Project Management Principles Applied in Academic Research Projects

Pollyana Notargiacomo Mustaro & Rogério Rossi
Mackenzie Presbyterian University, São Paulo, SP, Brazil

pollyana.mustaro@mackenzie.br rossirogerio@hotmail.com

Abstract

The achievement of academic research involves a series of steps and activities that must be managed in order to avoid delays, development problems (due to unforeseen risks) and even monitoring (which involves the work of the Advisor). Aiming to contribute to project development for academic research, this paper presents some principles of project management considering project management theories and also presenting many frameworks on this area. The PMBoK (Project Management Body of Knowledge) developed by the PMI (Project Management Institute) is presented in more details because it was used to define part of main specific proposals of this paper. Two (Initiating and Planning Process Groups) from the five process groups defined by the framework are presented and also their correlation to academic projects. This is relevant to formalize all activities and artifacts during an academic project. Besides that, the Knowledge Areas (KA) defined by the framework are also presented in details. The relationship between these KA's and the Initiating and Planning Process Groups are discussed in a viewpoint of academic research stakeholders. Specifics templates by KA are proposed to be used in this kind of projects and to support the student's academic journey conducted by an Advisor.

Keywords: Project Management Theory, Academic Research Activities, Academic Research Projects, Advisoring Process, PMI, PMBoK.

Introduction

One of the challenges faced by students that are involved in the acquisition of an academic degree, as Higher Education or a PhD., are related to the difficulties of development of a Academic Research Project. Such challenges are surrounded by incorrect determination of the research scope and complexity, the erroneous estimatives for the research conclusion (or even the time demand due to problems occurring during the research development) or even finishing with poor quality as something that were not expected by the advisor and other evaluators. These elements culminates in the application of Project Management Theory that is being studied by institutions such as the Project Management Institute - PMI (PMSURVEY.ORG, 2010) over the years and

which aims to improve the process of project development in general, including academic projects aimed at scientific research in the university accordingly to MUSTARO & ROSSI, 2013. PMI is responsible for developing guidelines for project management as defined on the Project Management Body of Knowledge - PMBoK (PMI, 2008).

From the presented scenario, the general objective of this paper is to establish

link between academic research projects with the Project Management Theory.

As specific objectives, this paper considers: 1) present the types of academic research projects that can be treated according to the precepts of the project, 2) provide project management theoretical foundations, and 3) present part of the process groups of PMBoK (Project Management Body of Knowledge), a framework widely used in over a hundred countries, linking these process groups to the academic research projects.

To develop the proposed objectives and present the research results this paper is organized as follows: initially is described the Project Management Principles, then the processes involved in Initiating and Planning Process Groups are detailed based on PMBoK as well their relation with Academic Research Project. For each process group, their relation with the Knowledge Areas from PMBoK are detailed, and specific templates, as an Academic Research Project Plan Template, are presented. Finally, the conclusions are related and future works are suggested.

Project Management Principles

It is considered that the man have been using actions that turns to practices of project management since long time ago. It is also considered that some important monuments created throughout the history of modern man were built under the precepts of project management although these were not formalized at the time. Valle et al. (2010) show historical analyses that consider the concept of project management can be older than it looks.

According to the authors, the construction of the pyramids of Egypt, the Great Wall of China and the Coliseum in Rome represent examples of man's efforts that must have been regimented by principles of project management.

In the contemporary era is verified, as Valle et al. (2010), that several works were done under management of big monetary amounts and the work force of thousands of workers, which generated the need to implement project management practices. According to the authors, Taylor (1911) was a pioneer in the science of Project Management and Gantt (1919) was another student of these sciences. Both contributed greatly to the practices of modern project management.

Although great events of the past suggested the theories of project management, it was only in the early twentieth century that the theories, methodologies and frameworks aimed at project management were in fact established.

A timeline, according to Carvalho & Rabechini Jr. (2011), present great landmarks of project management from the twentieth century. This is able to present the evolution of project management practices and represents milestones in this setting, as shown in Table 1.

Table 1: Project Management Evolution

Period	Event
Postwar	Creation of PERT/CPM net
1960's	Significant associations arise as IPMA and PMI
1970's	Stagnation. Software for Project Management are featured
1980's	Growing practice of Project Management in the world
1990's	Exponential growth in the number of certified professionals and publications
2000's	Emphasis on settling the practice of Project Management

In general, project management practices bring many benefits. These in turn can not be easily measured, because the same metrics that are established for project management often does not have historical data as references. Since the projects are unique, enterprises sometimes do not allow comparisons. In case of carrying out comparative efforts, should consider a number of variables, including organizational structure and culture, which interfere excessively in the comparisons.

However, benefits are tangible and intangible, and independent of its be tangible, some are highlighted as evidenced in Valle et al. (2010, p. 65): "1) Increase commitment to the objectives and outcomes, 2) availability of information for decision making, 3) quality improvement in results, 4) increasing integration between departments, and 5) increased customer satisfaction (internal / external)".

As mentioned and highlighted in Table 1, in the early twentieth century was identified some institutions or entities that were responsible for creating and disseminating methodologies and frameworks aimed at project management in order to maximize the benefits aforementioned of organizations in different segments. Without being restricted to the reasons why these structures have been defined, is possible to see in Table 2 some of these institutions and the frameworks defined and distributed by them.

Table 2: Institutions and Frameworks for Project Management

Institution	Framework
PMI – Project Management Institute	PMBoK – Project Management Body of Knowledge
IPMA – International Project Management Association	ICB – IPMA Competence Baseline
OGC – Office of Government Commerce	Prince 2
JPMF – Japan Project Management Forum	ENAA Model Form
AIPM – Australian International Project Management	RegPM Standards
APM – Association for Project Management	APM Body of Knowledge

From the frameworks presented in table 2, the PMBoK and Prince 2 are highlighted as highly accepted and used by organizations from different segments. Another framework can be observed in in Carvalho & Rabechini Jr. (2011) to regulate the activities related to project management nominated MEGP (Model Strategic Project Management). Aiming to add value to the projects the model considers the valuation on the project management and the maturity of those involved with the project.

In a circular approach, the center of MEGP model considers the Integration Knowledge Area and around of the circle, the model considers the others Knowledge Areas, all geared to the Project Management Theory. The MEGP is divided into three parts: Structure, Maturity and Competencies. For Structure division are considered the Knowledge Areas Procurement, Human Resources and Scope; for Maturity division are considered the Knowledge Areas Time, Risk and Communication, and, finally, for the Competencies division the model consider the Knowledge Areas of Cost and Quality.

After these considerations focused on the history and presentation of institutions and frameworks that define standards as the main element in the activities of project management, it is considered two important concepts regarding the theory and this paper, which are: Project and Project Management. Both are widely treated by authors from different segments and different institutions.

Thus, this paper presents the concept of project proposed by one of the institutions that determines standards that involving these practices, the PMI (Project Management Institute). According to PMI (2008) "project is a temporary endeavor undertaken to create a unique product, service, or result". To the other fundamental term directed to the theory of projects, i.e., the Project Management, PMI (2008) proposes that "Project Management is the application of knowledge, skills, tools and techniques to project activities to meet project requirements".

Two other considerations are appropriate to deal with aspects related to project management, which are: Portfolio Management and Program Management. Both elements aim to collate and treat projects under certain perspective. A program refers, according to PMI (2008) the "group of related projects managed in a coordinated way to obtain benefits and control not available from managing Them Individually". And, also according to PMI (2008), "the Portfolio is a collection of projects and other programs of work are grouped together to that facilitate effective management of that work to meet strategic business objectives".

The programs with the characteristic of encompassing multiple projects is very common and used in academic institutions as universities, isolated research institutes, etc.

The programs are sometimes created by the institutions of education and research to meet one or more areas of knowledge that are convergent under certain research lines set by academic institutions and requiring several research projects to report results.

Conduct such programs and projects sometimes require some determination and rigors that are presented by one who conducts the research activities (advisor), requiring from the learner (advising) that fits in certain criteria to manage the program activities, ie, the project associated to the program can be conducted by the advisor and has to be performed by the advising, something that can be quite complex.

In this sense these activities culminates in studies on the aspects and considerations of specific frameworks aimed to project management that can be applied in research settings by academic institutions. This paper, that is treating the complexity of project management for academic research, considers the PMBoK framework. As evidenced in Carvalho & Rabechini Jr. (2011), this framework is the most widespread, although known as an American approach to project management is present in more than 100 countries.

The PMBoK framework, as shown in Table 2, was created by the Project Management Institute, or PMI, that was founded in 1969 as a nonprofit association. The mission of the PMI involves the development of Standards and scientific improvement in relation to the project management area (Archibald & Prado, 2011).

The PMBoK, as it is also known, is in its fourth edition, and is structured in two main elements, ie, the Knowledge Areas and Process Groups (Carvalho & Rabechini Jr. 2011).

The Knowledge Areas defined by the PMBoK are: 1) Scope Management, 2) Time Management, 3) Cost Management, 4) Quality Management; 5) Human Resource Management, 6) Communication Management, 7) Risk Management; 8) Acquisition Management, and 9) Project Management Integration. These areas of knowledge provide the base to the processes execution as verified in PMI (2008).

The process groups defined by PMBoK are: 1) Initiating, 2) Planning, 3) Executing, 4) Monitoring & Controlling, and 5) Closing. These process groups are responsible for the grouping of forty-two processes established in the framework.

The Knowledge Areas and process groups are presented in matrix form according to the PMBoK. There is a relationship matrix between each of the Knowledge Areas that intersect with the Process Groups in at least two points. At these points are verified at least one of the processes. Each

process are unique and not repeatable, thus at each intersection point at least one process is verified.

To illustrate one of the possible intersection points, is considered the Scope Management Knowledge Area and the Process Groups that it intersect. This Knowledge Area intersect with the Planning and Monitoring & Controlling Process Groups. For the Planning Process Group this Knowledge Area considers three process: 1) Scope Planning, 2) Scope Definition, and 3) Create WBS. For Monitoring & Controlling Process Group, are considers two process: 1) Scope Verification, and 2) Scope Control.

As mentioned, the framework provides forty-two processes in its entirety, which are grouped into process groups. These processes, individually, are unique and not repeatable and they are associated with areas of knowledge.

To verify the dimension of the framework it will be presented the number of processes associated with each process group as shown in Table 3.

Table 3: Number of processes by Process Groups

Project Management Process Groups	Number of associated process
Initiating	2
Planning	20
Executing	8
Monitoring & Controlling	10
Closing	2

And in another dimension, the number of processes associated with each of the Knowledge Areas, as shown in table 4.

Table 4: Number of processes by Knowledge Area

Knowledge Area	Number of associated process
Project Integration Management	6
Scope Management	5
Time Management	6
Cost Management	3
Quality Management	3
Human Resource Management	4
Communications Management	5
Risk Management	6
Procurement Management	4

This paper is focused on the Initiating and Planning Process Groups as part of the studies that have been done. These process groups represents the goal of which is treated by academic research projects developed in academic environments. The presentation of correlation of these process groups and the affected Knowledge Areas favors the studies related to the specific research projects conducted by the academic institutions.

According PMI (2008), there are three main deliverables of a project, that are: 1) Project Charter; 2) Project Scope Statement (linked to WBS), and 3) Project Plan. These three deliverables are developed throughout the development of the processes belonging to the process groups of Initiating and Planning. As the focus of this paper is to present both process groups and the deliverables mentioned above, the following section will detail the goals and key features of each of these process groups and related deliverables specifically for the projects in academic research context.

Initiating Process Group

Specific Considerations for this Process Group

The Initiating Process Group is considered the startup project. It refers in general to the beginning of the project, however, given the possibility of different approaches to project management adopted by each institution, can also be applied to the initialization phase of a project.

The Initiating Process Group defines and authorizes the project or a project phase (PMI, 2008).

This process group is related to two Knowledge Areas: Project Integration Management and Communication Management. It has two processes, as shown in Table 5.

Table 5: Process by Knowledge Area for the Initiating Process Group

Knowledge Areas	Process
Project Integration Management	Develop a Project Charter
Communications Management	Identifiy Stakeholders

Although this process group considers only two processes, is a process group that generates a one of the major deliverables aimed to project management, i.e. the Project Charter. The Project Charter is responsible for publicizing the project to the organization and formalizes the initial actions defined by the project as scope, time, cost, risk, and people involved, as well as define and direct the actions of the Project Manager.

Applying processes of Initiating Process Group to Academic Research Projects

Following the premises adopted by the PMBoK (PMI, 2008), it can be concluded that each new study or even each new phase of a research project requires an approval (either, from the advisor, coordinator or sponsoring agency) as verified in more details on the Initiation Process Group (Figure 1).
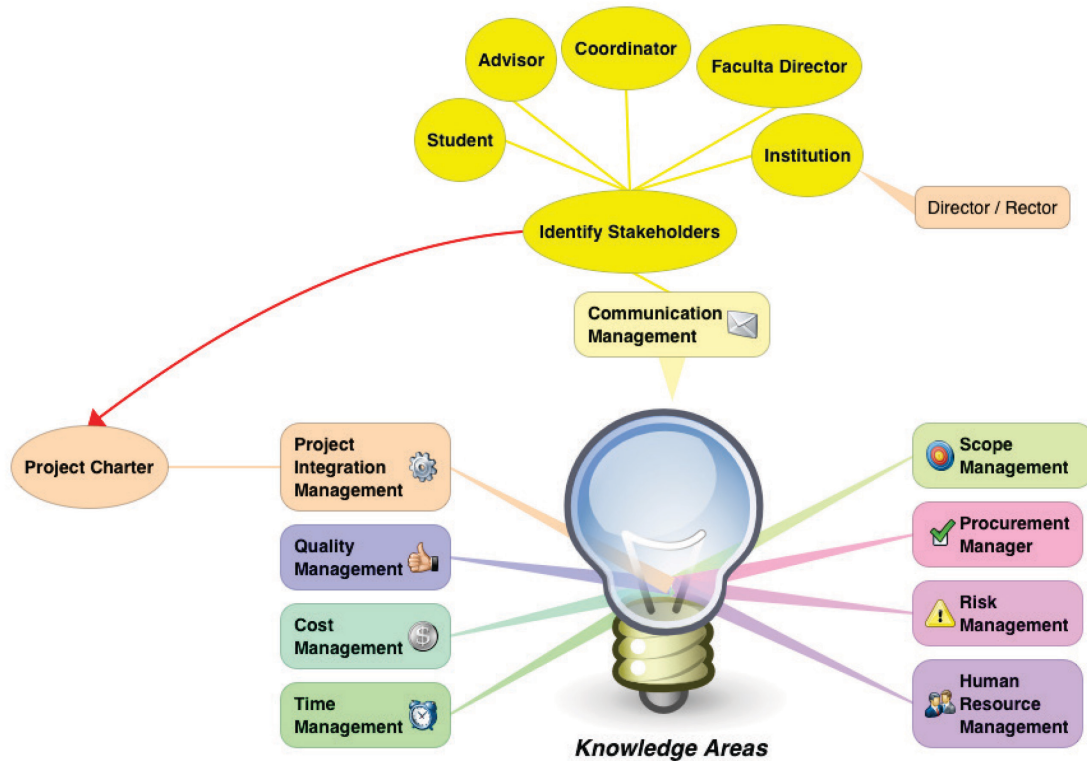
Figure 1: Initiating Process Group in Academic Research Projects

So, when it proposes a new research, whether undergraduate, graduate, improvement, extension, or even a monograph is necessary to define the initial proposal, as well as the people involved. In this case people involved on the project research are nominated as stakeholders and they can be, for example, the student (or group of students who develop the research), the advisor (and co-advisor, if applicable), the course coordinator, the course director and ultimately the institution itself as a responsible entity (represented by its Rector or Director). Such information is concatenated in a charter favoring the research initiation in an official way (Chart 1).

Depending on the size and complexity of the research, it is necessary in phases throughout his development, conducting similar initiating proceedings, like those arising from research reports, grant request, equipment justification for perform lab tests, postponement request, leave of absence, etc. So when it is necessary to institute new initiations are also analyzed the partial results of the research (i.e., the progress made until the moment of the new request) before the determination, which can be favorable or not to the continuity of scientific research, or even to be postponed. From this it is possible to work in Planning Process Group as detailed below.

CHART 1.

PROJECT CHARTER AS A DELIVERABLE OF AN ACADEMIC RESEARCH PROJECTS METHODOLOGY (MUSTARO & ROSSI, 2012)

Advisor: <Name of the research advisor>	
Advisee: < Name of the student or students>	
Abstract of the Academic Research Project: <A set of paragraphs to present the topics, the theoretical and methodological, approach and selected results:	
Objectives of Academic Research Project: <Presentation of research objectives (general and specific)>	
Justification of the Academic Research Project: <Description of the research relevance in the context of the area in which it is inserted, as well as the characterization of the possible contributions of the study>	
High-level scope definition: <Criteria and/or conditions to be met by student or students>	
Limits / Exclusions: <List of the elements which are not part of the research>	
Technical requirements: <Resources required for the development of research>	
Term: **<**Date for closing research (and this number of days involved)>	
Critical milestones assessment:	**Dates:**
<Milestone 1 of Academic Research Project>	<Date to finish of Milestone 1>
<Milestone 2 of Academic Research Project >	<Date to finish of Milestone 2>
<Milestone 3 of Academic Research Project >	<Date to finish of Milestone 3>
<Milestone 4 of Academic Research Project >	<Date to finish of Milestone 4>
Comments: <Additional considerations>	
Approved by: <Advisor / Course Coordinator (if necessary)>	

Planning Process Group

Specific Considerations for this Process Group

This is the process group that has more processes associated with it. There are twenty processes associated with the nine Knowledge Areas as evidenced in Table 6. In general, it can be consider as the unique process for project management, as the act of management is completely justified by planning.

The Planning Process Group defines and refines objectives and plans the actions required to attain the objectives and scope that the project was undertaken to address (PMI, 2008).

It is an extense process group, that considers twenty processes to be treated to complete the planning phase. This is the unique process group that relates to all Knowledge Areas defined by PMBoK framework.

The processes belonging to this process group must be executed after the execution of the processes belonging to the Initiating Process Group presented in previous section.

Table 6: Processes by Knowledge Area for the Planning Process Group

Knowledge Areas	Process
Project Integration Management	Development Project Management Plan
Scope Management	a) Scope Planning, b) Scope Definition, and c) Create WBS
Time Management	a) Activity definition, b) Activity sequencing, c) Activity resource estimating, d) Activity duration estimating, and e) Schedule development
Cost Management	a) Cost estimating, and b) Cost budgeting
Quality Management	Quality Planning
Human Resource Management	Human Resource Planning
Communications Management	Communications Planning
Risk Management	a) Risk Management Planning, b) Risk identification, c) Qualitative risk analysis, d) Quantitative risk analysis, and e) Risk Response Planning
Procurement Management	Acquisition Planning

For this process group (Figure 2), the Project Plan is the main deliverable and it shall be prepared based on the results of other processes linked to this process group, i.e., the development of the Project Plan is the result of the development of many processes.

Although, in the Figure 2 is possible to see each of the other processes can also generate some end deliverable as can be exemplified considering the Time Management Knowledge Area. The Time Management Knowledge Area intercepts the Planning Process Group, is possible to observe five processes on this interception, and in general it is common when performing these processes generate the Project Schedule, however, this is not the main deliverable of the Planning Process Group. The Project Schedule is one more input for the generation of the Project Plan that refers to the main deliverable that condenses the results of all other processes executing by the interception of each Knowledge Area.
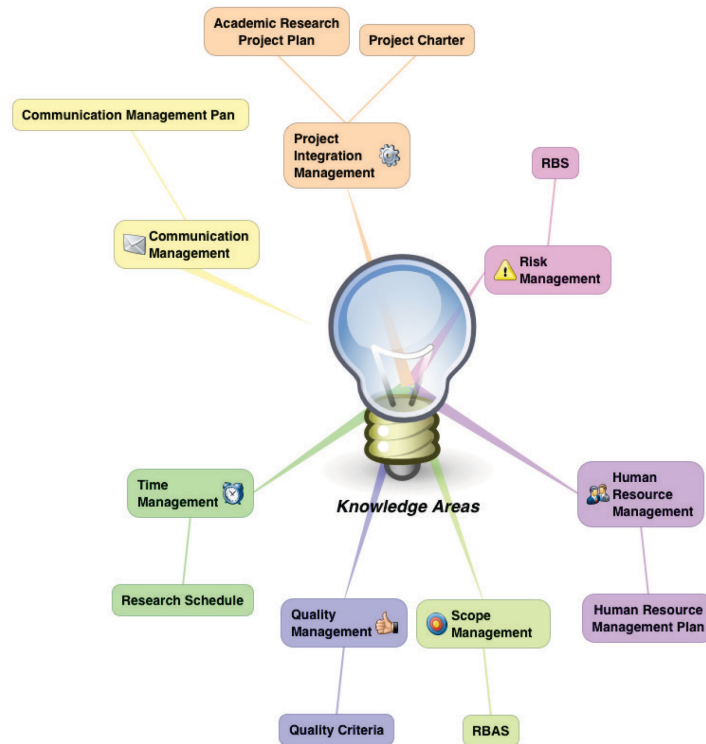
Figure 2: Planning Process Group in Academic Research Projects

Applying Processes of Planning Process Group to Academic Research Projects

The PMBoK Guidelines (PMI, 2008) involve, during the Planning Process the following Knowledge Areas of Project Management: Scope Management, Time Management, Cost Management, Procurement Management, Communications Management, Human Resource Management, Risk Management, and Quality Management.

The Scope Management, in this paper, turns to the issue of developing the Scope Management Plan of Scientific Research Project, or for the development of the Research Advisory Breakdown Structure - RBAS (Mustaro & Rossi, 2012). The RBAS has a hierarchical structure that allows the visualization of smaller structures that integrate the sub-deliverable products of Academic Research Project in order to achieve their goals (Figure 3).
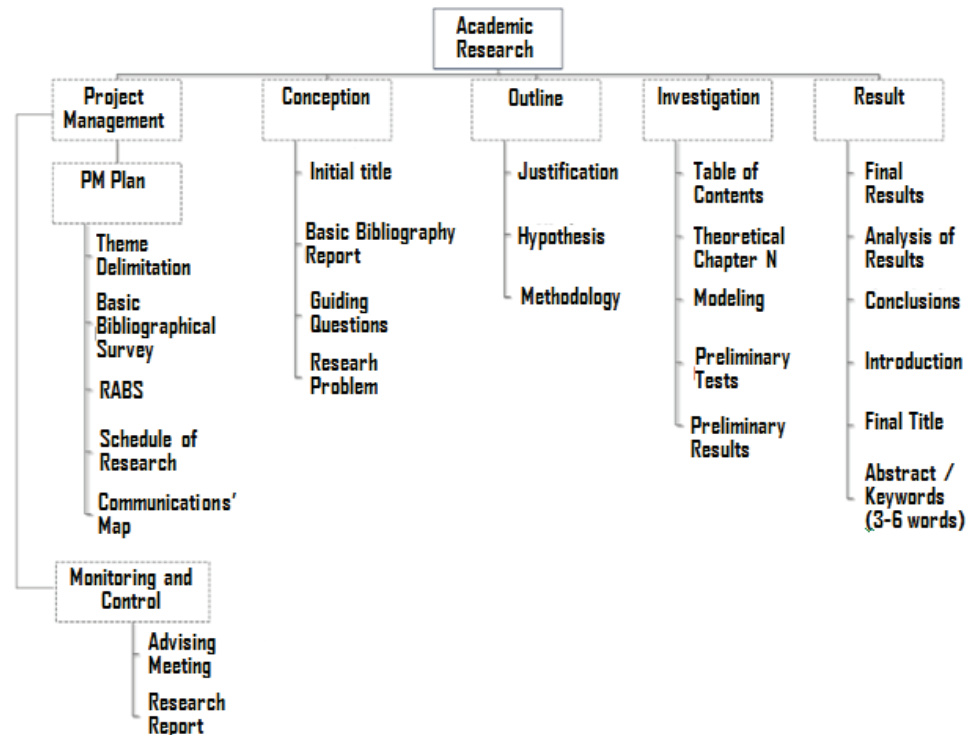
Figure 3: RBAS Representation (Translation of Mustaro & Rossi, 2012)

In a complementary way, the Time Management (PMI, 2008) turns to the definition, sequencing and estimated timing of activities involved in deliverables, generating a research schedule as result (Figure 4).
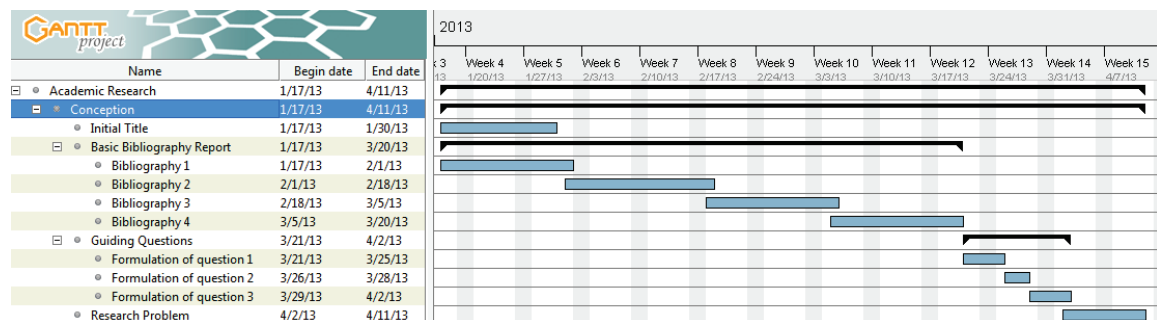

Figure 4: Part of Research Schedule Example

With regard to the Cost Management, this involves rising costs relevant to academic research projects (equipment, travel for conducting experiment or data collection, contracting proofreader, translator, statistical, etc.). Then it is necessary to align the estimation of costs resulting from the mapping to the work packages presented in RBAS. Moreover, it should be noted that there is a Knowledge Area called Procurement Management that is tied to the Acquisition Planning, and in the case of Academic Research Project it may occur due to the need to purchase equipment or books, for example. Where this applies, is necessary to establish what will be purchased (specifications, price quotes, etc.) and at what time (temporal identification).

In a complementary way, in Communication Management are established communication way between the stakeholders, especially between the advisor and advisees (and co-advisor, if applicable). In this sense, it can use different forms of communication (synchronous and asynchro-

nous) as well as different vehicles (email, Skype, meetings, interventions in the texts with comments and suggestions for changes and additions) as necessary (Mustaro, 2007). As a result one example of the communication structure is presented below (Table 7).

**Table 7: Example of Communication Management Plan for Academic Research Project**

Communication Events Plan		
Types	Media	Periodicity
Asynchronous	E-mail	Weekly
Synchronous	Chat or Face-to-face	Biweekly
Forms of communication documentation:	Minutes of Meeting of every communication	
Storage structure and distribution information:	Cloud storage with Version Control System (VCS)	

In addition to the above Knowledge Areas as Cost Management and Communication Management, there is also a function which is to map the roles, responsibilities and hierarchy existing in the Academic Research Project as defined in the Knowledge Area nominated Human Resource Management. In the case of Academic Research Project, it is usually identified in the Educational Institution Statute and this should be mentioned in the Project Plan Template, that will be presented below (Table 8).

Table 8: Example of Human Resource Management Plan for Academic Research Project

Roles and Responsibilities Matrix		
Responsability	Principal Role	Support Role
Research Advisor Guidance	Advisor	
Providing initial/basic references	Advisor	
Development of the research project	Student(s)	Advisor

Another Knowledge Area is Risk Management. Risk, according to PMI (2008), is an event or uncertainty resulting from one or more causes, which happen implies impact (singular or plural, positive or negative) on the project. The risk results from three factors, exemplified in the context of Academic Research Projects (Mustaro & Rossi, 2013): circumstantial condition (lack of equipment), premise (a certain domain or programming language specific content) and restriction (number of months or years specified for ending the research). However, it should be noted that is necessary to plan the approach, map (Figure 5), analyze (qualitatively and quantitatively) the acceptability and tolerance degrees (Table 9), enumerating the implications (whether negative or opportunities) and calculate the probability of risks take place, elements that should be followed by planning how to reduce the chances of risks concretion.
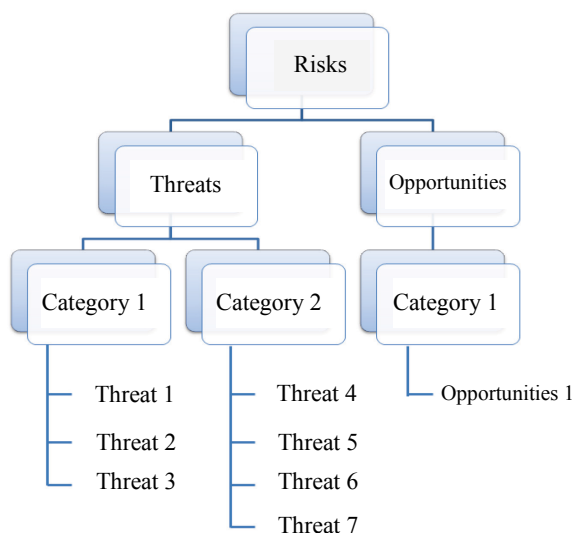
**Figure 5: Risk Breakdown Structure for Academic Research
(Translation of Mustaro & Rossi, 2013)**

**Table 9: Qualitative and Quantitative Degrees of Acceptability and Tolerance
(Translation of Mustaro & Rossi, 2013)**

Qualitative characterization of risks		
Probability of occurrence		
Low (<15%)	Average (> 15% and <50%)	High (> 50%)
Impact		
Low (<10%)	Middle (> 10% and <20%)	High (> 20%)
Quantitative characterization of risks		
Process adopted to quantify the risks (if applicable).		
Examples: SWOT Analysis (Wu, 2006), Brainstorming, Decision Tree (Dey, 2012), FMEA (Stamatis, 2003).		

Finally, Quality Management turns to measure the results of Academic Research Projects. In this sense, each institution is responsible for establishing their own criteria. Just as an example, some quality criteria for this type of projects can be: the contribution of the research results, the level of complexity in relation to the studies, the correct use of scientific writing employed on technical and scientific papers, the correct use of standards for text edition according to the rules defined by the institution, among others.

All elements presented above are concatenated into the Academic Research Project Plan. And also can be added, besides the information developed by means of the processes relevant to the Knowledge Areas as previously presented, other elements as is possible to verify on the Academic Research Project Plan Template (Table 10).

Table 10: Academic Research Project Plan Template

Academic Research Project Plan					
Title of research project:					
Author(s):					
E-mail(s):					
Mobile(s):					
Course:				Semester:	
Advisor:			Advisor's e-mail:		
Release:				Date:	
Approved by:			Date of approval:		
Signature:					
Change log					
Version:				Date of change:	
Description of change:					
Responsible:			Approval:		
The development of this plan is governed by the Rules of the Institution version <Number.Year>. These contain the rights and duties of the student as well as the rights, duties and authorities of the advisor.					
Responsibility Assignment Matrix [Table 8]					
1. Introduction (presentation of the theme, context and objectives of the research project)					
2. Justification (Placing the relevance of research to the context area and to others fields)					
3. Expected Results (possible contributions of the study)					
4. Assumptions and restrictions (Refer to the premises as, for example, the specific time to perform the search)					
5. Research Advisory Breakdown Structure (RABS) [Figure 2]					
6. Basic Schedule Research Development (also provides, under the rules of the educational institution, the frequency of review / update of the plan, and the research milestones) [Figure 3]					
7. Schedule of Communication Events [Table 7]					
8. Risk Management [Figure 4 and Table 9]					
8.1 List of responses to risks					
8.2 Opportunities					
9. Project Evaluation Rubric (according to the rules of the educational institution)					
10. Requirements established by the advisor					
10.1 Dissolution of groups or exchange advisor					
10.2 Disciplines required for Research Development					
11. Purchases of materials /equipment					
11.1 Specification of materials and/or equipment to be purchased or hired					
11.2 Evaluation criteria for proposals and quotes					
11.3 Initial estimates cost					
11.4 Types of contracts					

The concatenation of such elements not only allows mapping and planning what will be accomplished during the research as having a formal document for its management and control.

Conclusions and Further Works

The analysis of the Knowledge Areas pertinent to the PMBoK (PMI, 2008) allowed for an alignment and adaptation of the same proposition for planning and Academic Research Project under the supervision of an advisor. Thus, it was also possible to establish a framework that integrates knowledge areas, creating a project plan that is guided by the Project Management Principles through a process flow for the specific academic context.

Regarding further works, some parts of this research have been tested separately, however, it is necessary to implement the use of full proposal from early research project to conduct the validation of processes and proposed structures. Future studies may also involve the development of an expert system that can be used by the advisor, along the guidance process, to monitor their advisees, as well as for knowledge management involved. Likewise, such a system may also be (part of) a module for the student.

References

Archibald, R. D., & Prado, D. S. (2011). *Gerenciamento de projetos para executivos*. [Project management for executives] Minas Gerais: INDG TecS.

Carvalho, M. M., & Rabechini Jr, R. (2011). *Fundamentos em gestão de projetos*. [Fundamentals of project management] São Paulo: Editora Atlas.

Dey, P. K. (2012). Project risk management using multiple criteria decision-making technique and decision tree analysis: A case study of Indian oil refinery. *Production Planning & Control*, *23*(12).

Gantt, H. L. (1919). *Organizing for work*. NY: Harcourt, Brace, and Howe.

Mustaro, P. N. (2007). Blended proposal of orientation scientific works by comparison face-to-face and online processes. *Issues in Informing Science & Information Technology*, *4*, 189-199.

Mustaro, P. N., & Rossi, R. (2012). Research advisory breakdown structure proposal of guidelines for student mentoring based on project management principles. *Proceedings of the I Simpósio Internacional de Gestão de Projetos (SINGEP)*, São Paulo.

Mustaro, P. N., & Rossi, R. (2013). Da elaboração do termo de abertura de projeto de pesquisa à gestão de riscos: Subsídios para a gestão acadêmica de investigações científicas [From the project charter of the research project to risk management: Subsidies for the academic management of scientific research]. *Proceedings of the VIII International Conference on Engineering and Computer Education (ICECE'13)*. [which will be held in Luanda on March 3 to 6, 2013]

PMSURVEY.ORG. Estudo de Benchmarking em Gerenciamento de Projetos Brasil 2010 [Benchmarking Study Project Management Brazil 2010]. *Project Management Institute - Chapters Brasileiros*. Retrieved July 10, 2011, from
http://www.mp.go.gov.br/portalweb/hp/33/docs/benchmarking_gp_2010_geral.pdf

PMI (Project Management Institute). (2008). *A guide to the project management body of knowledge (PMBOK®)*. PA: Project Management Institute.

Stamatis, D. H. (2003). *Failure mode and effect analysis: FMEA from theory to execution*. ASQ Quality Press.

Taylor, F. W. (1911). *The principles of scientific management*. New York, NY: Harper & Brothers.

Valle, A. B., Soares, C. A. P., Finocchio Jr, J., & Silva, L. S. F. (2010). *Fundamentos de gerenciamento de projetos*. [Fundamentals of project management] Rio de Janeiro: Editora FGV.

Wu, T. W. (2006). *Project planning: conception for IT*. Taipei, Taiwan: Best Wise Co.

Biographies

Rogério Rossi has Bachelor's Degree in Mathematics by the University Center Foundation Santo André (1991), MSc in Electrical Engineering by Mackenzie Presbyterian University (1998). He is a PhD student in Electrical Engineering at Mackenzie Presbyterian University (early in 2010) with researches focused on quality for educational technology. Since 2000, is working as a professor of undergraduate and graduate courses in the areas of Quality Management, Software Engineering and IT Management. Consultant in the area of Quality and Processes for IT, implementing quality programs based on models such as CMMI, working for national and multinational companies.

Pollyana Notargiacomo Mustaro was graduated in Pedagogy by the University of São Paulo, an institution that also earned the title of Master and Doctor of Education. She is currently Professor at Mackenzie Presbyterian University, where she develops activities for Research and Teaching at the Computer Science College and Electrical Engineering Postgraduation Course. Among hes areas of research, the following themes stand out: Instructional Design, Learning Objects Theory, Learning Styles, Distance Learning, Podcasts, Social Media Approaches and Technological Tools, Social Network Analysis, Hypertext Theory, Serious Games, Game Culture Studies, and Narratology.