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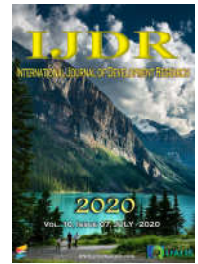
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RESEARCH ARTICLE

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## MANAGEMENT OF ACADEMIC PROJECTS IN HIGHER EDUCATION INSTITUTIONS UNDER THE FOCUS OF THE PROFESSOR AND RESEARCHER

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### ABSTRACT

Risk management is a decision making and execution process that aims to identify, assess, and control threats and effects of risk in an organization. To increase the success rate of project development, the literature suggests the need for effective risk management practices. Although this management is a fundamental task for organizations and their projects, they not always perceived it, risking possible failures. In this context, this study presents a systematic investigation to identify how professors/researchers understand and practice mechanisms to support project management and its risks; it also sought to characterize the types of academic projects and the success percentages obtained in their development. The survey included 101 participants from 10 Higher Education Institutions. The results indicated that the majority of current academic project managers had not yet been encouraged to adopt formal management tools, were unaware of consolidated strategies to support and existing obstacles in management, and signaled the need for such mechanisms as a way to improve the results of their projects. The search results revealed the importance of guiding and using mechanisms to support project management and its risks, apparently still little used in the context of academic projects.

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### INTRODUCTION

This work presents research to understand the practice of professors and/or researchers when they manage academic projects in Higher Education Institutions (HEI), characterizing such projects according to their nature, identifying the inherent risk factors and critical success factors, and the support mechanisms used to support the management. The professor in higher education is responsible for developing training activities in the various areas of knowledge, oriented to the preparation of future professionals. Its performance includes academic teaching, research, and extension activities (BRASIL., 1988), as well as administrative activities that are involved in the dynamics of the HEIs. Professors develop those academic activities concurrently or not. Therefore, from here on, the term "professor" implies a professor or researcher who develops academic activities. An academic project deals with the creation of academic activity. Academic project is considered an enterprise that aims at the production of new knowledge, regardless of ideological, political, or economic considerations, and is aimed at social contributions (RIOL; THUILLIER, 2015).

According to Resolution no 08/2018 of Federal University of Pernambuco (UFPE, 2018), academic project in HEI can be: (i) Teaching Project, involving teaching activities, in undergraduate or graduate courses, in various modalities. (ii) Scientific and Technological Research and Development Project, related to studies, research and technological innovation activities. (iii) Extension Project encompasses activities in the social reality, of an academic nature, of an educational, social, artistic, cultural, scientific or technological nature, and the transfer of the knowledge generated. (iv) Institutional Development Project, which involves special programs, projects, activities, and operations, which lead to a measurable improvement in the institution's conditions; and finally. (v) Innovation Project, refers to the introduction of novelty or improvement in the productive and social environment. HEIs develop teaching, research, and extension activities. Exposure to risk and consequent impacts can affect its dynamics and cause damage to the most varied types and ranges. While knowing that each project is different, it is necessary to institute principles to guide managers in establishing risk management processes. Although there are

many studies towards guiding guidelines for managing risks, few reveal how it is done (or not done) by project managers and why (OLECHOWSKI et al., 2016). Our starting point is the perception that academic projects cover a wide range of projects with the most diverse levels of complexity and social scope; thus, signaling a real need for formal processes to manage its development and the risks involved. A project has distinct attributes that differentiate it from work operations or ongoing processes. There are many project definitions. According to PMBOK(2018), project is a temporary effort undertaken to create a unique product, service, or result. As specified by ISO 10006 (2006), project is a unique process, consisting of a group of coordinated and controlled activities with start and end dates, undertaken to achieve an objective according to specific requirements, including time, cost and resource limitations. In general, these definitions approach the project as a single undertaking, differentiating it from operations that are continuous and repetitive; which has a temporary nature - with defined start and end dates, which is considered completed when its goals and objectives are reached or it is determined that it is no longer viable; to create an exclusive product, service or result. A successful project is one that meets or exceeds stakeholder expectations.

Typically, it is considered that a large part of the project effort is dedicated to ensuring that the project is completed on time (time determined to complete the project), cost (approved budget for the project, including all necessary expenses for delivery) and scope (the reason and objective of the project), known as a triple constraint or objectives. However, the project may have additional constraints, such as quality (a combination of standards and criteria for effective performance), resources (can be people, equipment, facilities, among others), and risk (possible external events that will have an impact on the project, if they occur). The restrictions are dependent on each other and need to be balanced. The application of good project management discipline to help balance constraints. Project management is the application of knowledge, skills, tools, and techniques applied to project activities, to meet project requirements. It is a process that includes planning, executing the plan, and measuring the progress and performance of the project (ISO, 2012; PMI, 2018; WATT, 2014). Project risk management is a process that aims to systematically identify, assess, and manage project-related risks to improve project performance (MARCELINO-SÁDABA et al., 2014; MAYTORENA et al., 2007). Risk is any event or uncertain condition that may affect the project. Not all risks are negative. However, in a traditional view, the risk is the potential of an event to carry out unwanted negative consequences(BALDRY, 1998; KWAN; LEUNG, 2011). For an event to a source of risk, it must have associated a predictable loss that arises as a result, eventually. The scale of the loss is the risk impact and attempts to place an acceptable value on that loss.

The management actions stimulated in response to the occurrence of such events focus on strategies to address how to deal with the risks to, among others, mitigate or limit the harmful effects. Implicit element in project execution, risk manifests itself in different ways at different stages in the project's life cycle (BALDRY, 1998). Risk management is a means of increasing the likelihood of success in the complex, multifunctional, and challenging task of managing project engineering and product development. However, although risks can affect the results of projects, project managers little

adopt risk management practices (OLECHOWSKI et al., 2016), exposing them to possible failures. The impact of risk events on academic projects can extend beyond the limits of the project, influence internal aspects, such as administrative and operational; and external, such as the sponsoring organization. The scope and extent of these impacts present a worrisome task for anticipation and management. Thus, the need for a systematic analysis of potential risks and, subsequently, their management is essential. Besides, though the benefits of project and risk management seem evident in the literature, this is not necessarily the case in HEI. To address this issue, we investigated how risk management and project management practice in Higher Education Institutions, focusing on academic projects. Despite the importance of managing the positive or negative potential of risks in projects, few studies are showing a practical application of risk management in academic projects. To resolve this gap, this article presents a survey that reflects the practice of professors when they are involved with the management of academic projects and their risks.

## MATERIALS AND METHODS

This research was developed as a preliminary exploratory and motivational strategy(KITCHENHAM et al., 2007), to understand aspects of the practice of professors, researchers and other collaborators when they manage academic projects, as well as characteristics of academic projects in HEIs, the risks they present and how they are managed. According to Mattar(1996), exploratory research is appropriate for the first stages of an investigation when the researcher's familiarity, knowledge, and understanding of the phenomenon are generally insufficient or non-existent. For Selltz(1967)], exploratory studies or formulators are indicated for discovering ideas and intuition, which, among others, can increase the researcher's knowledge about the phenomenon to be investigated in a later, increase the knowledge of the situation in that it is intended to carry out such a study, clarify concepts or obtain information on practical possibilities for researching real-life situations. The method used in the research was the study of experience, which considers a survey of people who had practical experience with the subject. Due to such specialists acquire, in the routine of their work, an extraordinary set of experiences that can be of great value in helping the researcher to become aware of important influences that act in any situation to be studied (SELLTIZ, 1967). The first stage of planning was to conduct an ad hoc investigation of the literature on project management, risk management, academic projects, and higher education institutions and their interrelationships. The material collected allowed the definition of the research strategy. After and from the bibliographic survey, the need for exploratory research arose, to provide greater knowledge about the practice of those involved in the management of academic projects.

The selection of individuals to participate in the research considered people with experience and capacity for knowledge on the topic. Thus, the target population of this research was composed of professors and researchers who manage academic projects in HEIs. The selection of the sample took place in a non-probabilistic way, through access to the electronic addresses (e-mail) of professors and researchers belonging to the staff of employees and collaborators of private and public universities, as well as higher education institutes. With the research objectives defined, the next step was the structuring

of the interview script to be applied, to understand the practice of professors, researchers and other collaborators when they manage academic projects in IES, characterizing such projects according to their nature, identifying the factors of risks they present, and the support mechanisms used to manage the risks.

**Data Collection Instrument:** Based on the review of the objectives and the definition of the characteristics of the individuals participating in the research, the chosen and structured instrument for data collection was the questionnaire, with a better relationship between the objectives, questions, and expected responses. The questions had as their source of ideas the bibliographic study on the characteristics of project management, risk management, and academic projects. The questions had a practical and objective nature. The questionnaire sought to obtain sufficient information to characterize and explain both the unique aspects of academic project management and that could be brought together in a unified interpretation of the many and diverse aspects of the data.

**Pilot test and validation:** At this stage, the concern was to know if the research was measuring what it was to measure. The research relied on the application of a pilot test, aiming at the previous evaluation of the questionnaire, to examine the clarity, ambiguities, redundancies, and understanding. For convenience, six researchers participated: three Ph.D. professors, one in Mathematics, one in Statistics and one in Civil Engineering, and three Ph.D. students in the area of Project Management at the Center for Informatics (CIn-UFPE). The experience with the research topic and availability were the criteria for choosing the participants of the pilot study. The observations and suggestions extracted from this evaluation led to adjustments in the presentation text and the data collection instrument.

### Questionnaire structure

The content obtained and validated served as a guide for the construction of definitions, objectives, and statements of this Survey, which resulted in a structured questionnaire with 6 objective questions with alternatives for pre-fixed answers and 12 open questions and 12 mixed questions. The questionnaire addressed defined and properly organized questions to answer the general objective of the research: Identify aspects of the practice of professors, researchers, and other collaborators who manage academic projects. To better clarify this objective, the instrument also included specific related objectives, such as knowing the characteristics of the models and listing tools for project management and risk management, classifying the types of academic projects developed, and relating difficulties and risks of this class of project. The questionnaire for data collection used the tool Google Forms - 2019 and sent to the respondents through the e-mail.

## RESULTS AND DISCUSSION

The following sections present a descriptive analysis of data generated since the 101 responses received from professors of 10 different HEIs.

**Profile of the respondent:** Respondents are in the age group from 26 years old, most are between 46 and 55 years old (30 people), and the smallest number of representatives is over 65 years old, only 5. Offered the options to declare sex or not, all

answered, the majority are male, approximately 56%. Regarding the degree of training, most have a doctorate (54.46%), there is a significant percentage of Post-Docs (32.67%), and there is only 1 Specialist. Most work at UFPE (53). There was great variation concerning the period in which they work at the indicated HEI: the longest period is 42 years (1 professor), and the shortest, 1 year (4 professors); and the period with the highest number of respondents was between 5 and 9 (8 professors).

**Academic activities:** The academic activities included in the research were focused on the areas of Teaching, Research, Extension, Institutional Development, and Innovation (UFPE, 2018). As for the teaching experience, the majority (11 respondents) claimed to have 20 years of teaching, the professor with the longest time claims to have 49 years in the activity. Regarding the years in which he works/worked in research, the highest frequency was 20 years (12 respondents), but it is interesting to realize that, while one respondent claims to have worked 45 years in research, 4 say they have never developed research at the institution. As for the years of developing extension activities, most have no experience (17 respondents), while 2 develop this activity for 40 years. Respondents work in 17 areas, with the highest concentration in Computing, with 14 participants, followed by Civil Engineering, 13 participants.

**Performance in academic project management:** The number of academic projects that the professor managed in the last 10 years was questioned, considering the classification proposed in (UFPE, 2018). In all, respondents claimed to have managed 2225 projects, distributed as follows:

- As for the teaching project, the majority, 64%, say they have not managed any. Leading to understand that the professors join the preexisting teaching projects, developed in and by other instances of the Institution, starting to develop teaching activities, without necessarily having participated in the project.
- There seems to be extensive practice in Project Management for Research, Scientific, and Technological Development. The average was 10.11 projects per respondent, although 9% of professors did not manage any, there are reports of professors having managed 50 projects in the 10 years considered in the survey
- Among the pillars of higher education are the Extension Project, however, it is interesting to note that most respondents, 27.72%, did not manage any university extension project; this may mean low involvement of professors with extension activities. Ten was the largest number of Extension Projects that a participant managed in the period.
- As for Institutional Development Projects, most of those surveyed developed few actions. The majority, for example, never developed projects in this class (46.57%).
- Regarding the Innovation Project, the majority affirmed that they did not manage any (56.43%). A high number when it comes to one of the trends among a researcher's activities.

The professors who managed the academic project evaluated the result of the completion of the projects, according to the time, cost, and scope restrictions defined in the planning. The responses indicated that:

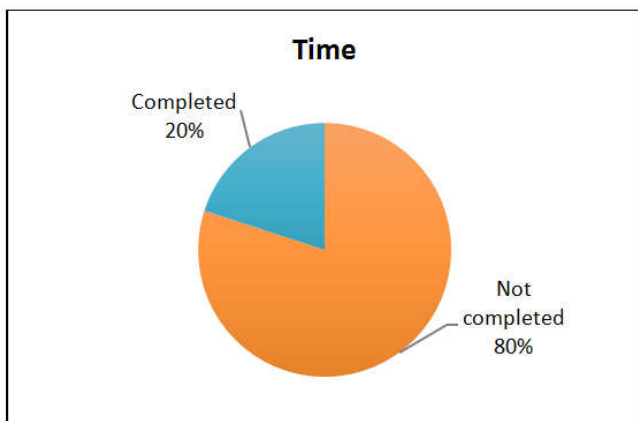
- Regarding the time to complete the project, 20% of the projects met the schedule as planned, as shown in Graph 1.
- Graph 2 shows the percentages of project execution in relation to the estimated cost, 80% of the reported projects exceeded the planned budget.
- Questioned about the number of projects that achieved the scope objectives as planned, the respondents stated that 78% of the projects covered the scope only partially. Currently, some mechanisms aim to fit the project to this dynamic change, an increasingly present characteristic. (Graph 3).

Considering the data on the execution of all the projects presented concerning the objectives of time, cost, and planned scope (Graph 4). Graph 4 shows that 10% of the projects achieved all the cost, deadline and scope objectives, the majority (86%) only partially achieved some of them, and 4% reported that they failed in all objectives and did not complete. Asked about the difficulties and obstacles faced for management, several were reported, 59 in all. The most frequent are listed in Table, which shows the percentage of times that the problem appeared in the data.

**Table 1. Main difficulties and obstacles faced**

Difficulty	%
Resource	42,8%
Bureaucracy	10,8%
Time	6,8%
Dedication of students	5,6%
Infrastructure	5,2%
Coordination with other administrative activities	4,0%

In addition to those listed in Table 1, other difficulties were mentioned that deserve attention, such as lack of management training, lack of methodologies, unpredictability inherent in research (in the case of research projects), institutional support, and reconciling teaching, research, and extension. Difficulties and obstacles, when analyzed, can lead to risk factors for academic projects. Another question was about the use of support mechanisms for project management, 68.3% of respondents said they did not use or did not know. However, when asked if they were interested in any type of managerial support mechanism, 89.1% answered yes.

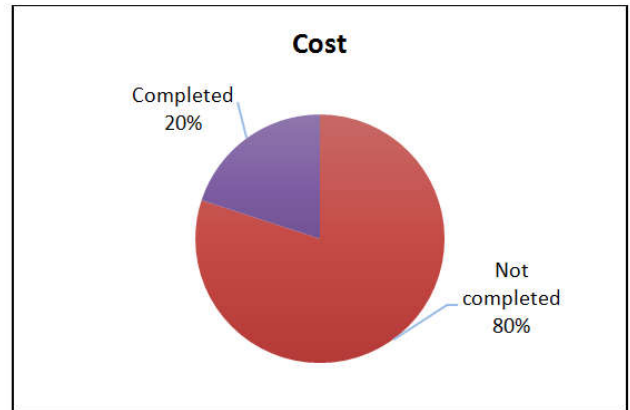


Source: elaborated by the researcher based on the research data.

**Graph 1. Projects completed on time**

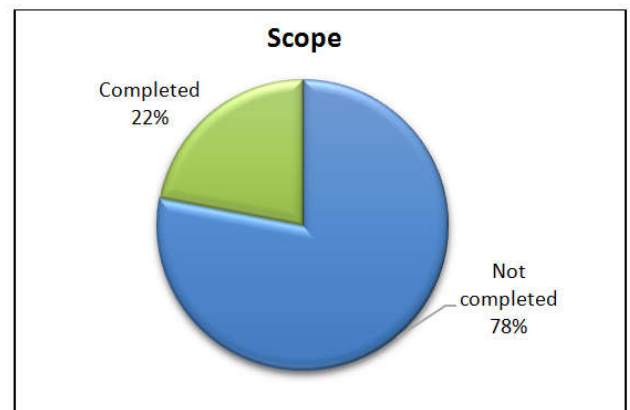
Asked to indicate management support mechanisms, if they knew, respondents mentioned 51 tools. Trello, Pmbok, Scrum,

appropriate methodology, spreadsheets, and MS Project, in that order, are among the most cited. Those surveyed who do not use it, but are interested in using project management support mechanisms, mainly suggest training, financial management, software, and administrative support. Note the association made between training to manage and control financially; this seems to be the main challenge in the management of academic projects.



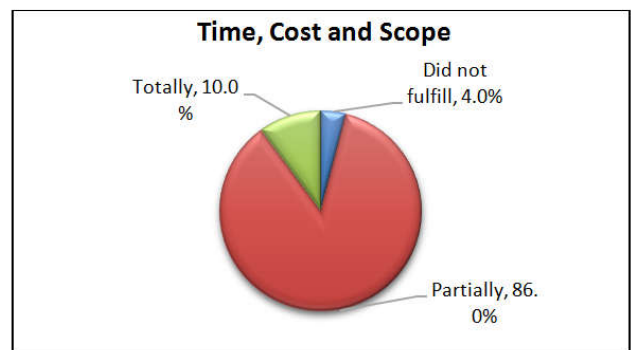
Source: elaborated by the researcher based on the research data.

**Graph 2. Projects completed at the expected cost**



Source: elaborated by the researcher based on the research data.

**Graph 3. Projects completed with the expected scope**



Source: elaborated by the researcher based on the research data.

**Graph 4. Completed projects with the expected scope**

**Performance in risk management:** When asked about events that caused difficulty or unexpected risk, the most cited were bureaucracy, financial issues, infrastructure and transience, and inexperience of the team. Respondents also mentioned problems with excessive professor activities and lack of

institutional support. Regarding the use of some risk management support mechanism, the majority, 91.1%, stated that they do not use any type. Those who used it indicated, among others, PMBOK, MS Project, Burndown chart, Early Signs / Sensemaking, and Isaca Risk IT Framework. Asked those who stated that they did not use risk management support if it would be interesting to use any, a significant number of individuals (21%) consider that there is no need, but the majority (79.0%) answered that yes, it is necessary. When asked to indicate some type of tool, the majority (82.6%) did not know how to indicate any, and some suggested specific methodologies, technical advice, training, updating professors, and processes for defining, identifying, and assessing risks. At this point, it was interesting to note that some respondents said they did not know what a risk is. In the end, respondents spontaneously left comments and contributions to the research and the topics covered. In the end, respondents spontaneously left comments and contributions to the research and the topics covered. In general, the demonstrations were constructive and led to the understanding that it would be necessary to invest in the preparation of professors to improve performance in project management, as well as in risk management.

### Conclusion

The objective of this research was to understand the practices adopted by professors/researchers for managing academic projects and risks inherent in HEI. The results presented and commented on in this article are the outcomes of a descriptive analysis of the data. In summary, the data showed that project development is present in academic activity, some professors demonstrated to manage their projects with knowledge of methodologies, but most did not. Most of the projects presented an unsatisfactory level of achievement of the objectives, resulting in excess costs and time or failure to reach the planned scope, which seems to confirm several studies that demonstrate that the great part of the projects does not conclude in the parameters foreseen for these attributes. This demonstrates a gap between guidelines in the literature and actual project management practices. The main difficulties in academic project management cited were resource, financial, and time management, in addition to bureaucracy. Many professors are not prepared to deal with the risks that can occur in an academic project; in some cases, they are not even prepared to recognize them. In addition, although most participants agreed that it is necessary to identify risks and their consequences, few knew how to do it, signaling the need for training in this process. The main difficulties and unexpected risks mentioned were problems with infrastructure, bureaucracy, and transience of the team, especially the student. The areas that make up the development of academic projects are sources of uncertainty, whether in terms of technology, scope, capacity, team performance, and each component, the functionality of the product or service generated, cost, schedule, among others. These uncertainties lead to risks that can affect the objectives of the projects. There is a strong need to support project and risk management, enhanced for academic projects, contributing to better results.

This can bring benefits to several aspects of the teaching activity. It is important to note the good reception of the professors who participated in this study. Several agreed that the adoption of project and risk management mechanisms facilitates the efficient realization of academic projects. They considered the methodology as a way to aggregate knowledge and available resources to obtain better results in their enterprise.

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