during its realization, to improve the results (deliverables) of a closed project. The goal

¹ ref. (Gourdin A., 2003), (Gourdin A., 2003), (Gourdin A., Wolezyk R., 2004)

² We often call these risks, although an event for which the probability is known isn't a risk.

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is to define standards for interaction in order not to waste too much time and energy in optimizing exchanges³.

3.2 Past Experience within the EMIM Program

All project management methods look rather similar. They all include guidelines for making a project plan, building the schedule and provisional budget, manage scope and risks, organize the project communication, etc. All project management methods have a clearly defined start and end, but the actions that have to be executed between the start and end of the project are organized in a slightly different way from one method to another.

Companies often use a 'home made' project management method, others select an existing one and customize it to meet their specific needs.

The EMIM project Management module bringing together people from all over Europe having different professional backgrounds, we felt the need of providing a 'standard' and 'easy to follow' method. In the first two experiences of this module, we have used the 'Project Management KIT', invented by M. Hugues Marchat⁴, providing several document templates that cover five project stages (Initiate, Prepare, Plan, Control and End a project) (Marchat H., 2008).

However, EMIM being a European adventure, the idea of focusing on a more international method became more and more appealing. Furthermore, adapt the module in order to prepare the participants for an internationally recognized certification would be a great opportunity for them.

3.3 Why Focus on a Standard?

In (3.1) we spoke about using methods as a way to organize disorder. Moreover choosing a widely used method gives more opportunities to find actors already trained and ready to share practices, vocabulary, ... and generally standard methods often have software tools in order to "automatize" activities, actions triggered by events ... that is to enhance productivity.

³ It is clearly possible to drive a project without any method. Because "no method" is "no constraint" the advantage is the freedom. But this usually leads to organizational chaos.

⁴ Hugues Marchat, Director of the EFII consultant company, Lecturer at CNAM and Ecole Centrale in Paris.

Remaining questions: Are standard methods those of the former hierarchical approach and are they used in knowledge network approaches? Doesn't the way our learning modules are used (online) naturally designate them for cooperative approaches?

4. Project Management – Norms, Standards and Methods

In this chapter we will present several standards methods used in the context of PM. These methods are quite different from each other and in some way not really comparable, but anyway we will try to have some comparative overview that is to find common criteria in order to select a method.

Before choosing a specific method, several standards, guidelines and existing methods should be looked at. We will present different PM standards and then discuss the following possible choices:

- ISO 10006
- CMMI
- PMI-PMBOK and PMP
- PRINCE2
- TEN STEP
- Six Sigma-DMAIC and DMADV
- Agile methods

4.1 ISOⁱ 10006: The International Guidelines for Project Management.

The ISO 10006 standard proposes a set of processes for project management among other clauses, more relevant from an organization perspective. The project management processes are divided into 4 families (Destors M - Le Bissonnais J., Afnor 1999):

- Management responsibility
- Resource Management
- Product realization (processes concerning interdependency, scope, cost, communication, risks, purchase)
- Measurement, analysis and improvement

4.2 CMMI®⁵:

Capability Maturity Model Integration (CMMI) is an approach for process improvement that can be used for a project, a division, or an entire organization. CMMI is not a method but a referential of best practices. The Capability Maturity Model describes five stages based on the capability of a company or organization to follow and improve processes:

1. Initial: The success factors of projects are not identified. Hence, success is not repeatable. This stage is also called chaos or ad hoc.
2. Standard Project Management: Project Management processes are defined. Projects are individually piloted and their success is repeatable.
3. Standard Techniques Defined: Piloting procedures, norms, tools and methods are defined. All projects follow the standard techniques.
4. Project Feedback: Project success is valued. Project feedback allows explanation of the differences between estimation and realization. Hence, processes can be improved.
5. Promotion: Repeatable processes are defined and metrics are collected to help improve these processes on an ongoing basis.

4.3 PMI⁶– PMBOK®⁷ and PMP

The “PMBOK Guide” is an internationally recognized

standard (IEEEⁱⁱ Std. 1490-2003) that provides the fundamentals of project management. The PMBOK approach is consistent with other management standards such as ISO 9000ⁱⁱⁱ and the Software Engineering Institute's CMMI. PMBOK defines five basic process groups that can be divided into 44 processes and nine knowledge areas. (See Table 1)

In 2004, PMI stated in the PM-Network magazine that “The PMBOK Guide is not a methodology, a how-to or a specific set of procedures.”

There is information and definitions, but no procedures and no best practices or techniques. The information provided by the PMBOK Guide can be seen as a guide for project management methods: project management processes should fit into the five process groups and cover the nine knowledge areas.

The PMI propose a project management method based on the PMBOK Guide, called PMP⁸.

4.4 PRINCE2®⁹:

Projects IN Controlled Environments is in the public domain, offering non-proprietary best practice guidance on project management.

It was created for the government of the United Kingdom but is also used in the private sector and it has become very popular in many European nations. PRINCE2 is supported by a rigorous accreditation

Process Groups	Knowledge Areas
Initiating	Project Integration Management
Planning	Project Scope Management
Executing	Project Time Management
Controlling and Monitoring	Project Cost Management
Closing	Project Quality Management
	Project Human Resource Management
	Project Communications Management
	Project Risk Management
	Project Procurement Management

Table.1.

⁵ © Capability Maturity Model (Integrated), CMM, and CMMI are registered in the U.S. Patent and Trademark Office by Carnegie Mellon University.

⁶ PMI: Project Management Institute: organization for the project management profession.

⁷ ©The PMI Project Management Body of Knowledge.

⁸ PMP : Project Management Professional.

⁹ PRINCE2 is a registered trademark of OGC.

process, including accreditation of training organizations, trainers, practitioners and consultants (Bentley C., 2002/2006).

The method proposes eight processes that can be divided into 45 sub-processes and provides 31 document templates. Every process has a note on scalability and can therefore be adapted to the needs of a particular project. (See Table 2)

TEN STEP¹⁰:

The TenStep process starts when a project is being formally defined and a project manager has been assigned (Project initiation) and is organized in 10 different project stages (steps 3 to 10 not to be used as a sequential progression): (See Table 3)

The Ten Step method does not include:

- The project Lifecycle
- The gathering of business requirements and analysis (which is considered being part of the project lifecycle)
- Procurement and vendor management
- Project Funding (start after initiation)

Process
Project Direction
Start a project
Initiate a project
Control a stage
Manage product delivery
Manage stage boundaries
Close a project
Planning

Table. 2.

Define the work
Build the schedule and budget
Manage the schedule and budget
Manage project issues
Manage change
Manage communication
Manage risks
Manage Human Resources
Manage Quality
Manage Metrics

Table. 3.

DMAIC (improvement of existing business process)	DMADV (creation of new product or process designs)
Define scope, requirements, goals to achieve and the overall process	Define scope, requirements, goals to achieve and the overall process
Measure process performance (collect data): delay, functional characteristics, risks	Measure and identify characteristics that are Critical To Quality (CTQs), product capabilities, production process capability, and risks.
Analyze the collected data; determine non quality causes	Analyze and make high level design for solutions and options (or alternatives) in order to be able to select most adequate solution
Improve or define alternative solutions and proceed to pilot tests before implementation	Design details for the selected solution, design the production process. This phase may require simulations.
Control to ensure that the solution corrects the problem; update documentation; set up control mechanisms and continuously monitor the process.	Verify performance and the ability of the solution to meet the client's requirements, set up pilot runs, implement the production process and hand it over to the process owners.

Table. 4.

¹⁰ TEN STEP is a "R.E.P - Registered Education Provider" registered at the Project Management Institute (PMI)



4.5 SIX SIGMA (DFSS)¹¹:

Six Sigma was originally developed as a set of practices designed to improve manufacturing processes and eliminate defects, but its application was subsequently extended to other types of business processes. It has been heavily inspired by quality improvement methodologies such as quality control^v, TQM^{vi}, and Zero Defects^{vii}, based on the work of pioneers such as Shewart^{viii}, Deming^{ix}, Juran^x, Ishikawa^{xi}, Taguchi^{xii} and many others.

Six Sigma is a methodology used to reduce waste and improve the quality, cost and time performance of any business. It is based on two key project management methodologies: DMAIC and DMADV, both inspired by Deming's Plan-Do-Check-Act Cycle^{xiii}. The Six Sigma method is also called DFSS (Design for Six Sigma). (See Table 4)

4.6 Agile Methods

These methods take into consideration the notion of constant evolution of requirements and hence of solutions to meet these requirements. Within an Agile approach, teamwork is naturally reactive to change, saving resources and continuously seeking efficiency (*Lean management*).

Multimedia actors are generally people that dislike important methodological constraints. Too constraining, too formal and not very adaptive methods risk a resulting into a repugnancy instead of creating a structured approach.

An example: PUMA^{xiv}

This method was conceived on the basis that 'Agile' methods share a common group of practices (Vickoff JP., 2007/2008). Practices, part of project management:

- Managing by challenges and risks,
- Planning based on rapid iterations,
- Incremental development in error-free milestones,
- Improvement of practices.

For PUMA men and women represent the major component of Agility. The Agile mode implies:

- Consensual engagement and collective responsibility
- Total engagement (team members and users)
- All resources intervene simultaneously from the project start
- A small group of experienced actors with a "sense of identity", having an "open" vision of solution achievement.

5 Choose a Method

All approaches described are very different in terms of goals and covered functionalities. We do not have any information about systematic comparison of project management methods and have initiated a reflection on comparison criteria.

5.1 Proposed Choice Criteria

(See Table 5)

5.2 Why Focus on PRINCE2?

Looking at the above comparison array it seems that Prince2 and Agile methods are good candidates to be a standard used as a basis for our PM training. May be the actual weakness of "Agile" methods is a certain lack of packaged training offers.

So taking into account the actual state of the market we think that Prince2 is the method to be chosen to support our e-training on PM.

Here are the main attributes of Prince2:

Easy to follow: There are a lot of similarities with the actual used 'Project Management KIT'. Both methods have a limited number of stages and provide several document templates for every project stage, which makes it easier for participants to keep concentrated on the content of the project documentation rather than on the creation of the document type itself. Templates are made up to cover small to big projects and can be tailored to meet the needs of a specific project.

¹¹ SIX SIGMA is a registered service mark and trademark of Motorola, Inc.

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Method → Criteria ↓	PMI-PMP	PRINCE2	TEN STEP	6Sigma (DFSS) - DMAIC, DMADV	Agile methods (ex: Scrum, UP, DSDM, PUMA...)
Owner	PMI (USA)	OGC (UK)	Ten Step (USA)	(USA)	no
License needed	no	no	yes	no	no
Number of users	265.000 PMI members	400.000 certified PM	3500 enterprises & consultants, 45.000 PM		4261 members of AgileAlliance + others
Community *	Several communities	Forum, discussion group	Active community, tips of the week General purpose	Several communities	Several communities
Project type	General purpose Big projects	General purpose Adaptable (small – big projects)	Adaptable (small – big projects)	General purpose	Especially used for software development small projects
Functional scope Process groups	Based on PMBOK - Project Initiation - Project Planning - Project Executing - Controlling & Monitoring - Project closing	Starts before project initiation (business case) - Project Direction - Project Start - Project Initiation - Stage Control - Product Delivery - Stage Boundaries - Planning - Project Closing	Starts after project initiation. - Define work - Build schedule, budget - Manage schedule, budget - Manage issues - Manage change - Manage communication - Manage risks - Manage Human res. - Manage Quality - Manage metrics	Focused on quality and performance. - Define - Measure - Analyze - Improve or Design - Control or Verify	Focused on change management. - Project vs. Business - Pilot the project (resources, schedule, control, reports) - Requirement management (design, realization, validation) - Change management (organizational & deployment impact)
Geographical area	International	International	International	International	International
Certification criteria	3 levels of certification: MCQ	Fundamental: MCQ, Practitioner: Q on Case study	Fundamental: MCQ, PM: real project simulation	6 levels of certification: real project presentations	Not applicable
Certification validity	3 years	5 years for Practitioner		3 years for Black Belt	Not applicable

Table. 5.

* Know an accredited method allows the specialist of this method to be de facto, part of a practice community and hence have the possibility to exchange ideas or experiences, to keep knowledge up to date as products evolve, to get a critical view, to access to documentation, etc. This is particularly important for a specialist who gets his knowledge through e-learning in which he could feel isolated due to the distant and asynchronous aspect.



Standard: Recognized as the 'de facto' standard in the United Kingdom and tending to become a European standard.

License: No license is needed.

Certification Process: The two levels of certification are a good compromise for getting knowledge and competence certification.

6. The problem of knowledge and practice assessment: advantage and inconvenient of certification

6.1 Potential inconvenient

Project management methods are useful for organizing activities of project team members with resource assignment within a partially unpredictable environment and in which requirements can evolve in time.

Is the advantage of standard method use the fact that it can lead towards a certification? If so, could we certify capabilities or competences?

Competence is knowledge in action, a 'know-how-to' in a real context. In socio-constructivist approaches the learner acquires competences by doing and criticizing in groups. The measurement of acquired competences can and should be done within a real project realized by a team.

In numerous approaches, certification is based on capability measurements: independent and simple knowledge or reactions to simple coded contexts. The pedagogical approach is underlying and very often behaviorist (stimuli-reflex). In certification partially measured by Multiple Choice Questions, the idea is clearly to measure elementary knowledge more than complex know how useful in project management.

To conclude, a certification on project management can be the wrong measure and lead actors to wrong ideas about required competences and abilities for project management.

6.2 Advantages

One main advantage is to furnish a widely recognized label (beyond the learning program) to the participants. This label is delivered to people who have been clearly identified within certification sessions; hence there can be no doubt on the identity of the certified person. Any future employer can trust the certification.

7. Conclusions

Project Management methods are useful; however the method employed should be adapted to the type of project that has to be managed. Classical methods (PMI-PMP, Prince2, Ten Step...) are well adapted for projects with a low or measurable level of uncertainty. Pure innovation projects need more flexible methods (Agile methods).

We think that using a widely used standard PM method has many advantages and that PM teaching by e-learning, based on such an approach holds the same benefits for trainees. Use a recognized method is interesting but from our point of view one should not only teach the method but also put students in real situations wherein they have to realize projects within a team and thus learn the method by doing (using the socio-constructivist approach).

Does a learning program have to lead to certification? From our point of view the certification is not the ultimate validation of knowledge; it is only a potential step. We intend to focus on the Prince2 approach as a shared reference and continue to have students working in distant teams on a real project.

It would be interesting to continue research on objective and rational choice criteria, but we have to keep in mind that the choice of a method or tool isn't only a rational process. It also includes human, sociological factors. Furthermore, we will also continue research on how to get better recognition of gathered knowledge for our participants.

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9 Webography

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10. Glossary

ⁱ **ISO:** The International Standardization Organization is a specialized international agency that promotes the development of precise standards to help ensure that products, services, and materials throughout the member nations remain consistent. Standardization should facilitate the international exchange of goods and services and help to develop cooperation in intellectual, scientific, technological, and economic activity. If a company uses processes that respect ISO norms, the products produced by these processes will meet some minimum standards.

ⁱⁱ **IEEE:** Institute of Electrical and Electronics Engineers, Inc. International non-profit, professional organization for the advancement of technology, related to electricity and electronics. Members rely on the IEEE association as a source of technical and professional information, resources and services.

ⁱⁱⁱ **ISO 9000:** a set of standards for quality management systems, administered by accreditation and certification bodies. Some of the requirements in ISO 9001 (one of the standards in ISO 9000) include:

- procedures that cover all business key processes
- monitoring effectiveness of processes

- keeping adequate records
- checking for defects, define appropriate and corrective actions
- regularly reviewing individual processes as well as the quality system itself
- facilitating continual improvement

^{iv} **PRINCE2 accreditation process:** The accrediting body is the APM Group, www.apmgroup.co.uk; their website lists approved training organizations, consultants and practitioners. Accreditation is done at two distinct levels:

The Foundation exam is the first of the two PRINCE2 Examinations you are required to pass to become a PRINCE2 Practitioner (measures whether a candidate would be able to act as an informed member of a project management team using the PRINCE2 method).

The Practitioner exam is the second of the two PRINCE2 Examinations that measures whether a candidate would be able to apply PRINCE2 to the running and managing of a project.

^v **Quality Control:** process for maintaining proper standards in manufacturing. Quality control is meant to ensure that products or services meet customer requirements.

^{vi} **TQM or Total Quality Management:** "TQM is a management approach for an organization, centered on quality, based on the participation of all its members and aiming at long-term success through customer satisfaction, and benefits to all members of the organization and to society." ISO 8402:1994

^{vii} **Zero Defects:** One of the steps in the Quality Improvement Process. It has been initially used in Industry Supply Chains, but applicable to any kind of enterprise. The four principles for Zero Defects:

- Quality is conformance to requirements
- Prevent defects is preferable to quality inspection and defect correction
- Zero Defects is the quality standard
- Quality can be measured in monetary terms

^{viii} **Shewhart:** Walter Andrew Shewhart (March 18, 1891 - March 11, 1967) was an American physicist, engineer and statistician, known as the father of statistical quality control.

^{ix} **Deming:** William Edwards Deming (October 14, 1900–December 20, 1993) was an American statistician best known for his work in Japan where he trained hundreds of engineers, managers, and scholars in statistical process control and concepts of quality.

^x **Juran:** Joseph Moses Juran (December 24, 1904 – February 28, 2008) was a management consultant who is principally remembered as the author of several influential books on quality and quality management.

^{xi} **Ishikawa:** Kaoru Ishikawa (1915-1989) was a Japanese University professor and influential quality management innovator best known for the Ishikawa or cause and effect diagram (also known as Fishbone Diagram).

^{xii} **Taguchi:** Gen'ichi Taguchi (born January 1, 1924 in Japan) is engineer and statistician. Since 1950, he developed a methodology for applying statistics to improve the quality of manufactured products. His methods have met controversies, but many concepts have been accepted as extensions to the body of knowledge.

^{xiii} **Deming's Plan-Do-Check-Act cycle:** iterative four-step problem-solving process typically used in quality control. It is also known as the Deming Cycle, the Shewhart cycle or the Deming Wheel.

^{xiv} **PUMA:** French acronym for Unified Processes for Agile Methods.