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THE USE OF ADAPTIVE PROJECT MANAGEMENT PRACTICES AND METHODOLOGIES IN THE DEVELOPMENT OF A PROFESSIONAL DOCTORAL PROGRAM

UTILIZAÇÃO DE PRÁTICAS E METODOLOGIAS ADAPTATIVAS DE GERENCIAMENTO DE PROJETOS PARA O DESENVOLVIMENTO DE UM PROGRAMA DE DOUTORADO PROFISSIONAL

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ABSTRACT

Purpose – Higher education institutions have used more and more project management tools to run development projects to create new professional postgraduate programs. The purpose of this research was to propose an adaptive project management model for creating a professional doctoral course in Business Administration, in order to fulfill the goals established by CAPES.

Design/methodology/approach – For such, the qualitative approach was favored with the adoption of the single case study method. Semi-structured interviews were conducted with academic coordinators who are experts in the field in addition to the gathering of documents, thus using data triangulation to explore the phenomenon. The analysis of primary data and the analysis of documents from the Coordinating Agency for Advanced Training of Graduate Personnel (CAPES) served as inputs for analyzing and interpreting the results.

Findings – As a result, we developed an adaptive project management model with the following characteristics: a) constant planning of activities, occurring in every cycle of interactions; b) iteration using short activities, allowing for more control of the project; c) validations performed continuously to ensure the goals proposed by CAPES are reached; and d) adaptable to change of scope during the execution phase of the project life cycle.

Research limitations/implications – Among the limitations of the study is the lack of other studies related to the use of adaptive project management methodologies for developing postgraduate programs. And for future researches, we point out the need for applying the proposed model, to verify its efficacy and adherence to the development of a professional doctoral course.

Originality/value – This study contributes to the academy by highlighting the need for project management as a tool and technique for the development of stricto sensu professional graduate programs. In this way, HEIs will be able to use a model of adaptive project management practices to achieve the objectives proposed by the CAPES evaluation process. As a result, HEIs are strengthened in the management, control and monitoring of the progress of their programs.

Keywords – Professional Doctorate, Adaptive Project Management, Postgraduate, Project Management, CAPES

RESUMO

Objetivo – Para conduzir os projetos de desenvolvimento e criação de novos programas de pós-graduação stricto sensu profissional, as instituições de ensino superior têm, cada vez mais, utilizado ferramentas de gestão de projetos. Esta pesquisa teve como objetivo propor um modelo de práticas adaptativas de gerenciamento de projetos de curso de um Doutorado Profissional em Administração, visando o alcance dos objetivos propostos pela CAPES.

Design/metodologia/abordagem – A abordagem utilizada foi qualitativa, por meio do método de estudo de caso único. Para explorar o fenômeno, houve a condução de entrevistas semiestruturadas com coordenadores acadêmicos especialistas em pós-graduação e a coleta de documentos, o que permitiu a triangulação dos dados. A análise de dados primários e a análise de documentos da CAPES serviram como insumos para análise e interpretação dos resultados.

Resultados – Como resultado, desenvolvemos um modelo adaptativo de gerenciamento de projetos com as seguintes características: a) planejamento constante das atividades, ocorrendo a cada novo ciclo de interações; b) iterações de atividades curtas, que permitem maior controle do projeto; c) validações realizadas a todo o momento para garantir o cumprimento das metas propostas pela CAPES e; d) adaptável a mudanças do escopo durante a execução do ciclo de vida do projeto.

Limitações/implicações da pesquisa - O estudo do uso de práticas de gestão de projetos e metodologias adaptativas de gerenciamento de projetos ainda é escasso, no que tange ao contexto de desenvolvimento de programas de pós-graduação stricto sensu. O processo de absorção dos conceitos relacionados à gestão de projetos é árduo, devido à maioria dos coordenadores de programas executarem os processos de avaliação da CAPES de forma automática, seguindo apenas os quesitos e prazos determinados pela ficha de avaliação, sem determinar marcos e períodos curtos de entrega.

Originalidade/valor – Este estudo contribui para a academia ao evidenciar a necessidade da gestão de projetos como ferramenta e técnica para o desenvolvimento de programas de pós-graduação stricto sensu profissional. Dessa forma, as IES terão a possibilidade de utilizar um modelo de práticas adaptativas de gerenciamento de projetos, para o alcance dos objetivos propostos pelo processo de avaliação da CAPES. Com isso, as IES se fortalecem na gestão, no controle e no monitoramento do avanço de seus programas.

Palavras-chave – Doutorado Profissional; Gerenciamento Adaptativo de Projetos; Stricto Sensu; Gestão de Projetos; CAPES.

1 INTRODUCTION

In Brazil, the first postgraduate courses were created in 1965, as the regulations on master's and doctor's degree programs (a.k.a stricto sensu postgraduate courses) were introduced in the country (Festinalli, 2005). Henceforth postgraduate studies have evolved, both in the number of programs and in the number of students who either enrolled with or were granted degrees by the Brazilian universities (CAPES, 2019b). Therefore, the Coordinating Agency for Advanced Training of Graduate Personnel - CAPES, has improved, over the years, the process of assessment of postgraduate courses in Brazil, through several evaluation criteria (Maccari, Martins, & Almeida, 2015; Maccari, Almeida, Nishimura & Rodrigues, 2009).

CAPES's system of assessment, the National Postgraduate System or SNPG, aims at ensuring the quality of Brazilian postgraduate programs, by instructing qualified human resources and strengthening the scientific, technological and innovation bases (CAPES, 2019c). Through the SNPG assessment system, the institutions that want to create a master's or doctor's degree program, besides undergoing a rigid process of evaluation, must also submit the project with new courses to the system's approval process (APCN). In case this project is approved, then the course integrates the SNPG. The courses are continuously evaluated henceforward, with the evaluation occurring every four years (quadrennial evaluation), in order to ensure their permanence in the evaluation system as well as achieving a greater score, ranging between (3) and seven (7) (CAPES, 2019c). One of the most

important evaluation criteria in this process is the university's faculty, especially regarding intellectual production. It should be highlighted that the courses not reaching the minimum score (i.e., 3) in this evaluation process are disqualified and are left out of the SNPG (CAPES, 2019c).

There is an evolution demonstrated by the increase of 340.82% in the number of postgraduate courses and 536.90% in the number of students who have obtained a degree by a higher education institution in the country, comparing years 1998 and 2018 (CAPES, 2019b). However, most of this growth concentrates in the Southeastern and Southern regions of Brazil, and together they had a total growth of 286.97%, regarding the number of postgraduate programs in Brazilian universities (CAPES, 2019b). On the other hand, the North Region had a less impressive growth of the total existing programs, for the same period. In 1998, there were only 24 postgraduate programs and, in 2018, these were 237 (CAPES, 2019b).

These challenges faced by the higher education institutions (HEIs) have influenced directly the results of the evaluations of new course proposals in all regions of the country. A survey conducted from 2015 to 2019 by CAPES evidenced the difficulties of approving new postgraduate courses. In total, 3,860 applications were submitted between 2015 and 2019, considering both new applications and requests for reconsideration, of which 53.57% were denied and 46.43% granted. (CAPES, 2020).

These figures motivated us to understand how the creation of new Professional Doctorate courses has been conducted by the course coordinators. Project management tools have helped coordinators of postgraduate programs in CAPES's evaluation process. Yet, they use these tools more informally, thereby not taking strict steps of the existing project management methodologies.

Project management practices make it easier to manage a project because it brings the organization, monitoring, and control of both the project and the staff (PMI, 2017; Barcellos & Nesselro, 2014). Adaptive project management practices contribute to providing clarity, objectivity, and integration of these plans (Teles, 2014). Thus, the validations are executed every iteration, whether using specialized tools or not (Teles, 2014).

Adaptive project management practices differ from traditional approaches, as they have more agile and effective processes within a project life cycle (Shenhar & Dvir, 2010; Koskela & Howell, 2002). Each life cycle becomes adaptive containing short and incremental iterations, making the project's scope flexible (PMI, 2017; Shenhar & Dvir, 2010). With these characteristics, each project seeks to achieve the targets aimed by the organization, thus meeting the project's multiple criteria (Shenhar & Dvir, 2010).

Intending to innovate and obtain increased performance, agility, flexibility and quality, the adaptive project management methodologies and approaches have become prominent in the organizational environment due to the improved performance and quality in their projects (Koskela & Howell, 2002; Shenhar & Dvir, 2010; PMI, 2017). Kosteka and Howell (2002) showed in their study the fact that large organizations' projects have increased productivity around 30%, with a reduction of the project time of delivery and improved quality of the security process. For this reason, adaptive project management methodologies such as Scrum, Lean Software Development and Last Planner, bring techniques, skills and professional talents aiming at more quality results (Brioso, Humero & Hernández, 2018; Stopa & Rachid, 2019).

This study used a qualitative approach, through the single case study method, to explore the processes of development of a doctoral course project in Brazil. The choice of the single case of a doctoral program was due to the recent approval of doctoral programs by the State Ministry of Education. The professional doctoral program was approved in March of 2017, by Ordinance 389. In Business Administration there are only four cases of doctoral programs approved by CAPES. Therefore, this study aimed at analyzing the case of approval of the professional doctoral program at "Blue University" (a code name assigned to the university under analysis). Ultimately, it seeks to under-

stand how adaptive project management practices can be incorporated into a model for developing a professional doctoral degree program that meets the evaluation requirements set out by CAPES.

2 LITERATURE REVIEW

2.1 Postgraduate Studies in Brazil

Postgraduate programs have been developed over the years with the mission of expanding and consolidating master's and doctor's degree courses in Brazil (CAPES, 2019a). CAPES, a government agency under the Ministry of Education responsible for ensuring quality in higher education institutions in Brazil, was established on July 11 of 1951, by Decree no. 29,741, aimed at the development of the country by increasing the number of people specialized in public and private enterprises (CAPES, 2019a). Thus, CAPES is assigned with a list of activities that can be gathered around five lines of action: 1) evaluation of master and doctoral programs; 2) access and dissemination of scientific production; 3) investment in training highly-qualified human resources in Brazil and abroad; 4) development of international scientific cooperation; and 5) incentive and support for initial and continuing training for teachers of Brazilian primary education (CAPES, 2019a; Ferraz, Maccari, Quoniam, Silva & Modkovski, 2017).

With CAPES as the main agency supervising postgraduate programs (Maccari & Nishimura, 2014), the Brazilian national system begins to evolve by 1976, when it is then regarded as "efficient and modern", through its system of evaluation of postgraduate programs (Maccari, Almeida, Riccio & Alejandro, 2014). Thus, CAPES focused its efforts on scientific production linked to postgraduate programs, which resulted in the synergy between performance and success within the agency (Balachevsky, 2005).

The prominent evolution of post-graduation in Brazil is evidenced by the number of programs and students enrolled and obtaining a degree (CAPES, 2019b). In 1998, there were 747 postgraduate programs in federal universities, 397 in state universities, and 115 in private institutions. In 2017, this jumped to 2,397 postgraduate programs in federal HEIs, 973 in state HEIs, 775 in private HEIs, and 32 in municipal HEIs (CAPES, 2019b).

This represents a growth of 331.8% of master and doctoral programs in the previous 19 years (from 1998 to 2017) and an increase of 389.7% of students in the country, whose number changed from 92,350 in 1998 to 359,906 students in 2017 (CAPES, 2019b). However, the scholarship and tuition financing process still pose an enormous challenge for the HEIs, as finance is an issue that has prevented the processes of development of postgraduate programs from evolving (Martins, Maccari & Martins, 2017). Yet, the creation of CAPES's evaluation system, which is being constantly improved, has played a relevant role in the development of post-graduation in Brazil (Ferraz et al., 2017; Maccari, Rodrigues, Alessio & Quoniam, 2008).

2.1.2 CAPES's Evaluation Criteria

The process used by CAPES to evaluate postgraduate programs takes place in stages. At the first stage, consultants receive beforehand the data related to four to seven postgraduate programs (PGP), to be analyzed (CAPES, 2019d). In this process, the result of the quadrennial evaluation of 2017 led to the formation of three groups, namely: score 3, score 4 and scores 5, 6 and 7. Each group was composed of two leaders, who conducted and facilitated the discussions and the alignment of the processes and methods (CAPES, 2019d; Maccari & Nishimura, 2014). Following that, limits are

used for classification into strata according to each metric of evaluation: Very Good, Good, Regular, Poor, Insufficient.

The evaluation process of the National Postgraduate System, or SNPG, has the purpose of certifying to the Brazilian post-graduation and guide the process of creation and development of new programs (CAPES, 2019g). The SNPG is divided into two processes: 1) creation/introduction of new postgraduate programs, and 2) the permanence of the program in the portfolio of postgraduate courses. The sheet elaborated for the evaluation process, which is structured into criteria, subcriteria and the weight of each item, seeks to ensure the standard of this process of evaluation, as shown in Box 1, describing what composes each criteria evaluated by CAPES in order to score and approve or not a postgraduate program in Brazil.

Box 1: New CAPES's Evaluation Sheet for postgraduate programs.

Criterion	Subcriterion	Weight
1. Program	1.1 Organization, adherence and revision of the fields of study, research lines, ongoing projects, and curricula, as well as the infrastructure available, regarding the objectives, mission, and modality of the program.	30%
	1.2 Profile of professors and their compatibility and suitability to the Program's Proposal.	50%
	1.3. The program's strategic planning, also considering the interaction with the institution's strategic planning, in order to manage future development, adequacy and improvement of the infrastructure and better education of its students, related to intellectual production – bibliographic, technical and/or artistic.	10%
	1.4. The processes, procedures, and results of the self-assessment of the program, focused on the qualification of the faculty and intellectual production.	10%
2. Qualification	2.1. Quality and suitability of the theses, research projects or equivalent regarding the program's fields of study and research lines.	15%
	2.2 Quality of students' and former students'* intellectual production. * consider former students who obtained a degree in the last 5 years.	15%
	2.3. Destination, experience, and evaluation of the program's former students* regarding the education received. * consider former students who obtained a degree in the last 5 years.	10%
	2.4. Quality of the research activities and intellectual production by the program's faculty.	50%
	2.5 Quality and engagement of the faculty regarding the program's educational activities.	10%
3. Impact on Society	3.1. Impact and innovating character of the intellectual production considering the nature of the program.	40%
	3.2 Economic, social and cultural impact of the program.	40%
	3.3. Internationalization and visibility of the program. a) Internationalization b) Visibility	20%

Source: Prepared by CAPES (2019c).

The objectives that are distinctive of professional master's and doctoral degree courses, according to Ordinance 389 of March 23, 2017, and Ordinance 60 of March 20, 2019 (CAPES, 2019f, 2019e) are: a) train qualified professionals to exercise the advanced and transformative professional practice of procedures; b) transfer knowledge to society, to meet specific demands and productive arrangements intended to the national, regional or local development; c) promote the interaction of professional training with different types of demanding entities, aiming to improve the effectiveness and efficiency of public and private organizations, through problem resolution and the generation and application of innovation processes; d) contribute to add competitiveness and increase productivity in companies, public and private organizations; and e) provide qualification to doctors with a profile characterized by autonomy, the ability to generate and transfer innovative technologies and knowledge for new solutions to highly complex problems in his/her field (CAPES, 2019e, 2019f).

The academic and professional postgraduate courses differ in some aspects, which has raised several debates over the last years around the subject (Takahashi et al., 2010). Concerning these divergences, some studies compare the professional master's degree with the Master of Business Administration (MBA), for instance, pointing out that American MBAs may correspond to Brazilian professional master courses (Takahashi et al., 2010). Hence, Takahashi et al. (2010) compiled a table describing some characteristics that are different in the two modalities of postgraduate courses.

es, i.e. academic and professional, divided into 11 criteria, where the eleventh criterion presents the number of current programs under the study. Box 2 shows data updated according to the quadrennial evaluation of 2017.

Box 2: Characteristics of the academic and professional postgraduate degrees.

Criterion	Academic	Professional
1. Concept / Objective	Aims at training researchers, in the long term, by the immersion in research.	Qualify someone who knows how to find, recognize, identify, and especially utilize research in the professional world, in order to add value to his/her activities.
2. Profile of professors	All professors must have a doctor's degree. The faculty may be formed by permanent, collaborating and visiting professors. Permanent professors must have an employment contract of 40 hours a week with the HEI administering the course.	Professors and advisors must have a doctor's degree or unquestionable professional qualification, including high-level intellectual production. The professors selected due to their professional qualifications can work as co-advisors and will account for a restricted number of the faculty.
3. Profile of students	Market professionals interested in broadening their knowledge and stay in the market or pursue an academic career. Graduates interested in pursuing an academic career or enter the labor market.	Professionals, who are active in the market, interested in broadening their knowledge and going back to the market. The profile should be associated with the social demand to be satisfied by the Course.
4. Research project	Investigation of a special topic of the chosen matter resulting in a dissertation evidencing the research.	The same rigor required in the academic master's courses, also resulting in a dissertation with investigation applied to problem resolution. Ordinance 17 of Dec 28, 2009 – Brazil's National Council of Education (NCE).
5. Prepares the student for	Research, teaching or working in a company	Research, teaching or working in a company
6. Financing	Public sources	Public and private sources
7. Regulations	Opinion 977/65 by CESU; Resolution NCE/Chamber of Higher Education, 2 of Apr 3, 2001.	Opinion 977/65 by CESU; Ordinances 47/95 CAPES, 080/98 CAPES and 17 of Dec 28, 2009 - NCE.
8. Evaluation	CAPES System	CAPES System. Ordinance 17 of Dec 28, 2009 - NCE.
9. New courses proposal format	CAPES's criteria – <i>Documento de área</i> (a report on a specific field).	CAPES - Guidelines and parameters for evaluating proposals of new professional master's courses. Ordinance 17 of Dec 28, 2009 - NCE
10. Maximum duration	30 months for the conclusion, on average, for obtaining a very good standard in CAPES evaluation.	24 months, on average, Ordinance 17 of Dec 28, 2009 - NCE.
11. Representativeness	3,472 (CAPES, 2019d)	703 (CAPES, 2019d)

Source: adapted from Takahashi et al. (2010); CAPES (2019d).

2.2 Adaptive Project Management

The project management's evolution process has demonstrated its importance in project management, being supported and reinforced under two waves (Rabechini Jr., Carvalho, Rodrigues, & Sbragia, 2011). These waves are related to the project and the organization, by setting knowledge guides, maturity models, aligning the project portfolio with the organizational strategy, structuring resources by their aptitude and skills, while also structuring processes and seeking performance and value for the organization (Carvalho & Rabechini Jr., 2017). The search for this value occurs through a model balanced with a less formal process, containing a high level of maturity in the process of communication (Rabechini Jr. et al., 2011).

Accordingly, to maintain an effective project management process, five groups of processes were created to support management, whether it is a simple or complex project, regardless of its size, to contribute to the expected success (PMI, 2017; Kerzner, 2011; Carvalho & Rabechini Jr., 2017). These are: 1) Project initiation, by selecting projects that are operational and strategically aligned with the company; 2) Project planning, which defines the work's requirements and scope; 3) Project execution, by directing and managing a project with the team members; 4) Monitoring and project control, in charge of controlling and tracking each activity; 5) Closing, by finishing the project, ending the contract and keeping the lessons learned from events that happened in the project life cycle.

Still, even with each process created, many challenges are still found in the management of each project, due to factors of complexity and uncertainties (Padalkar & Gopinath, 2016; Carvalho & Rabechini Jr., 2017). Such uncertainties are identified by the variability produced by the state of nature and complexity, which are dealt with as independent elements, taking the project to a

great number of possible situations (Padalkar & Gopinath, 2016). Thus, models and methodologies emerge to guide on the differences between projects, analyzing the project's benefits and possible risks (Shenhar & Dvir, 2010) in a place where "creativity and freedom" are enacted (Barcellos & Nesselro, 2014).

Additionally, adaptive project management, unlike the traditional approach (Shenhar & Dvir, 2010), establishes an agile and effective adaptation. There are several manners of processes, which are executed continuously throughout the project, because of its flexibility and high level of response to changes, forcing stakeholders to be highly engaged during the project's entire life cycle (PMI, 2017; Shenhar & Dvir, 2010). Box 3 describes precisely the difference between traditional and adaptive project management models.

Box 3: Traditional and adaptive project management.

From traditional to adaptive project management		
Approach	Traditional project management	Adaptive project management
Project goal	Getting the job done on time, on budget, and within requirements.	Getting business results, meeting multiple criteria.
Project plan	A collection of activities that are executed as planned to meet the triple constraint.	An organization and a process to achieve the expected goals and business results.
Planning	Plan once at project initiation.	Plan at outset and re-plan when needed.
Managerial approach	Rigid, focused on initial plan.	Flexible, changing, adaptive.
Project work	Predictable, certain, linear, simple.	Unpredictable, uncertain, nonlinear, complex.
Environment effect	Minimal, detached after the project is launched	Affects the project throughout its execution.
Project control	Identify deviations from plan, and put things back on track.	Identify changes in the environment, and adjust the plans accordingly.
Distinction	All projects are the same.	Projects differ.
Management style	One size fits all.	Adaptive approach; one size does not fit all.

Source: Shenhar & Dvir (2010).

The challenges and uncertainties found in each project (Padalkar & Gopinath, 2016; Carvalho & Rabechini Jr., 2017; Koskela & Howell, 2002) always lead to several discussions, in the search for improvements and advances in effectively managing projects (Starkweather & Stevenson, 2011). For these reasons, some project development and management methodologies have appeared over the years (PMI, 2017), such as the concepts of Koskela & Howell (2002), who created adaptive project management theories based on two methods: Last Planner and Scrum.

The theories used in the Last Planner and Scrum methods and the traditional methodologies go in opposite directions (Koskela & Howell, 2002). These methods are divided into four theories: 1) the theory of planning, which aims to align the plan to the situation of each project and task; 2) the theory of execution, which seeks the involvement of all the project's stakeholders, in order to inform everyone about the status and conclusion of tasks; 3) the theory of control, which uses the metric called Percent Plan Complete (PPC), stemming from a scientific control; and 4) the theory of project, which is summed up as project tasks, aiming at risk mitigation, variation, and unnecessary corrections.

The adaptive approach focused on the project life cycle goes through the project's processes since the beginning, such as planning, execution and the project's monitoring and control in a continuous and adaptive cycle, with short iterations, which may change at any moment, allowing an agile and effective analysis and adaptation (PMI, 2017). These short iterations, with the cycles of agile processes in the adaptive approach, have contributed to the effective mitigation of risks,

thereby leading to cost reduction, quality, and efficiency (PMI, 2017; Wirkus, 2016). In the end, with short-term iterations a project can deliver a product that is ready and functional as each iteration is concluded (Wirkus, 2016), thus adding value to the business in the short term.

2.2.1 Adaptive Project Management Practices

The search for best project management practices has always been a challenge for professionals and organizations (Goldman, Nagel, & Preiss, 1995). Hence, a collection of business strategy, models and best practices has been the focus of studies for some years. (Goldman, Nagel, & Preiss, 1995; Koskela & Howell, 2002). With each discovery made, project management also improves. On that account, Koskela & Howell (2002) determined two theories: the theory of design, which analyzes projects like a map of operations; and the theory of management, aimed at the life cycle and management tools used in projects.

According to the PMBoK® guide, each phase of a project has a formal start to determine what is allowed and expected in the cycle of development (PMI, 2017). Conceptually, project management is the application of knowledge, skills, tools, and techniques to all activities that form a project of any kind, until all requirements defined by the project's scope are fulfilled. (PMI, 2017; Barcellos & Nesello, 2014). This structure and the practices complement each other, to reach the project's goals established together with the customer (PMI, 2017; Barcellos & Nesello, 2014).

Project management practices should be organized to contribute to the flow of information, allowing for better organization, monitoring, and control, of both the project and of the team (PMI, 2017; Barcellos & Nesello, 2014). However, when seeing all different aspects, projects that are poorly managed or those containing neglected processes can result in loss of performance, missed deadlines, exceeded costs, rework, poor-quality deliveries, loss of credibility with the organization, among other problems (PMI, 2017).

Adaptive practices form a collection of tasks to relate activities in a clear, objective and integrated way. Continuous integration is a practice that aims to check and validate all processes of an application (Teles, 2014). Validations are performed for each iteration, regardless of how it will be validated, i.e. manually or automatically, by using specialized tools or not. (Teles, 2014).

2.2.2 Adaptive Project Management Methodologies

As a result of several changes and transformations in the organizational environment related to project management processes, the organizations have more and more looked for processes that are adaptable (Stopa & Rachid, 2019). These processes have the purpose of contributing to an effective planning and a more agile execution (Stopa & Rachid, 2019), thus making the project less bureaucratic, iterations to be delivered with quality and in less time, while still keeping an effective control (Nunes, 2017).

Then, adaptive project management methodologies have been more and more relevant, especially due to the emergence of innovative projects in complex environments (Barcellos & Nesello, 2014). The models of adaptive processes emphasize the need for quality design. For this reason, the Scrum, Lean Software Development (LSD) and Last Planner System methodologies bring about the professional's techniques, skills, and talents that contribute to the execution of the project (Brioso, Humero & Hernández, 2018; Stopa & Rachid, 2019).

Scrum has a simple and objective framework, allowing its use in different contexts, mainly in conjunction with other adaptive techniques and practices (Sabbagh, 2014). Also, it presents ben-

efits to contribute to developing products with more quality (Sabbagh, 2014). Scrum has frequent deliveries to customers, adding value in the short term, reducing project risks and increasing product quality (Sabbagh, 2014). Moreover, it brings visibility into the evolution of the project, reduces waste, using only tools and artifacts useful and necessary for the project, besides increasing team productivity (Sabbagh, 2014).

The Lean Software Development (LSD), focused on the lean thinking and working in small teams, aims to improve product development processes through a broader perspective (Poppendieck & Poppendieck, 2003; Rodríguez, Mäntylä, Oivo, Lwakatare, Seppänen & Kuvaja, 2019). The LSD seeks to eliminate waste from projects by removing waste during the execution process (Rodríguez et al., 2019). This is part of the seven principles of the LSD that contribute to its efficiency: 1) Eliminate waste, understanding first what value is; 2) Build quality in, by testing as soon as possible; 3) Create knowledge through feedbacks; 4) Defer commitment, by taking irreversible decisions; 5) Deliver fast, through small batches; 6) Respect people; and 7) Optimize the whole, implementing Lean across an entire value stream (Rodríguez et al., 2019).

And the Last Planner System is a methodology whose main objective is to control the tasks, allowing them to start only after all the constraints are removed (Seppänen, Ballard & Pesonen, 2010). Moreover, the collaborative scheduling process of the Last Planner System promotes participation in the scheduling of the work to be executed in each phase by its respective staff (Seppänen, Ballard & Pesonen, 2010). In this manner, the Last Planner System methodology requires the commitment of the specialists involved to perform the work each day, prioritizing the selection of activities without constraints (Seppänen, Ballard & Pesonen, 2010).

3 METHODOLOGY

To carry out a single case study of “Blue University” (code name used for the university analyzed), this study was developed under a qualitative approach. For such, data were collected, followed by data registration and data analysis and interpretation, in a methodological structure established by Creswell (2010), while seeking reliability in the whole process of research (Ferreira, 2015). As the research method, the single case study was adopted, following the reasoning proposed by Yin (2015), to analyze events, situations happening during the elaboration of a project for the development of a Professional Doctoral program in Business Administration. In essence, the case study seeks to understand complex phenomena, allowing a holistic investigation that can be experienced in the real world (Yin, 2015).

Thus, since the theme “project management for maintaining academic and professional doctoral programs” is not well explored in the national literature, the single case study method was used as a methodological framework to explore the facts and analyze them considering the adaptive project management concepts in the context of a single case.

3.1 Interviewed

The definition of the interviewees was determined based on the involvement, function and responsibility in the development of *stricto sensu* programs in Brazil. All respondents are or have been coordinators of *stricto sensu* programs for at least two years. In addition to the time and functions exercised in the *stricto sensu* programs, everyone was responsible for preparing and organizing all documentation for the evaluation process of CAPES ‘four-year programs. The chosen interviewees also have experiences in creating and maintaining *stricto sensu* programs at their universities,

which strengthens and strengthens the research.

Thus, six semi-structured interviews were conducted with coordinators of stricto sensu programs. Box 4 provides a brief summary of the qualifications of the interviewees, who had their names coded to preserve anonymity.

Box 4: Traditional and adaptive project management.

Interviewed	PhD Area	PhD Time (in years)	Program Coordination Time (in years)	Interview Time	Interview Location
Interviewed 1	Administration	10	8	00:24:01	Sao Paulo
Interviewed 2	Engineering	14	4	00:42:06	Florianopolis
Interviewed 3	Administration	6	2	00:53:50	Florianopolis
Interviewed 4	Administration	29	25	00:40:01	Sao Paulo
Interviewed 5	Administration	11	10	01:38:58	Sao Paulo
Interviewed 6	Administration	10	9	00:36:09	Sao Paulo

Source: Prepared by the author.

3.2 Data Collection

Semi-structured interviews were conducted to collect data, in order to provide the research with relevant information. Also, secondary data were collected from documents used in the process of development of a doctoral degree program. The procedure for analysis includes three steps for collecting data: 1) Gathering primary documents through interviews, and secondary documents (public and private) to complement and validate the information of the primary documents; 2) Preparation of questionnaires, selection of people to be interviewed and the conduction of interviews; and 3) Interpretation and analysis of the data collected from interviews and secondary documents.

3.3 Data analysis

The data analysis involved processes for the collection of open data, which helped to ask questions to provide the appropriate information for research (Creswell, 2010). Hence, the gross data, which are transcribed for a document, resulting in precise questions, reliable and interpretative data (Gibbs, 2009), are organized and prepared, so that, afterward, a complete reading is done (Creswell, 2010). Subsequently, the data are encoded, enabling the structuring of the theme and the description, represented by the qualitative narrative. Finally, transcribed and encoded data are interpreted (Creswell, 2010).

For the data analysis process, six steps are necessary: 1) Gather primary and secondary data; 2) Organize and prepare the data for analysis, transcribing the interviews and digitalizing the information contained in the data; 3) Read all data, to fill out the general ideas, the impression of depth and credibility of the interviews conducted and obtain perceptions around the data and interviews; 4) Carry out a deep analysis of the data collected and encode them; 5) Make a narrative relating the theme to the description; and 6) At the end of the analysis of the collected data, interpret or analyze the meanings (Creswell, 2010).

Besides, the MAXQDA® Analytics Pro 2020 – Release 20.0.6 software version was used for data codification, in order to build a correlation of data (Braga, Romano, Silva & Duarte, 2019; Humble, 2012; Marjaei, Yazdi & Chandrashekara, 2019). The MAXQDA® has a collection of analytical tools that favors the organization, exploration, codification, and analysis of the collected data (Braga et al., 2019; Marjaei et al., 2019). It allows the analysis of all kinds of data, such as interviews, articles, media, research papers, Twitter, among others (Marjaei et al., 2019). With its range of tools and resources, the researcher can create theories efficiently (Humble, 2012).

4 PRESENTATION AND ANALYSIS OF RESULTS

Most of the interviewees adopted project management practices but in a less formal manner. Thus, the maintenance of a program or the execution of a process regarding a Proposal of New Courses (APCN) was managed and controlled, although there was no formal schedule. Two interviewees used an electronic system for management, control, and follow-up of the activities related to the programs. The spreadsheet contained 14 sheets corresponding to the metrics from the participation of professors up to the registration of scientific production, the publication of books, etc.

As for the project management process of postgraduate programs, it was clear that the concepts of project management are used by program coordinators and directors, though still in an embryonic stage. But, despite using the concepts of project management, many challenges are found along the way. Nonetheless, it is a fact that the interviewed coordinators and directors understand the importance of using project management tools and techniques for the execution of a project. With them, they could control and manage the evaluation and application of a proposal more effectively.

4.1 Analysis of the Professional Doctoral Program at “Blue University”

The Professional Doctoral program in Business Administration at “Blue University”, recently approved by CAPES, was the result of hard work since the preparation of the Professional Master’s program in Business Administration. The program’s director, together with the university’s faculty, developed a plan that was strictly followed. However, during the whole process, they faced some challenges, such as a reduced number of professors, which caused an overload of work.

On the other hand, from the preparation of the proposal to the program’s approval, which took years, the “Blue University” made many changes to its professional postgraduate program. But something relevant to consider is the planning, organization, and engagement of the entire faculty in the process for the proposal getting approved. Thus, the program evolved, from the selection of subjects to the acceptance of new students into the program.

In the proposal preparation, project management techniques were used such as the iron triangle (time, scope and cost) in the entire planning process. The first stage of planning in preparing the proposal consisted of gathering the whole group of people who were interested in the evolution of the program and draw a plan to reach the desired goal. Besides, the project was controlled and monitored the whole time and in case any problem or situation deserving more attention arise, collegiate meetings were called to make decisions for improvement based on lessons learned throughout the process.

Thus, with all the control, management and evolution of the program during the pro-

ject life cycle of the proposal for the Professional Doctoral program in Business Administration, the program became prominent in the academic environment. The engagement of the faculty with scientific publications in well-qualified journals and the students' contribution with technical works and scientific publications have taken the program to high levels. And one of the factors that contribute to the involvement of students is the Academic Studies Plan (called a "PEA" in the original language), which is a required plan where the student has to comply with a scope of productions and preset deadlines.

Due to these reasons, the Professional Doctoral program in Business Administration at the "Blue University" keeps score 5. The activity management, organization, constant learning and engagement of students and professors provided the postgraduate program with a good reputation.

4.2 Interpretative Analysis

The previous analyzes were summarized and contributed to the production of the interpretative analysis stage. Under the behavior of the areas of project management knowledge (PMI, 2017), the results were structured to show the adoption of adaptive project management practices in a summarized and objective way. Box 5 presents a comparison of the interviews as well as the areas of project management knowledge.

Box 5: Comparison of interviewees regarding adaptive project management practices

Interviewees	Planning	Control and Monitoring	Execution	End of Project	Interpretation
Interviewee 1	High	High	High	High	Interviewee 1 makes project management his daily tool to manage programs.
Interviewee 2	High	Medium	Medium	Medium	There is no formal use of project management tools, but the way of working shows some processes being applied.
Interviewee 3	High	High	Medium	Low	There is effective management, mainly in the control and monitoring of the activities performed among professors and students.
Interviewee 4	High	High	High	High	Interviewee 4 makes project management his daily tool to manage programs.
Interviewee 5	High	Medium	High	Medium	Interviewee 5 uses project management only as a complement to guide processes but carries out detailed planning and execution.
Interviewee 6	Medium	Low	Medium	Low	Despite lacking something formal and tangible related to project management, the interviewee himself reported that if he used project management tools and practices, it could benefit the program.

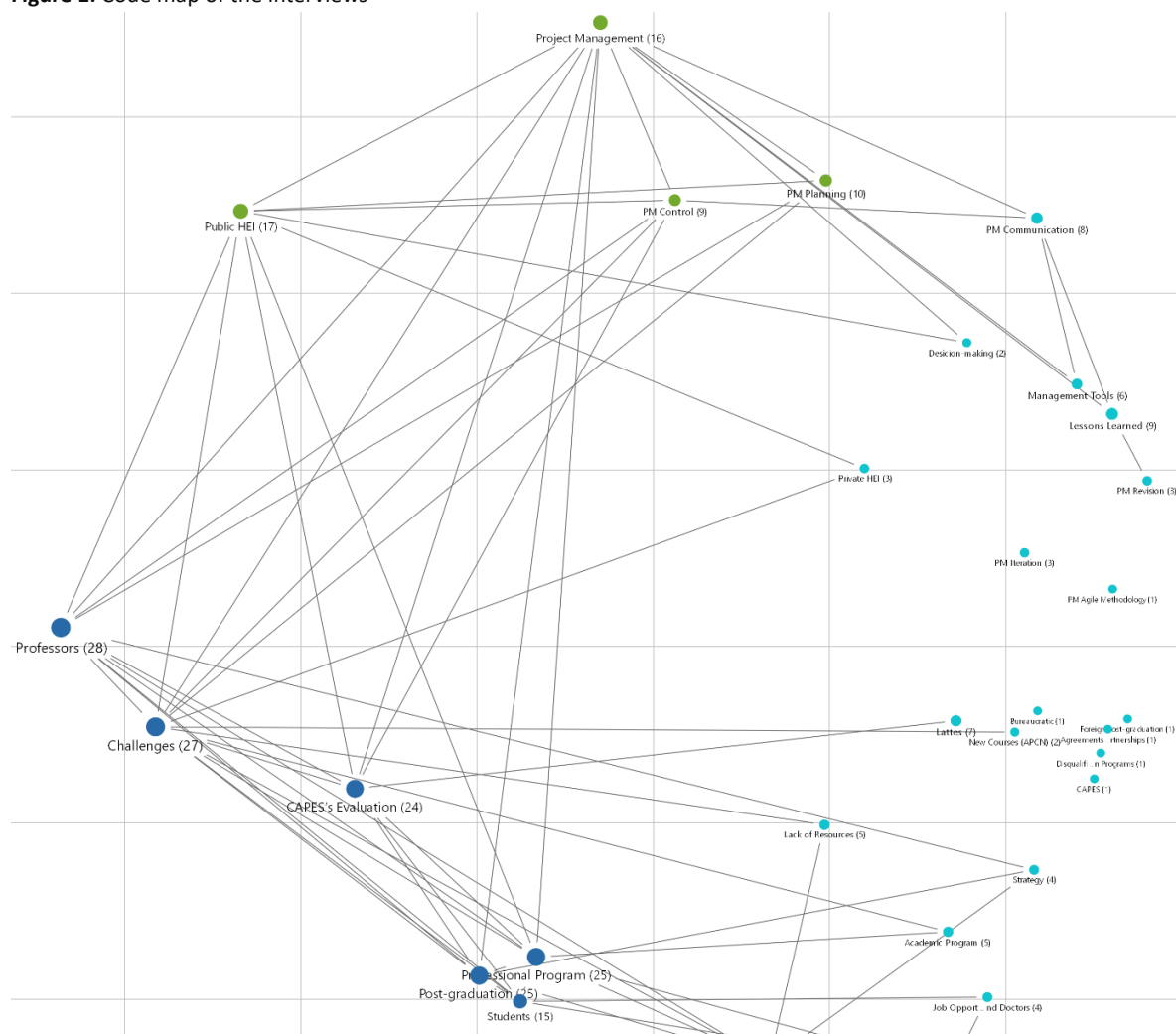
Source: Prepared by the author.

Interviewees 1 and 4 strongly demonstrate project management practices related to daily work. Even though in some processes there are no formal procedures, the use of project management tools and practices has effectively contributed to the conduct of programs. Interviewees 2, 3 and 5 showed a partial use of these practices and more informal use of project management. In turn, interviewee 6, despite showing a low use of project management tools, recognizes its importance and has been trying to evolve every day in this regard.

4.3 Analysis of the Code Map of All Interviews

The analysis of the code map of all the interviews conducted shows relationally and quantitatively the frequency of each code. The 32 codes analyzed show a real need and application of project management practices. This fact is demonstrated in Figure 1, which shows a strong relationship between project management and the university's faculty and project management with CAPES's evaluation process. The relevance of this relationship is made clear by two sentences from interview 4, showing the importance of effective planning: *"Obviously, we carried out a project with planning over time. And at the end of this project, the maximum score was reached and, consequently, it was approved, because we worked towards that."* And the use of project management tools and techniques: *"(...) we drew up a plan to get there, allocated resources, determined the time we wanted to run that project. Time, scope and cost (iron triangle)"*.

Figure 1: Code map of the interviews



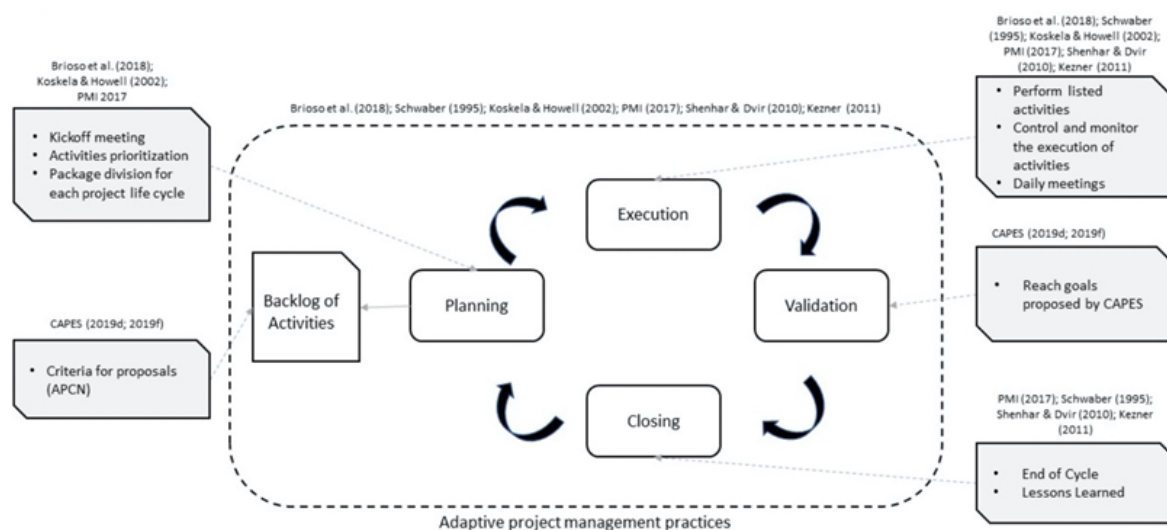
Source: Prepared by the author.

4.4 Proposed Model

The proposed model is established through the structure of the project management model, specifically under the approach of adapting the project iterations (Schwaber, 1995; PMI, 2017; Sabbagh, 2014). Practices are used in several phases, determining an organized and appropriate process for complex and uncertain situations (Schwaber, 1995). Additionally, the experiences acquired in the course of the project contribute to the evolution of the organization, regarding the projects of Professional Doctoral programs (Brioso et al., 2018).

Given the results, it is possible to conclude that the application of adaptive project management practices contributes to the development of Professional Doctoral programs. Figure 2 below shows the layout of a single model, to exhibit the processes of adaptive project management practices.

Figure 2: Proposed model



Source: Prepared by the author.

This model has practical, adaptable and effective process control features from beginning to end. These practices can be adopted for projects developed for professional doctoral courses. The proposed model was directed by the literature (Schwaber, 1995; Rodríguez et al., 2019; Koskela, Stratton, & Koskenvesa, 2010); Brioso et al., 2018) and by the triangulation made with the interviews. Then, the model has characteristics that aim at an effective execution, in order to reduce the number of programs denied by CAPES. It is important to emphasize the following four characteristics of the model: a) constant planning of activities, occurring with each new cycle of interactions; b) short iterations concerning activities that allow greater control of the project; c) validations carried out at all times to ensure compliance with the goals proposed by CAPES and; d) adaptable to changes in scope during the execution of the project life cycle.

The model has four steps and each step has several activities to be performed. These activities include necessary steps to achieve the objectives proposed by CAPES, regarding the requirements for new course proposals. In addition to the steps and respective activities, the model has a backlog of activities in order to store each criterion for proposals that will be planned and executed for the construction of the new course. It contains the following criteria: teaching and research infrastructure; detailed course proposal; details of the faculty and; evaluation of scientific

ic production carried out by the HEI (CAPES, 2019c, 2019d).

And the model's four stages are: 1) Planning – the process responsible for listing the scope, deadline, and cost of each project activity. In this process, there are three activities to start each iteration cycle, namely: the kickoff meeting, activities prioritization and dividing packages for each project cycle. Then, strategically and aligned with the criteria for proposals, the program coordinator starts the project; 2) Execution – the process responsible for controlling, monitoring and executing the project activities that were listed. There are three activities in this process: the execution of the listed activities, the control and monitoring of activities and daily meetings. In this manner, the program coordinator has a view of the entire project, which makes decision-making easier; 3) Validation – the process responsible for validating each activity performed, whether or not the goal proposed by CAPES was reached and; 4) Closing – the process responsible for closing each cycle of activities and for listing the challenges and lessons learned during the life cycle of the processes. The lessons learned must be analyzed, recorded and help in possible problems, strategic changes or tactics of the new course project.

5 FINAL CONSIDERATIONS

From the data collected and the interpretation of the analyses, it became evident that it is necessary to create a model that allows an agile and efficient control of the processes for the preparation and execution of CAPES's evaluation process. At different moments in the semi-structured interviews, it is confirmed that the use of project management practices and tools may contribute to CAPES's evaluation process. This was so evident that CAPES's approval of the Professional Doctoral course in Business Administration of the "Blue University" was mainly because of the engagement of the program's faculty and director and also because of all the control during the execution of each process.

In view of the analyses made, it can be concluded that the suggested model of adaptive project management has significant synergy with the conduction of projects for the development of new programs. Thus, to manage the postgraduate program projects, the HEIs must have well-structured planning and follow the steps of the suggested model, so that all criteria required by CAPES are met efficiently.

Therefore, it is possible to evidence that the adoption of project management practices is commonplace in the academic environment. And the programs that used the project management tools and techniques from the beginning to end of projects had better results. And in the face of such evidence, we understand that the adoption of project management practices contributes to the evolution and performance in CAPES's evaluation processes.

Among the limitations of the study is the lack of other studies related to the use of adaptive project management methodologies for developing postgraduate programs. And for future researches, we point out the need for applying the proposed model, to verify its efficacy and adherence to the development of a professional doctoral course.

REFERENCES

- BALBACHEVSKY, E. (2005). A pós-graduação no Brasil: novos desafios para uma política bem-sucedida. **Os desafios da educação no Brasil**. Rio de Janeiro: Nova Fronteira, 1, 285-314.
- BARCELLOS, P. F. P., & NESELLO, P. (2014). A contribuição do gerenciamento de projetos no processo de



- desenvolvimento de produtos. **Revista GEINTEC-Gestão, Inovação e Tecnologias**, 4(2), 808-822.
- BRAGA, P. P., ROMANO, C. M., SILVA, K. L., & DUARTE, E. D. (2019). Utilização de software em análises de dados qualitativos: contribuições para resultados consistentes em investigações nas ciências da saúde. **CIAIQ2019**, 2, 950-955.
- BRIOSIO, X., HUMERO, A., & HERNÁNDEZ, C. C. (2018). Teaching how to integrate Last Planner System and the Safety and Health Management System= Enseñando a integrar el Last Planner System y el Sistema de Gestión de Seguridad y Salud. **Advances in Building Education**, 2(1), 12-30.
- CARVALHO, M. M., & RABECHINI JR, R. (2017). Fundamentos em gestão de projetos: construindo competências para gerenciar projetos. **São Paulo: Atlas**.
- Coordenação de Aperfeiçoamento de Pessoal de Nível Superior [CAPES] (2019a). **História e missão**. Recuperado de <<http://www.capes.gov.br/historia-e-missao>>.
- Coordenação de Aperfeiçoamento de Pessoal de Nível Superior [CAPES] (2019b). GEOCAPES – Sistema de Informações Georreferenciadas. Recuperado de <<https://geocapes.capes.gov.br/geocapes/>>.
- Coordenação de Aperfeiçoamento de Pessoal de Nível Superior [CAPES] (2019c). Recuperado de <<https://capes.gov.br>>.
- Coordenação de Aperfeiçoamento de Pessoal de Nível Superior [CAPES] (2019d). Avaliação Quadrienal 2017-2. Recuperado de <<http://avaliacaoquadrienal.capes.gov.br/resultado-da-avaliacao-quadrienal-2017-2>>.
- Coordenação de Aperfeiçoamento de Pessoal de Nível Superior [CAPES] (2019e). Portaria 389, de 23 de março de 2017. Dispõe sobre o mestrado e doutorado profissional no âmbito da pós-graduação *stricto sensu* brasileiro – Ministério de Estado da Educação. Recuperado de <<http://www.capes.gov.br/images/stories/download/legislacao/24032017-PORTARIA-No-389-DE-23-DE-MARCO-DE-2017.pdf>>.
- Coordenação de Aperfeiçoamento de Pessoal de Nível Superior [CAPES] (2019f). Portaria 60, de 20 de março de 2019, dispõe sobre o mestrado e doutorado profissionais, no âmbito da CAPES. Recuperado de <http://capes.gov.br/images/novo_portal/portarias/22032019_Portarias_59e60.pdf>.
- Coordenação de Aperfeiçoamento de Pessoal de Nível Superior [CAPES] (2019g). Sobre o Processo de Avaliação. Recuperado de <<http://capes.gov.br/avaliacao/sobre-a-avaliacao>>.
- Coordenação de Aperfeiçoamento de Pessoal de Nível Superior [CAPES] (2020). Sobre o Processo de Avaliação. Recuperado de <<https://www.capes.gov.br/avaliacao/entrada-no-snp-g-propostas>>.
- Fundamentos em gestão de projetos: construindo competências para gerenciar projetos Creswell, J. W. (2010). Projeto de Pesquisa: métodos qualitativos, quantitativos e misto. 3. ed. Porto Alegre: Artmed.
- FERRAZ, R. R. N., MACCARI, E. A., QUONIAM, L., SILVA, M. V. C., & MODKOVSKI, A. F. (2017). Planejamento anual e quadrienal de prestação de contas à Capes por meio da ferramenta computacional Scriptsucupira. **Revista Brasileira de Pós-Graduação**, 14.



- FERREIRA, M. P. (2015). Pesquisa em administração e ciências sociais aplicadas. **Grupo Gen-LTC**.
- FESTINALLI, R. C. (2005). A formação de mestres em administração: por onde caminhamos? **Organizações & Sociedade**, 12(35), 135-150.
- GIBBS, G. (2009). **Análise de dados qualitativos: coleção pesquisa qualitativa**. Bookman Editora.
- GOLDMAN, S. L., NAGEL, R. N., & PREISS, K. (1995). **Agile competitors and virtual organizations: strategies for enriching the customer** (Vol. 8). New York: Van Nostrand Reinhold.
- HUMBLE, Á. M. (2012). Qualitative data analysis software: A call for understanding, detail, intentionality, and thoughtfulness. **Journal of family theory & review**, 4(2), 122-137.
- KERZNER, H. (2011). Gerenciamento de Projetos: uma abordagem sistêmica para planejamento, programação e controle. **São Paulo: Blucher**, 166.
- KOSKELA, L., & HOWELL, G. (2002). The theory of project management: Explanation to novel methods. **In Proceedings IGLC** (Vol. 10, No. 1, pp. 1-11).
- KOSKELA, L. J., STRATTON, R., & KOSKENVES, A. (2010). Last planner and critical chain in construction management: comparative analysis. **In Proceedings of the 18th Annual Conference of the International Group for Lean Construction** (pp. 538-547). National Building Research Institute, Technion-Israel Institute of Technology.
- MACCARI, E. A., ALMEIDA, M. I. R., NISHIMURA, A. T., & RODRIGUES, L. C. (2009). A gestão dos programas de pós-graduação em administração com base no sistema de avaliação da CAPES. **Revista de Gestão USP**, 16(4), p. 1-16.
- MACCARI, E. A., ALMEIDA, M. I. R., RICCIO, E. L., & ALEJANDRO, T. B. (2014). Proposta de um modelo de gestão de programas de pós-graduação na área de Administração a partir dos sistemas de avaliação do Brasil (CAPES) e dos Estados Unidos (AACSB). **Revista de Administração**, 49(2), 369-383.
- MACCARI, E. A., MARTINS, S. B., & ALMEIDA, M. I. R. (2015). Comparativo entre os sistemas de avaliação da Association to Advance Collegiate Schools of Business (Estados Unidos) e da Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (Brasil) e o seu uso pelos coordenadores de programas. **Revista Brasileira de Pós-graduação (RBPG)**, 12(27), p. 39-66.
- MACCARI, E. A., & NISHIMURA, A. T. (2014). Povoamento dos estratos conceitos 6 e 7 no sistema de avaliação da CAPES pela área de Administração, Ciências Contábeis e Turismo nas avaliações trienais 2010 e 2013. **READ-Revista Eletrônica de Administração**, 20(3), 601-624.
- MACCARI, E. A., RODRIGUES, L. C., ALESSIO, E. M., & QUONIAM, L. M. (2008). Sistema de avaliação da pós-graduação da Capes: pesquisa-ação em um programa de pós-graduação em Administração. **Revista Brasileira de Pós-Graduação**, 5(9).
- MARJAEI, S., YAZDI, F. A., & CHANDRASHEKARA, M. (2019). MAXQDA and its Application to LIS Research. **Library Philosophy and Practice**, 1-9.
- MARTINS, S. B., MACCARI, E. A. & MARTINS, C. B. (2017). O uso dos métodos Delphi e AHP na priorização de projetos em programas de mestrado profissional: Na área de administração pública e de empresas, ciências contábeis e turismo. Departamento de Ciências da



- NUNES, R. D. (2017). A Implantação das metodologias ágeis de desenvolvimento de software scrum e extreme programming (XP): uma alternativa para pequenas empresas do setor de tecnologia da informação. **ForScience**, 4(2).
- PADALKAR, M., & GOPINATH, S. (2016). Are complexity and uncertainty distinct concepts in project management? A taxonomical examination from literature. **International Journal of Project Management**, 34(4), 688-700.
- POPPENDIECK, M., & POPPENDIECK, T. (2003). **Lean Software Development: An Agile Toolkit: An Agile Toolkit**. Addison-Wesley.
- PROJECT MANAGEMENT INSTITUTE [PMI] (2017). **A Guide to the Project Management Body of Knowledge [PMBok® Guide]**, 6th ed. Newtown Square, USA: Author, p. 762.
- RABECHINI JR., R., CARVALHO, M. M., RODRIGUES, I., & SBRAGIA, R. (2011). A organização da atividade de gerenciamento de projetos: os nexos com competências e estrutura. **Gestão & Produção**, 18(2), 409-424.
- RODRÍGUEZ, P., MÄNTYLÄ, M., OIVO, M., LWAKATARE, L. E., SEPPÄNEN, P., & KUVAJA, P. (2019). Advances in using agile and lean processes for software development. In **Advances in Computers** (Vol. 113, pp. 135-224). Elsevier.
- SABBAGH, R. (2014). **Scrum: Gestão ágil para projetos de sucesso**. Editora Casa do Código.
- SCHWABER, K. (1995). **Scrum Development Process. OOPSLA'95 Workshop on Business**. Object Design and Implementation. Austin, 1995.
- SHENHAR, A. J., & DVIR, D. (2010). Reinventando gerenciamento de projetos: a abordagem diamante ao crescimento e inovação bem-sucedidos. **São Paulo: M. Books**.
- SEPPÄNEN, O., BALLARD, G., & PESONEN, S. (2010). The Combination of Last Planner System and Location-Based Management System. **Lean construction journal**.
- STARKWEATHER, J. A., & STEVENSON, D. H. (2011). PMP® certification as a core competency: Necessary but not sufficient. **Project Management Journal**, 42(1), 31-41.
- STOPA, G. R., & RACHID, C. L. (2019). Scrum: Metodologia ágil como ferramenta de gerenciamento de projetos. **CES Revista**, 33(1), 302-323.
- TAKAHASHI, A. R. W., VERCHA, J. K., MONTENEGRO, L. M., & RESE, N. (2010). Mestrado Profissional e Mestrado Acadêmico em Administração: Convergências, Divergências e Desafios aos Programas de Pós-Graduação **Stricto Sensu** no Brasil. **Administração: ensino e pesquisa**, 11(4), 551-578.
- TELES, V. M. (2014). **Extreme Programming-2ª Edição: Aprenda como encantar seus usuários desenvolvendo software com agilidade e alta qualidade**. Novatec Editora.
- WIRKUS, M. (2016). Adaptive management approach to an infrastructure project. **Procedia-Social and Behavioral Sciences**, 226, 414-422.
- YIN, R. K. (2015). **Case study research: design and methods**, 5th ed. Thousand Oaks, USA: SAGE Publications, inc.



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1. Definition of research problem	√	√		
2. Development of hypotheses or research questions (empirical studies)	√	√		
3. Development of theoretical propositions (theoretical work)	√	√	√	
4. Theoretical foundation / Literature review	√	√	√	
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