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Active Teaching of Project Management Through Tutorials

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Abstract

After presenting learning of project management, we present the interest of using a system modeling approach for the specification of active tutorials. The experience is located in training of students at the Tunisia Polytechnic School (EPT) with a view to obtain a university degree in engineering. This experiment could be conducted at the level of the other higher institutions in Tunisia. The important of this methodological approach is to specify the composition of the various teaching modules to be available to the students by the system modeling method OOPP (Oriented Objectives Project Planning) and to develop a digital support that can be exploited in a distance learning setting.
Keywords: Tutorials; Project management; Active teaching; Systemic; Higher education.

1. Introduction

The distance learning becomes these days a solution while it can settle economy and answer to constraints and efficiency thanks to the New Technologies of Information and Communication (NTIC). It is more that tendency or an answer to simple geographical problems. In fact, the extensive diffusion of the distance learning is a whole of methods that answers for approach adapted to all types of requirements (Cade, 1993).

The distance learning needs efficient techniques that settle the industrial approach and the flexibility of solutions. These technical means concern training supports also multimedia supports, that means of management of trainees and their improvement to communicate with them (data processing and telecommunications).

At present immaterial investments expand more rapidly than materials. To know, Ability and Expertise become the most significant wealth of enterprises, regions and nations. We live a numeric revolution. In this framework in perpetual change there is not anything of astonishing to note an increased demand regarding learning (UNESCO, 2002).

The learning must increase several challenges:

- To answer to the augmentation of the demand.
- To face the speeding up of changes.
- To augment the number of formed.
- To reduce the constant deficit of expertise.
- To reduce the increasing unsuitability among the educational device and the market of work.
- To increase the general expertise level.
- To reinforce the aptitude of enterprises and to optimize their fashion of organization.

Generally, the tutorials are classic software teaching assisted by computer to put in a condition, more or less interactive, a student and a problem to answer (Chi Ng, 2006). These software are specialists and deal with specific content (industrial computers, electrical machinery, robotics, technology...). These softwares are considered environments specializing in specific topics.

The design of these applications is based on interactive dialogue, and learning typically involves the focus memorizing and training sequences of procedures associated with certain concepts. They are now distributed quite generally in packages to cover a particular domain connected with a work environment that also includes dedicated tools (word processing, database...).

The tutorial is a practical tool, not only for the authors by sensitizing them to the challenges of scholarly computer publishing and giving them the tools to develop their mastery of traditional word processing tools, but also for the services and administrative structures that will be increasingly solicited to circulate and promote scientific production by offering models and tools for implementing computer broadcasting projects (Mu *et al.*, 2009).

The aim of the present study is to show interests of active tutorials for learning project management. The next section briefly presents a review on distance learning and tutorials. Next, the concepts of project management are presented. In Section 3, after presenting a system approach based on the OOPP (Oriented Objectives Project Planning) method for the specification of tutorials for project management, this approach is applied to the analysis this project. The last section presents a discussion about the impact of this project on students.

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2. Review on Distance Learning

In this part, we present some studies the distance learning and tutorials that have been presented in different researches:

Researchers Absi *et al.* (2018), have presented the teaching practice in higher education. They have applied and assessed methods to progress teaching during active tutorials with modular classroom equipment and learning through play pedagogy with a movie-making project. These methods were evaluated from the study of both students' assessment of teaching and module marks. In their tutorials with mobile equipment, students become active and actors. In a problem-based learning approach, students work in groups, they talk about the problem and try to discover the best way to get a solution with certain constraints (time, existing help...). In the same way, making a movie to record the experiments and to locate the adequate editing to make the movie comprehensible is a very practical exercise to better understand the course and to provide it sense.

Researcher Trekles and Nakayama (2010), have investigated during assessment of current literature of instructional design, distance learning, direct instruction, and constructivist teaching strategies, in addition to during research conducted in an undergraduate Organizational Leadership and Supervision online course taught at Purdue University Calumet in Hammond, Indiana, United States. In reality, many educators, principally those who teach at a distance, often have questions as to how much information is sufficient.

Researchers Kohli *et al.* (2014), have addressed the diverse aspects regarding IIT Bombay's Spoken Tutorials proposal to change Indian education and its resounding success in teaching students in diverse aspects, such as programming languages, simulation and circuit design platforms and office productive tools, using free open source softwares. The Spoken Tutorial project aims to present IT training through audio-video tutorials.

Researchers Guang-bin and Shu-yan (2011), have presented the learners in School of Network Education of Beijing University of Posts and Telecommunications and Tianjin Radio and Television University. They have make use of methods of analysis study, interviewing, observing and literature research to tell the category that learners take part in online tutorial and the factors touching them. Through one year's study and analysis, they discover the many conclusions, such as the delay in network infrastructure is still the bottleneck of online tutorial in China.

Researchers Ponzanelli *et al.* (2018), have presented the software development video tutorials that have seen a steep augment in popularity in latest years. Their major achieve is that they thoroughly demonstrate how certain technologies; programming languages, etc. are to be exploited. However, they come with a limitation: there is currently little support for searching and browsing their content. This makes it hard to rapidly find the useful parts in a longer video, as the only options are watching the whole video, leading to wasted time, or fast-forwarding through it, leading to missed information. They have presented an approach to mine video tutorials establish on the web and enables developers to question their contents as opposed to just their metadata.

Researchers Rotanova *et al.* (2018), have presented distance learning system in the higher education institutions that is one of the majority significant communication platforms recently. Modern level of development of information and communication technologies lays the establishment for a global distance learning system that helps people make an open education environment with no borders. The authors of the article suggest a model of a universal system for evaluation of quality of distance learning in the world. The system includes assessment criteria for goal - setting, content, organizational and technical setup and results.

Researchers Ji-chun and Jian-xin (2018), have presented the fast development of streaming media and cloud technology, original opportunities that have been brought to the development of network distance education. In order to answer the bottleneck problem of data processing, cloud computing architecture and mode are adopted to ensure the data processing skill of the platform. The design of distance learning platform based on cloud technology is specified, and Content Delivery Network and flash peer to peer is exploited in the streaming media service system. The stability of data and the client knowledge result is enhanced.

Researchers Koroleva *et al.* (2018), have presented the educational potentials of networking and distance learning exploitation in the system of maritime education and teaching. Application of network in educational process provides opportunities to train for high-risk professions for example shipping, aviation and others. The controlled networking environment also has academic advantages, due to the fact that material to learn can be designed to train and assess detailed learning outcomes in a way that is familiar to the level of the students' developing competency. The proposed in the paper situational and functional approach is the effort to provide an extra tool for developing original methods of the maritime education and teaching system with large use of networking and distance learning.

Researchers Wang *et al.* (2011), have presented the use of online tutorials of integrated application with information techniques as well as conventional classrooms and labs. They hope to look for the learning effect of distant learning using the study and questionnaire survey on the base of the author's instructed class, accumulating practical experience of conventional learning using online learning tutorials. The conclusions of the study will be exploited as the base for potential distant learning support and strategy planning.

3. Presentation of Project Management

Project management is the practice of initiating, planning, controlling, executing, and closing the work of a group to accomplish specific goals and get together precise success criteria at the specified time (Olivier, 2017).

In fact, a project is a temporary attempt designed to generate a unique product, service or result with a clear beginning and end undertaken to meet special goals and objectives, usually to bring about useful change or added value. The temporary nature of projects stands in distinction with business as usual (or operations), which are cyclic,

permanent, or semi-permanent functional activities to create products or services. In practice, the management of such different production approaches requires the improvement of different technical skills and management strategies (Pairis, 2018).

The main challenge of project management is to realize all of the project goals in the particular constraints. This information is generally described in project documentation, created at the beginning of the development process. The primary constraints are scope, time, quality and budget (Cattani *et al.*, 2011). The secondary and more determined - challenge is to optimize the allocation of necessary inputs and apply them to obtain pre-defined objectives.

The aim of project management is to create a full project which complies with the client's objectives. In many cases the object of project management is also to outline or change the client's brief in order to feasibly be capable to address the client's objectives. Once the client's objectives are visibly established they should influence all decisions made by other people involved in the project for instance project managers, designers, contractors and sub-contractors (Nokes, 2007).

4. Specification of Tutorials of Project Management

In order to add to the training of students of the Tunisia Polytechnic School in project management, we realized several tutorials.

Today, the construction of a tutorial is considered to be creative a solution to a problem. It must pursue certain pre-defined and essential steps which are:

- The selection of the topic and the language programming that is the starting point.
- The definition of the operational objectives of the tutorial.
- The planning of the tutorial.
- The programming and testing of the tutorial.

A reflection on these points led us to adopt a methodological approach which is to develop a project management tutorial based on a structured analysis methodology. This is why it is necessary to identify the impact of the use of courseware in the teaching of project management. This necessitated the selection of an adequate method to better specify the content of the article object tutorial. This is how the OOPP (Oriented Objectives Project Planning) method for the analysis and specification of the content of the tutorial.

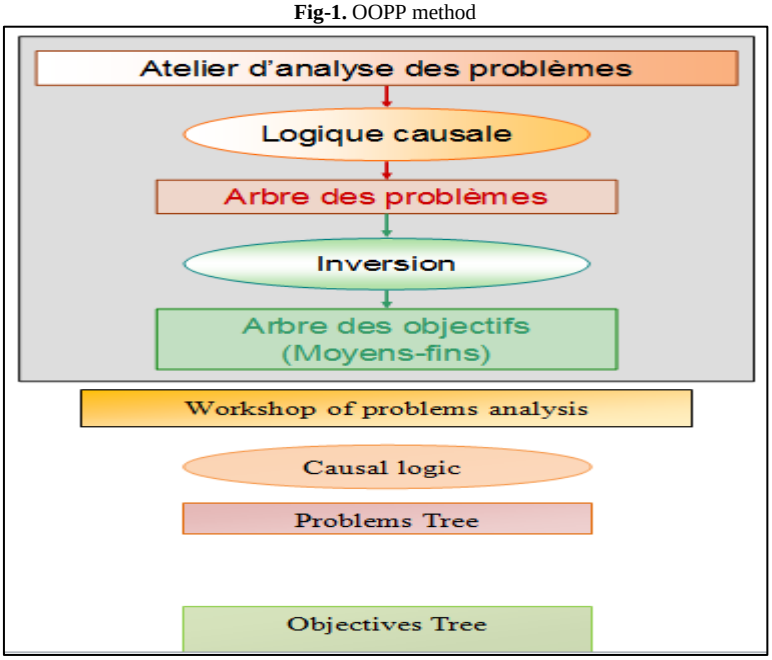
4.1. Presentation of the OOPP Method

The OOPP method is used increasingly by numerous financial backers (World Bank, European Union, bilateral Cooperation…). It is as well used to take to terms of development projects, of cooperation (Germany, Canada, Belgium...) or other. It gave a good approval at the time of its exploitation and numerous researches have been done extremely well to extend tools and to show its strength for the scheduling of projects (AGCD, 1991). The descriptive documentation of the OOPP method, indicate that the logic of the OOPP method is not limited theoretically to a type of determined problematic (Guangshu and Songjiang, 2010). However, in practice the method is more appropriated to the following interventions: projects of the technical cooperation and projects of investments with economic and / or social objective (The Logical Framework Approach, 1999).

The OOPP method is considered similar to a tool of communication, analysis and scheduling of project, whatever is its nature, its position, its complexity and its sensitivity (Fig.1).

We define a method of Informational Analysis by Objectives (MAIO) permitting to elaborate a Matrix of information allowing us to analyze the informational exchange process among activities.

Fig-1. OOPP method



The analysis and the identification of the information exchanged by the activities specify the dynamics and the communication among the elements of the system that we plan to study or to manage (Annabi, 2003).

So, an information matrix was presented. This matrix establishes a connection between activities and their information. The information about an activity can be classified in two categories (Lakhoua and Ben Jouida, 2011):

- An imported information by an activity is supposed to be obtainable : it is either produced by another activity of the system, or coming from outside,
- The produced information by an activity reflects the condition of this activity. This last information can be exploited by other activities of the project.

Then, the information produced by an activity can be considered similar to a transformation of imported information by this activity.

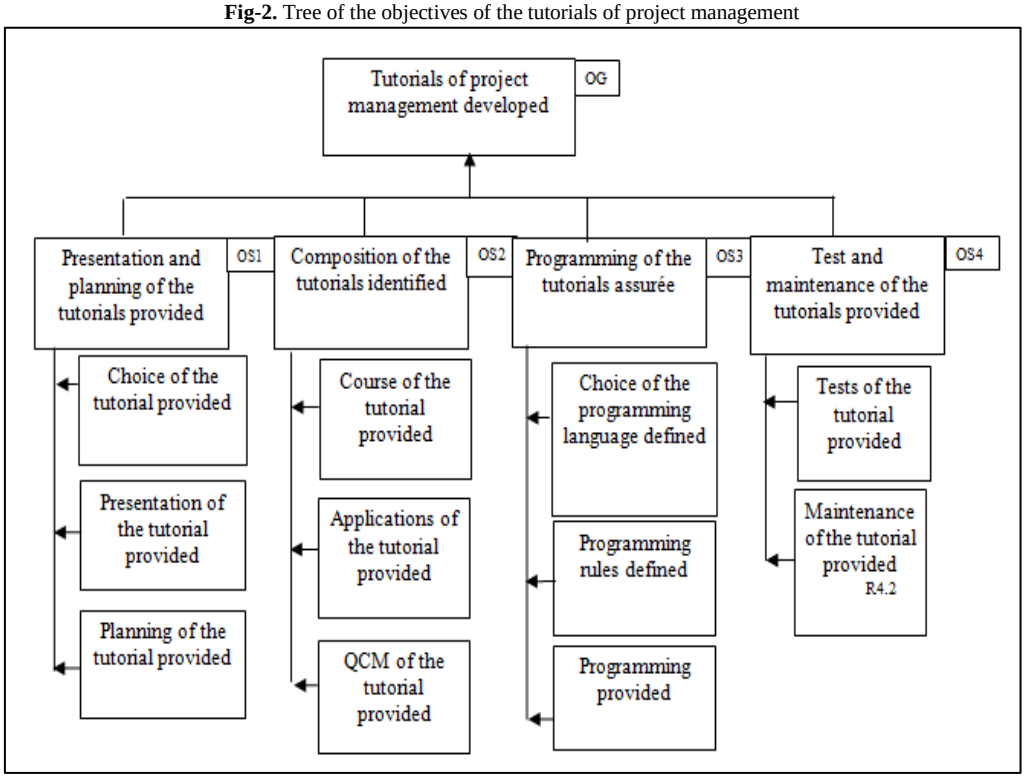
In order to analysis this information, we describe an information matrix associated to OOPP analysis enabling to establish the relations among the activities or among the concerned structures identify the information sources, establish the manner in which the information is exploited (Lakhoua and Ben Jouida, 2011; Lakhoua *et al.*, 2016; Lakhoua and Wertani, 2018).

To make certain of the quality of information system, we describe some logic-functional rules reflecting the coherence, the reliability and the comprehensiveness of the analysis by an information matrix where the lines are concerning the activities and the columns the information.

4.2. Results of the OOPP Analysis

We present on figure 2 the development of the objectives tree of tutorials of project management.

Fig-2. Tree of the objectives of the tutorials of project management



The aim of this method of planning is to define the various activities of the project. This requires identifying the objectives. It is in this step to organize an integrated and predetermined configuration or to organize and adjust according to a plan the development of the tutorial.

- OS1: Presentation and project planning.
- OS2: Composition of the tutorial.
- OS3: Programming of the tutorial.
- OS4: Test and maintenance of the tutorial.

In order to present an example of a course on project management, we present the specification details of the SADT method (Structured Analysis Design Technique).

The table1 presents a hierarchical analysis of the modelling by the SADT method.

Table-1. Illustration of the OOPP analysis of SADT

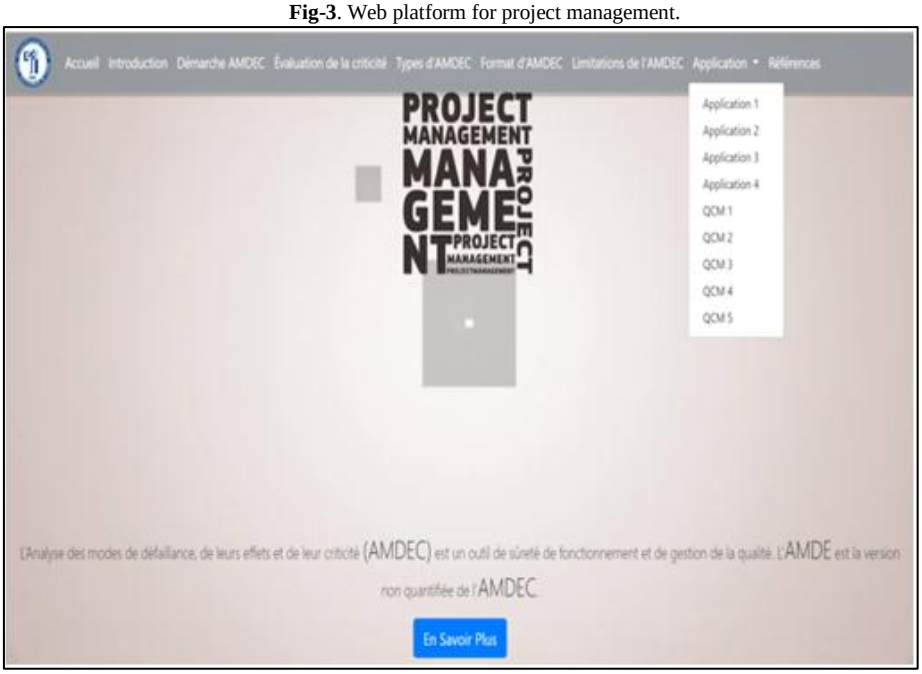
N°	Code	Designation
1	OG	SADT model produced
2	OS1	SADT activities diagrams produced
3	R1.1	A0 Activity Diagram produced
4	A1.1.1	To draw the interfacings arrows
5	A1.1.2	To create structure box / arrows
6	A1.1.3	To trace the Activity Diagram
7	A1.1.4	To improve the Diagram A0
8	A1.1.5	To control the Diagram A-0 in relation to the Diagram A0
9	R1.2	Box to decompose selected
10	A1.2.1	To arrange creation of the selected box
11	A1.2.2	To establish the corresponding diagram to the selected box
12	A1.2.3	To sketch the Activity Diagram corresponding to the selected box
13	A1.2.4	To draw the interfacings arrows
14	A1.2.5	To establish the structure box / arrows
15	A1.2.6	To trace the Activity Diagram of the selected box
16	A1.2.7	To develop the drawn Diagram
17	A1.2.8	To control the drawn Diagram in relation to box's mother
18	A1.2.9	To restart work at the level 3
19	A1.2.10	To create the list of all activities enabling to construct the different Diagrams of activities
20	A1.2.11	To regroup the activities of the list by family
21	A1.2.12	To create the list of all data transported on arrows
22	A1.2.13	To identify the generating activities and the users for every data of the list with the help of a matrix
23	A1.2.14	To regroup the given using the same generating activities and users with the matrix

5. Impacts of Tutorials of Project Management

In this project, many tutorials are proposed in teaching of project management (Fig.3). Theses tutorials correspond to methods of transferring information and may be used as a component of a learning process. More interactive and detailed than a book or a lecture tutorial seek to teach by example and provide the information to complete a definite task.

This project also made it possible to create a web platform developed of project management using HTML platform.

Fig-3. Web platform for project management.



Tutorials usually have the next characteristics:

- A presentation of the view generally explaining and showing the user interface
- A demonstration of a process, using examples to show how a workflow or process is completed; often broken up into discrete modules or sections.

- Some method of review that reinforces or tests understanding of the content in the related module or section.
- A transition to additional modules or sections that builds on the instructions already provided.

In these tutorials, we presented the different aspects of a project and the planning techniques used in project management.

In order, to reinforce or test understanding of the content and better understand the course and to offer its meaning, we provide some exercises on planning techniques: PERT and GANTT and some quiz.

We build additional modules or sections on some methods used in project management such as FMEA and SADT.

6. Conclusion

This contribution aims to share teaching experience in higher education. Methods were applied to improve teaching through active tutorials. The innovative approach to all of these tutorials is the specification of their content and that by adopting a system method of planning by objectives based on exploitation of the OOPP method.

In order to better understand the impact of this work on students, we conducted a survey of around 50 students, who had participated in these tutorials courses. Most of the students well appreciated this and they also felt motivated to do more courses. This experience was very efficient and allowed students to understand some unclear concepts better. They become active and actors.

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