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Performance indicators of the process of reformulating UFRN's academic projects

Indicadores de desempenho do processo de reformulação dos projetos acadêmicos da UFRN

Indicadores de desempeño del proceso de reformulación de proyectos académicos en la UFRN

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ABSTRACT

Goal: The objective was to create a measurement system for the process of reformulating the work plan and the plan for the employment of UFRN's academic projects' financial resources. **Methodology/approach:** This is an exploratory and descriptive research, with a qualitative approach, using action research as a technical procedure, in which workshops, document analysis, participant observation, and content analysis were adopted. **Originality/relevance:** The public organization must manage its processes, promoting more efficiency, effectiveness, and agility, so that it can offer a better return to the stakeholders, contributing to the fulfillment of its organizational objectives. **Main findings:** A modeling of the reformulation process (as-is) was carried out, resulting in the proposal of five key performance indicators. During the discussion about the indicators, some improvements, which will provide greater efficiency to the process, were identified and already implemented. The transformation of processes was evident, even before the implementation of the indicators, allowing a better provision of services and greater alignment with organizational objectives. **Theoretical contributions:** The study demonstrates how the collaborative creation of measurement systems and performance indicators can improve processes in public institutions. The application of BPMN and participatory action reinforce the importance of modeling for organizational efficiency and alignment. **Management contributions:** The study shows how the implementation of indicators improves efficiency, reduces rework and increases productivity. By promoting clearer and less bureaucratic processes, the study contributes to greater user satisfaction and employee commitment in public management.

Keywords: Performance indicators. Process management. Work plan. Academic project.

RESUMO

Objetivo: Objetivou-se criar um sistema de mensuração do processo de reformulação do plano de trabalho e do plano de aplicação dos recursos financeiros dos projetos acadêmicos da UFRN. **Metodologia/abordagem:** Trata-se de uma pesquisa exploratória e descritiva, com abordagem qualitativa, utilizando-se como procedimento técnico a pesquisa-ação, na qual foram adotadas oficinas, análise documental, observação participante e análise de conteúdo. **Originalidade/relevância:** A organização pública deve gerir seus processos, promovendo mais eficiência, eficácia e agilidade, para que possa oferecer melhor retorno aos stakeholders, contribuindo para o cumprimento de seus objetivos organizacionais. **Principais resultados:** Foi realizada uma modelagem do processo de reformulação (as-is), resultando na proposição de cinco indicadores-chave de desempenho. Durante a discussão sobre os indicadores, algumas melhorias, que darão maior eficiência ao processo, foram identificadas e já implementadas. A transformação dos processos ficou evidente, antes mesmo da implementação dos indicadores, permitindo melhor prestação de serviços e maior alinhamento aos objetivos organizacionais. **Contribuições teóricas:** O estudo demonstra como a criação colaborativa de sistemas de mensuração e indicadores de desempenho pode melhorar processos em instituições públicas. A aplicação do BPMN e a ação participativa reforçam a importância da modelagem para a eficiência e alinhamento organizacional. **Contribuições para a gestão:** O estudo mostra como a implementação de indicadores melhora a eficiência, reduz o retrabalho e aumenta a produtividade. Ao promover processos mais claros e menos burocráticos, o estudo contribui para maior satisfação dos usuários e comprometimento dos funcionários na gestão pública.

Palavras-chave: Indicadores de desempenho. Gestão de processos. Plano de trabalho. Projeto acadêmico.

RESUMEN

Objetivo: El objetivo fue crear un sistema de medición del proceso de reformulación del plan de trabajo y del plan de utilización de los recursos financieros de los proyectos académicos de la UFRN. **Metodología/enfoque:** Se trata de una investigación exploratoria y descriptiva, con un enfoque cualitativo, utilizando la investigación-acción como procedimiento técnico, en la que se adoptaron talleres, análisis de documentos, observación participante y análisis de contenido. **Originalidad/relevancia:** La organización pública debe gestionar sus procesos, promoviendo más eficiencia, eficacia y agilidad, de modo que pueda ofrecer un mejor retorno a las partes interesadas, contribuyendo al cumplimiento de sus objetivos organizacionales. **Principales resultados:** Se realizó el proceso de reformulación (as-is) y se propusieron cinco indicadores clave. Durante la discusión, se identificaron mejoras que ya fueron implementadas, generando mayor eficiencia y alineando mejor los servicios con los objetivos organizacionales, incluso antes de aplicar los indicadoreses. **Contribuciones teóricas:** El estudio demuestra cómo la creación colaborativa de sistemas de medición e indicadores de desempeño puede mejorar los procesos en las instituciones públicas. La aplicación de BPMN y la acción participativa refuerzan la importancia del modelado para la eficiencia y el alineamiento organizacional. **Contribuciones a la gestión:** El estudio muestra cómo la implementación de indicadores mejora la eficiencia, reduce el retrabajo y aumenta la productividad. Al promover procesos más claros y menos burocráticos, el estudio contribuye a una mayor satisfacción de los usuarios y al compromiso de los empleados en la gestión pública.

Palabras clave: Indicadores de desempeño. Gestión de procesos. Plan de trabajo. Proyecto académico.

INTRODUCTION

All over the world, efficiency and effectiveness objectives are adopted in public sector bodies, causing civil servants to seek inspiration from the private sector on how to improve the performance of public organizations (Lapuente & Van de Walle, 2020).

In Brazil, public management has been guided by aspects of economicity, efficiency, quality and cost control. For Lehnen (2020), the population increasingly demands quality public services, requiring administrators to perform well in administration, in order to meet the criteria of efficiency, efficacy, effectiveness, economicity and equity. From this perspective, management in public organizations has sought to create public value, in which services are provided with quality to the citizen, especially in basic services, such as health and education (Soares et al., 2020). Lapuente and Van de Walle (2020) identified that respect for public values such as equity and impartiality are compatible and even complementary with the managerial values of efficiency and effectiveness.

In order to implement public policies aimed at citizens and society, it is necessary to develop good performance in process and people management, in addition to investments in information and knowledge management, so that excellent results are generated. For Soares et al. (2020, p. 9) one needs "investments in technology for the acquisition and development of information systems that provide performance indicators for measuring results and monitoring", which will allow improving the quality of services provided to society. However, Spiazzi and Battistella (2019) stress that it is not only through the computerization of the process that the improvement and redesign of processes happen, taking into account that a better distribution of activities, the use of standardization manuals and the reorganization of work itself already fulfill the objective of generating improvement in institutions.

Administrators of non-profit institutions, such as public bodies, are increasingly concerned with measuring and managing the performance of their organizations (Kaplan, 2001; Balabonienė & Večerskienė, 2015; Cotelnic, 2022). Therefore, public bodies and entities are using strategic management techniques, which enable these organizations to plan, implement and control their actions. Thus, they tend to promote an increase in their administrative capacity to manage in the search for effectiveness. Organizations must be able to manage their processes, systematically measuring performance and taking actions to correct deviations, maximizing benefits.

Among the different organizations are educational institutions, which range from elementary school to graduate programs, which promote human, social and scientific development.

It has been a challenge for universities to educate and research with a high level of quality, in changing conditions and competing with one another. These difficulties have encouraged these institutions to act as business organizations taking on key features such as the use of performance assessment (Kucinska-Landwójtowicz et al., 2023). Among them, the Federal

University of Rio Grande do Norte – UFRN stands out. UFRN is a special regime autarky, linked to the Ministry of Education, whose mission is "to educate, produce and disseminate universal knowledge, preserve and disseminate the arts and culture and contribute to human development, committing itself to social justice, social and environmental sustainability, democracy and citizenship" (UFRN, 2019, p. 5).

UFRN has several units, such as the Presidency, which comprises the President's Office and eight Vice-Presidencies, such as, for instance, the Vice-Presidency of Planning - PROPLAN, under which is the Academic Projects Office – DPA, responsible for authorizing the allocation of financial resources of an ongoing academic project and, therefore, it has several challenges in order to meet clear and objective criteria that enable the appropriate use of resources and the satisfaction of collaborators of academic projects (UFRN, 2019). Therefore, it requires good process management in order to minimize divergences in the allocation of resources and satisfying the interests of academics, the community and the institution.

In this sense, the goal of this study was to define a measurement system for the process of reformulating the work plan and the plan for employing the financial resources of academic projects being carried out at UFRN. Thus, the process of reformulating the work plan and the plan for employing UFRN's ongoing academic projects' financial resources were mapped. The strategic objectives for DPA/PROPLAN to be measured were defined; and a set of key performance indicators (KPI) was created.

"KPIs determine the performance of the process to achieve results, indicating whether or not it will be feasible to achieve a goal. KGIs define measures for reporting whether a process met business objectives" (Maure et al., 2022, p. 22). Considering that the study will discuss a department at UFRN, it will focus on KPIs.

KPIs constitute a technical activity that presents several advantages by generating consistent, stable results that allow for comparisons. The information generated from the development of these metrics is useful and effective for the decision-making process in projects with multiple particularities and perspectives, as is the case with the academic projects developed in research centers, such as the Brazilian public universities. Kucinska-Landwójtowicz et al. (2023, p. 2658) already highlighted that "the issue of quality assessment and management in universities is relevant until today".

Public institutions need to measure performance to demonstrate their responsibility towards internal and external users of universities. However, knowing performance is not enough, it needs to be managed (Cotelnic, 2022). And the KPIs are essential for any business, because they allow one to manage performance and improve processes to achieve the success of organizational strategies, with the appropriate indicators varying according to the business life cycle, the competitive environment in which they are inserted, strategies and many other factors (Lima, McMahon & Costa, 2021).

PROCESS-BASED MANAGEMENT

Process-Based management aims to modernize and adjust workflows in public administration by changing the perspective of the patrimonial and bureaucratic administration, which did not manage taking into consideration the needs and desires of citizens (Spiazzi & Battistella, 2019). Therefore, public organizations exist to provide quality and affordable services, meeting the satisfaction of public interests, with the use of available resources in an efficient and effective manner (Balabonienė & Večerskienė, 2015).

In general, organizations manage their operations based on results, in which objectives are evaluated by measuring performance and its effects (Lee et al., 2000). According to Kaplan (2001), measuring and controlling the performance of an institution is a concern of administrators of non-profit organizations, especially due to competition for scarce financial resources. However, monitoring only financial indicators is insufficient to satisfy the needs of public service users (Kaplan, 2001; Chmielewska et al., 2022).

Strategic management requires a performance measurement process in order to identifying gaps between the expected and the real situation and contributing to devise strategies that contribute to achieving objectives, including in higher education, as well as directing them to become internationally recognized universities, such as the world class universities (Hermanu et al., 2022). It is noteworthy that competitive advantage originates from an organizational structure that supports the institution and from good individual performance of each worker (Sampaio, Saraiva & Monteiro, 2012)

As *Business Process Management* – BPM establishes ways of how these processes are managed, executed and transformed, it can be said that the organizational goals are more easily achieved.

According to the ABPMP [Association of Business Process Management Professionals] (2021):

Business process management (BPM) is a disciplined management approach to identify, design, execute, document, measure, monitor and control automated and non-automated business processes, to achieve consistent and targeted results, aligned with the strategic objectives of an organization. BPM involves defining, improving, innovating and managing in a deliberate and collaborative manner and in a manner increasingly supported by technology, business processes from an end-to-end perspective that boost business results, create value for customers and enable an organization to achieve their business objectives more quickly. 39).

The BPM practice enables the organization to regularly measure its performance and taking actions to correct deviations, where applicable, identifying opportunities for change in order to align processes with organizational objectives. To conduct changes in a process, it is necessary to map its activities by creating a graphical representation that reveals its operation. The level of details of this illustration can identify what, where, when, why, how and by whom the work is performed.

BPM makes it easier to understand how the process is currently executed (as-is) and achieves its objectives. From this mapping, the organization can carry out an analysis and redesign the process, conducting the necessary

improvements or even proposing a new process. These improvements may include cost reduction; increase in production capacity; improvement in the quality of services and reduction of execution time, contributing to greater customer or user satisfaction (ABPMP, 2013).

Performance evaluation has been drawing interest from the organizational community, as a result of the changes that businesses have undergone over the years, of the fierce competition for markets, forcing institutions to seek a continuous flow of improvement in performance (Francischini & Francischini, 2017).

One tool for performance evaluation is the Balanced Scorecard. Kaplan and Norton (1996) already pointed out that relying on performance indicators forces administrators to organize the metrics that will allow them to operationalize their organizational visions. Once these comprehensive strategic measures have been defined, they must be translated into measures for each specific group, allowing each employee to understand how his or her work supports the overall strategy.

Managing with a focus on organizational processes requires an organization attentive to the perspective of its stakeholders, focusing on creating value and monitoring the effectiveness of defined objectives, which generates change in internal management in order to streamline processes. The use of performance system models in university quality management allows for the monitoring and measuring of the main aspects of their programs, processes and systems, in addition to facilitating their simplification. Therefore, "universities need an educational quality management system, in addition to performance measurement indicators" (Kucinska-Landwójtowicz et al., 2023, p. 2658).

A quality improvement process begins with the intention, which is defined by the administration. Once the intention has been set, it needs to be adjusted into plans, defined in the specifications and put into practice in operations. This process aimed at quality allows for the reduction of rework, reduces costs, minimizes operational delays, improves the level of use of machines, and, consequently, increases productivity (Deming, 1986).

Balabonienė and Večerskienė (2015), present that in the public sector a performance measurement system is a key tool that drives the development of internal processes and increases employees' motivation to focus on organizational improvement. Therefore, this type of system aims to provide information that enables the improvement of the institution's performance in the public sector, as well as the function of calculating the resources used.

For Francisco et al. (2013), performance indicators and their goals facilitate to identify and position the competencies needed for an institution, because they enable greater efficiency in processes as they allow for learning which performance or result is expected. For these authors, the evaluation process is a driver of change in education when based on management indicators, considering that it allows for the promotion of a macro market view of academic purposes.

Lima et al. (2021), carried out a survey of the most cited articles on performance indicators and concluded that the most used dimension among the analyzed models was the financial/profitability (100%), followed by consumer satisfaction (78%), quality of products and services (78%), flexibility (56%), employee performance (44%) and productivity (39%).

When implementing a measurement system, one must be aware of the pitfalls inherent to its construction process. Measurement is an expensive process and, therefore, its costs must surpass its benefits. Furthermore, it is important to measure only what is controlled by the administrator. In this sense, Corrêa and Corrêa (2013) state that a good measure of performance must be relevant, simple to understand and use, based on quantities that may be influenced or controlled by the user; provide feedback; reflect the business process involved; belong to a complete closed control loop, focusing on the monitoring. In addition, it must be based on explicit formulas and databases, employing more relations than absolute values.

In the research by Hong et al. (2023, p. 21), it was found that the use of performance measures aligned with critical success factors and derived from the Balanced Scorecard allowed for the identification of areas in which universities lacked management action, in order to identify barriers and improve technology transfer. For these authors, "what can be measured can be improved"; aligning with the phrase presented by ABPMP (2021, p. 183) which describes "you can't manage what you can't measure".

An indicator is a simple or intuitive representation of a metric or measure to simplify its interpretation when compared to an objective or reference. However, it needs to be simple, because when based on complex indices, the administrators often cannot understand or influence it (ABPMP, 2021).

Neely et al. (1997) cites the attributes of a performance measure: measure, purpose, relationship between the measurement system and the strategy, goal, formula, frequency with which it is recorded and reported, data source and possible actions to be taken.

In the research by Queiroz et al. (2020), on performance indicators in an educational institution, the critical success factors were identified with the work team and for each critical factor (dropout rate, support for students with special needs and resources for extension and research) a performance assessment was prepared, and initiatives for improvement were suggested. This logical development facilitated the coordination of the activities towards achieving the proposed objectives.

In the study by Franco and Webber (2020), on the Smart University: concepts, planning and indicators, it was also proposed a group of key performance indicators – KPIs to evaluate higher education institutions in relation to the five pillars of a Smart University, namely: education, environment, people, processes and technology. In this study, the "processes" pillar refers to actions aimed at managing the institution, in addition to innovation, improvement, redesign and changes to existing processes, adapting and modernizing them.

Universities are spaces for human and scientific development, which promote change in individuals and in the entire society in which they are inserted. For this transformation process, it is essential to interconnect teaching, research and extension, allowing for the practical application of theoretical knowledge and the creation of new ideas and new forms of doing on different acquired knowledge. This objective can be facilitated when the administrators do it while monitoring its objectives through the use of performance indicators.

METHODOLOGICAL PROCEDURES

This is applied research, with exploratory and descriptive objectives, characterized as qualitative and using the procedure of the action research type. According to Santos et al. (2017), action research encompasses the resolution of a problem, involving the researcher in the search for organizational change. Therefore, it is a cyclical process of planning, execution and changes that encompass "plan, act and evaluate". For this process, primary and secondary data is used in order to achieve the desired organizational change and the theorization derived from the project.

This action research work was developed in eleven phases: planning the research, in which objectives, field and research subjects were defined; collection of information; analysis of interviews and forms; mapping the process of reformulation of the plan for the employment of the academic projects' financial resources; presentation of information to research participants (workshop I); analysis and organization of workshop I information; identification and prioritization of measurement objectives and items to be measured (workshop II); analysis and organization of information from workshop II; definition of indicators (workshops III); analysis and organization of information from workshop III; presentation of results at PROPLAN. These phases are presented in a detailed manner in the topic "Results".

The study was carried out at the Academic Projects Office (DPA, acronym in Portuguese), directly subordinated to UFRN's Vice-Presidency of Planning (PROPLAN). Regarding the research subjects, this study relied on the participation of project coordinators and their respective administrative staff, employees from the Fundação Norte-Rio-Grandense de Pesquisa e Cultura (FUNPEC), the Vice-President of Planning, the Director of DPA and the analysts responsible for executing the process.

Based on queries to the project module of the Integrated System for Assets and Contract Administration - SIPAC, it was possible to identify the coordinators of the units that have the largest number of active academic projects running at UFRN, in 2021. Involving researchers with experience from 2 up to 24 projects. It was also conducted queries of administrative staff from unavailable coordinators.

DPA/PROPLAN initially expressed its concerns regarding the process of reformulating the work plan and the plan for employing the financial resources of ongoing academic projects at UFRN, which are carried out without any support to the decision-making process through indicators.

In this sense, meetings took place with the parties involved to carry out a situational analysis, explaining the reality based on the understanding of the problems and their possible causes. This resulted in the creation of a specific board, in the Trello tool, to record the information collected.

As the weekly process monitoring meetings took place, participants came to the conclusion that action research with the purpose of defining indicators for the reformulation process would be interesting. For Santos et al. (2017), the researcher can collect information, through involvement with the organizational processes related to the action research project. Costa (2017) teaches that, in this type of research, collection takes place through participant observation and analysis of written documents. He also states that participation in meetings, document analysis and interviews are common forms of data collection for this type of survey. For the development of this

study, data collection was carried out using interviews, forms, participant observation, participation in meetings, document analysis and workshops.

To operationalize this research, it was developed a form with five open-ended questions, using Google Forms, and sent by email, in the period from February 9 to the 17, 2021, in which fifteen project coordinators participated, with the aim of knowing what they know, believe, expect, feel and wish in relation to the process of reformulating the work plan and the plan for employing the financial resources of ongoing projects.

Seeking to reach a larger number of people involved in the topic under study, technical-administrative staff who assist coordinators in the administrative and operational activities of the projects were also questioned. To this end, five interviews were carried out, with an average duration of 20 (twenty) minutes, in which respondents expressed their difficulties, concerns and suggestions on how to conduct the process under study.

The analysis of the interviews, the forms and the workshops were based on the content analysis technique, through categorical analysis. The classification of these elements derived from data collection in order to classify them into indicators are presented in the results, in Table 1.

Content analysis is a set of techniques that analyzes communications through systematic and objective procedures for describing and categorizing messages, whereas the categorical analysis technique is the type that considers the entirety of a text, classifies it and makes a census, based on the frequency of meaningful items. It sorts as drawers that allow for the classification of message elements. Basically, it is a taxonomic method, which sorts according to established criteria (Bardin, 1977). Thus, to define the categories, a first reading was carried out in order to check whether the answers were in line with what had been inquired, then it was carried out a selection of the registration units taking into consideration the relevance of the words and, finally, the words most cited by the participants in the forms, interviews and workshops were selected.

RESULTS

The research was developed according to the following steps: Mapping of the reformulation process (as-is) and presentation of information - Workshop I; Definition and prioritization of measurement objectives – Workshop II; and Definition of KPIs – Workshop III.

Mapping of the reformulation process (as-is) and presentation of information

Through document analysis and participant observation, we obtained information to map the process of reformulating the work plan and the plan for employing the academic projects' financial resources.

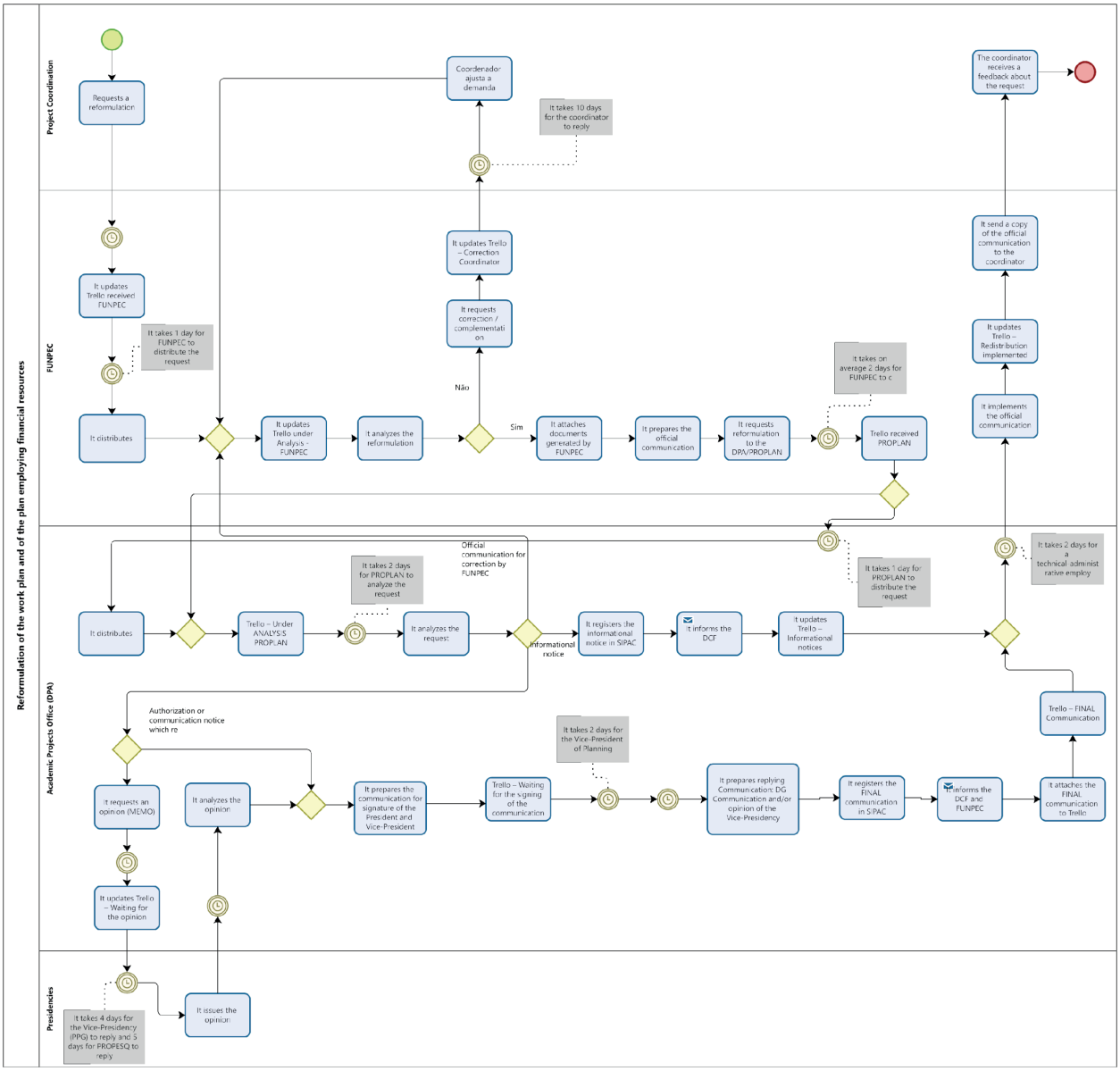
The mapping of processes carried out at the Academic Projects Office (DPA) at UFRN provided several advantages, similar to those cited by Costa and Moreira (2018). These authors describe that mapping allows for the standardization of procedures and agility; reduces errors and improves service; and improves the internal communication. In addition to generating

motivation as it manages to achieve the goals. Therefore, involving employees in these improvement actions is essential for them to feel responsible and beneficiaries of the results.

To map this research, it was used the business process management notation – BPMN, which makes it possible to record end-to-end activities. It is a useful tool for identifying problems in organizational processes in order to address them, to develop continuous improvement management (Brocke & Rosemann, 2013). This mapping can be seen in Figure 1.

Figure 1

Mapping of the reformulation process



According to the mapping, the reformulation of a project begins with a request to FUNPEC made by the Project Coordinator. After this stage, FUNPEC registers this information in the Trello tool, to then start the various activities under its responsibility, until the reformulation can be directed to the Aca-

demic Projects Office - DPA, the focus of this study. At DPA, the request is distributed to a technical-administrative employee who will proceed with the analysis, request an opinion from the Vice-Presidency, of the project, where applicable, and will issue a response to FUNPEC, authorizing or not the requested reformulation. FUNPEC, in turn, will inform the coordinator about the outcome of his or her request, completing the process.

The mapping of the studied process constituted a source of information that, when analyzed, allowed for the achievement of the other specific objectives of this study. Based on it, it was possible to identify the paths that the process can follow, from the simplest to the most complex phases, and thus, set goals to reduce the total time of execution. This mapping process was, by the way, carried out in conjunction with the analysis of the interviews and the forms to identify the main bottlenecks in the process, developed through content analysis, which can be seen in Table 1.

Table 1

Content analysis categories for the creation of the indicators

Collection tools	Categories of analysis
Forms	Contradictory information
	Outdated, incomplete documents, documents with errors
	Diverging interpretations of legislation
	High response time
	Greater autonomy over the resources
Interviews	Constant changes in legislation
	Unnecessary information requirement
	Lack of information on the process
	Excessive bureaucracy
	Outdated, incomplete documents, and documents with errors
	High response time
Workshops	Communication failures
	Increase transparency
	Time, rework and project management

The combination of these analysis processes enabled the triggering of information until reaching the creation of key performance indicators – KPI and a consequent structuring of PROPLAN's decision-making process.

According to Francischini and Francichini (2017), the organization that wants to create performance indicators must carried it out in phases, namely: clearly identifying the objective it wants to achieve; elaboration of the relevant criteria, transforming them into numbers; definition of indicators that reflect these objectives.

Furthermore, it is very important that the definition of what should be measured is carried out in conjunction. For Deming (1986), to improve quality the first step is to provide leadership education. For change to occur,

the involvement of employees is necessary, which is feasible with leaders demonstrating their commitment, in order to build credibility. Only then will the team be involved, understand the reasons and tend to embrace responsibility for the workflows (ABPMP, 2021).

Therefore, it was held the first workshop with the participation of seven technical-administrative employees and FUNPEC's Project Manager, three analysts and the Director of Academic Projects at DPA/PROPLAN. The meeting lasted approximately one hour and took place over three parts:

- Presentation of the mapping of the process of reformulating the work plan and the plan for employing the financial resources of UFRN's ongoing academic project (as-is);
- Presentation of information collected up to that point regarding the perception of the user about the process under study;
- Discussion of the data presented.

As a result of the first workshop, it was created a spreadsheet, which was then shared with all the participants so that, through a collective construction, it was filled with the pertinent problems, which deserve treatment by DPA/PROPLAN. In this way, it was scheduled a second meeting to discuss, define and prioritize the problems, registered in this spreadsheet, identified as strategic for the success of the reformulation process.

Defining and prioritizing measurement objectives

At this stage of the study, the problems were already known, but it still hadn't been defined which of them would be critical and which should become measurement objectives. To this end, a second workshop was held to consolidate the information collected in the first. This second meeting took place with the participation of the Vice-President of Planning; four technical-administrative employees from PROPLAN, the project manager and a technical-administrative employee from FUNPEC and lasted approximately one hour and thirty minutes. Francischini and Francischini (2017) describe the importance of knowing the administrator's objectives, the relevant variables that show these objectives and then develop performance indicators that measure these variables.

During the workshop, it was discussed what should be measured to support the decision-making process on the changes needed to change the scenario posed by the stakeholders. Thus, the problems were prioritized, the measurement objectives and the items to be measured defined. Table 2 shows a summary of the results obtained over the first two workshops.

Table 2

Problems prioritized, measurement objectives and items to be measured

Problems identified and prioritized	Purpose of measurement	Items to measure
Contradictory information	Reduce rework in the process of reformulating the work plan and the plan for employing academic projects' financial resources	Number of reformulations denied
Outdated / incomplete documents / documents with errors		
Diverging interpretations		
Error in the financial spreadsheet		Number of reformulations returned to FUNPEC for correction
Error in the coordinator's official communication		
Error in FUNPEC's official communication		
Difficulties in understanding the coordinator's request		
High response time	Reduce the average duration of the process of reformulating the work plan and the plan for employing academic projects' financial resources	Time the reformulation remained at PROPESQ [Vice-Presidency of Research]
Time for formulation of the official communications and delay between FUNPEC and PROPLAN		Time the reformulation remained at the Vice-Presidency of Graduate Studies (PPG)
Response time and lack of feedback for researchers		
Vice-Presidents take quite some time to issue the opinion		Time the reformulation remained at the Coordination
The project planning impacts directly its execution and, therefore, the number of formulations that these projects demand	Reduce the number of reformulations of the work plan and of the plan for employing academic projects' financial resources	Number of reformulations per project
Plan better in order to carry out less adjustments in the project during the execution		

Once the problems had been identified and prioritized, once defined the objectives to achieve with the measurement and what actually to measure, the third workshop was scheduled, to move towards defining a set of key performance indicators for the process of reformulating the work plan and the plan for employing the academic projects' financial resources, based on the already defined measurement objectives. That phase of the workshop emphasizes the value of communication with the entire team, encouraging employees, public servants, to be participants in the strategic objectives in their daily operations.

According to Woodcock and Francis (2014), problem solving is only possible when the work team starts to have a common language and effective procedures, which initially requires that employees define the problem or the opportunity in the same way, requiring harmony between the team, to later establish the objectives and then measure.

According to Sokolov et al. (2023), the team's involvement in the specific stages that occur between the procedure and the result makes it possible to understand the bottlenecks that can interfere with key indicators. It is essential that employees participate in the development of performance

metrics in order to achieve beneficial effects in the quality of the indicators (Groen, Wouters & Wilderom, 2017).

Definition of indicators

At this stage of the study, what to measure and why to measure was already a consensus among the members of the organization. Therefore, the work progressed towards defining the indicators. An indicator must be analyzed by comparing its measure with some reference standard. However, goal setting needs to be aligned with customer expectations and the organizational strategy (ABPMP, 2021).

Goal is the value that the indicator should reach. This value should not be easy nor impossible to achieve, but must be challenging. Furthermore, the goal value must be reviewed periodically to adjust the reality of the process with the objectives to be achieved (ABPMP, 2013; Francischini & Francischini, 2017).

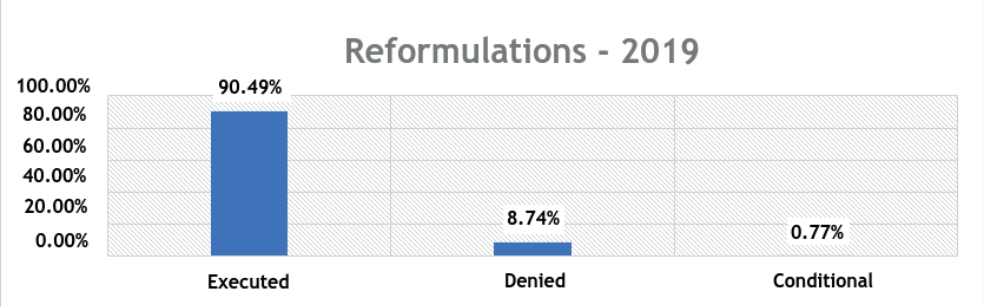
So that comparison standards, goals and measurement frequencies could be defined, we used data from reformulations carried out in 2019, recorded in an Excel spreadsheet, and the Trello dashboard, so that they could be used as supporting information for the definitions of the indicators.

Based on the analyses carried out in the different stages of this study, indicators were proposed and widely discussed during the third workshop. The following sections describe the discussions and the definitions that participants reached in relation to the indicators that should be used, which are: Percentage of reformulations denied; Percentage of reformulations returned to FUNPEC for correction; Percentage of reformulations per project; Average period of time the reformulation remained at the Vice-Presidency of Research – PROPESQ; Average period of time the reformulation remained at the Vice-Presidency of Graduate Studies – PPG; and Average period of time the reformulation remained in the coordination.

Percentage of reformulations denied. Figure 2 shows the reformulations executed, partially executed or denied, during the year 2019. From it, it is observed that, of the total number of reformulations carried out, 8.7% were denied and 0.7% were conditional upon compliance with some legal requirement that had not yet been met.

Figure 2

Reformulations of 2019 Projects at UFRN



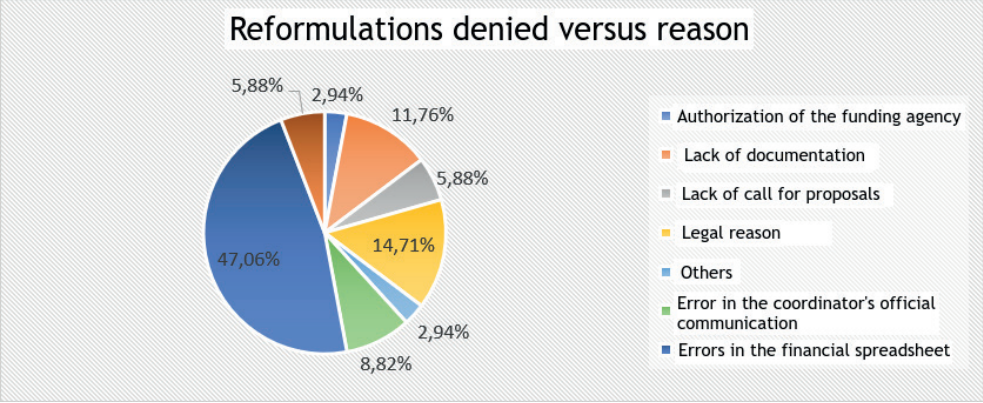
It was considered that the denied requests reflect a lack of knowledge on the part of the coordination of what can be done in relation to the reformulation of plans for employing the financial resources of an academic project. They also added that this could be understood as being a difficulty that the coordination had to prepare the request for the desired formulation. Finally, they concluded that some requests have been presented in a formally poorly constructed manner or whoever makes them does not have the appropriate knowledge to make them. In both cases, rework was identified and, therefore, a measure that must be monitored and controlled, so that structured decisions, based on knowledge, are taken to mitigate or even eliminate this waste of effort.

The research by Spiazzi and Battistella (2019), on process management carried out at the Federal University of Santa Maria, also observed the existence of rework in which two and even three sectors simultaneously carried out the same activity. To reduce this bottleneck, along with problems in the flow of information and in the limit of tasks between the sectors, which was confusing, some actions were proposed, such as the standardization of processes and the definition of the activities that each sector would be responsible for, among others. This process of reducing rework is directly related to the search for quality in process management, which reduces costs, cause less waste, less rework, achieve greater speed and finally, it generates less stress among employees and users (Marshall Júnior et al., 2012).

By analyzing Figure 3, it was found that 47.06% of reformulations denied in the year 2019 exhibited errors in the financial spreadsheet as the cause for the denial. Secondly, there is the legal reason, with 14.71%.

Figure 3

Main reasons for the reformulations denied



This scenario reveals that the error in the financial spreadsheet is a measure apart from the others, being responsible for almost half of the causes of denied reformulations and deserves a differentiated attention. Therefore, it is proposed a 50% reduction (from 16 to 8) in the requests denied for this specific reason, and around 10% (from 18 to 16) for the other errors.

To achieve quality in processes, people need to be committed at different stages of the process. Therefore, all departments are responsible for the success of an institution, and senior management needs to create synergy between the different functional skills, so that they work together to minimize problems (Marshall Júnior et al., 2012).

Considering that that which is not measured gets deteriorated, this study suggests the indicator "percentage of denied reformulations", as shown in Table 3.

Table 3

Percentage of denied reformulations

Name of the indicator	**Percentage of denied reformulations**
Objective	**To reduce rework in the process of reformulating the work plan and the plan for employing the academic projects' financial resources** **Number of denied reformulations**
Item to be measured	Number of denied reformulations
Type	Rate
Responsible	DPA/PROPLAN
Source of data	Trello
Frequency	Bimonthly
Goal	1%
Formula	(Number of denied reformulations / Total number of reformulations) X 100

This indicator works on the quality dimension and constitutes a result indicator (outcome). The time employees use to correct inefficiencies can be excessive. Thus, investing time and resources upfront is worth the effort when it contributes to reducing or avoiding revisions or rework in processes (ABPMP, 2021).

Percentage of reformulations returned to FUNPEC for correction. During the discussion of the "percentage of reformulations denied" indicator, a consensus was reached that, instead of denying the request due to an error that could still be remedied with the reformulation in progress, the reformulation procedure should be changed so that the process returned to FUNPEC for correction and subsequent return to PROPLAN.

Therefore, it was proposed to PROPLAN to register and return to FUNPEC requests that exhibited errors in the financial spreadsheet, lack of documentation and errors in the preparation of the official communication. This change will prevent the reformulation from being denied and the start of a new process to fulfill the same request. To this end, some improvement initiatives were defined as essential for registering this return of the process to FUNPEC, such as: create a custom field to record the reason why PROPLAN returned the reformulation request to FUNPEC; create a list (column) in Trello in which it will be kept the requests for reformulation returned from PROPLAN to FUNPEC; and strengthen the culture of reading emails sent by Trello, which notify that the process has returned and is pending.

On this occasion, it was observed that the number of processes returned to FUNPEC for correction is a rework and, therefore, must be monitored and controlled. It was thus defined the indicator "percentage of reformulations returned to FUNPEC for correction", as shown in Table 4.

Table 4

Percentage of reformulations returned to FUNPEC for correction

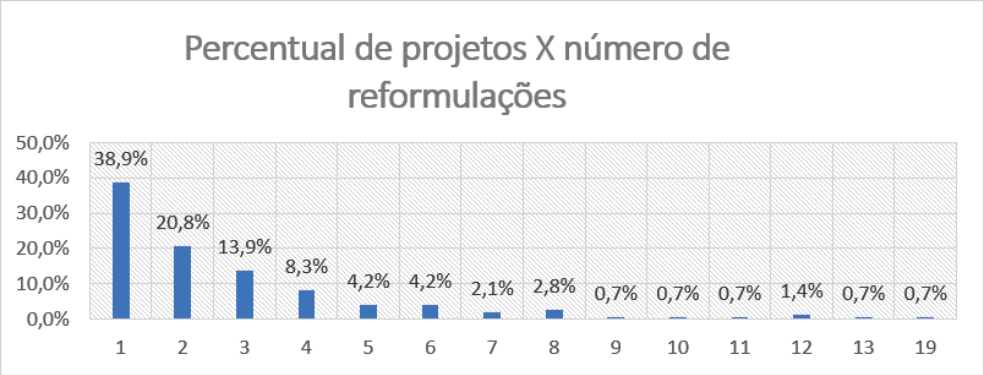
Name of the indicator	Percentage of reformulations returned to FUNPEC for correction
Objective	**To reduce rework in the process of reformulating the work plan and the plan for employing the academic projects' financial resources**
Item to be measured	Number of reformulations returned to FUNPEC for correction
Type	Rate
Responsible	DPA/PROPLAN
Source of data	Trello
Frequency	Every three months
Goal	1%
Formula	(Number of reformulations returned to FUNPEC / Total number of reformulations) x 100

This measure will indicate the number of reformulations already analyzed by FUNPEC and which returned to it for correcting errors that occurred during the preparation of the request to the DPA. Thus, it will make it possible to measure the efficiency of the process so that the lower its value, the closer to the objective the process will be.

Percentage of reformulations per project. By analyzing Figure 4, it is observed that 38.9% of academic projects running at UFRN (in 2019) were reformulated once, 20.8% twice and 40.3% three or more times. It is important to note also that 4.2% of the total number of projects exhibited ten (10) or more reformulations.

Figure 4

Percentage of project Versus number of reformulations



This reformulation process greatly hinders the efficient flow of activities, causes discouragement and frustration for researchers and rework for the technical-administrative staff. According to Marshall Júnior et al. (2012), there is no point in developing the best product/service with the best processes if

what is developed does not meet the customer's needs, which is the reason of all institutional processes. Furthermore, especially in services, special attention must be given to the human element for this process improvement.

Therefore, the success of organizations, for example, can only be achieved from adequate training. Sokolov et al. (2023) stress that it is important that employees are trained in process improvement techniques so that they can concentrate their work on KPIs.

Academic projects are classified, according to their nature, research, teaching, extension, institutional development, scientific and technological development and promotion of innovation, as stipulated in Article 2, item I to VII, of Resolution No. 061/2016-CONSAD [Higher Council for Administration], of December 15, 2016.

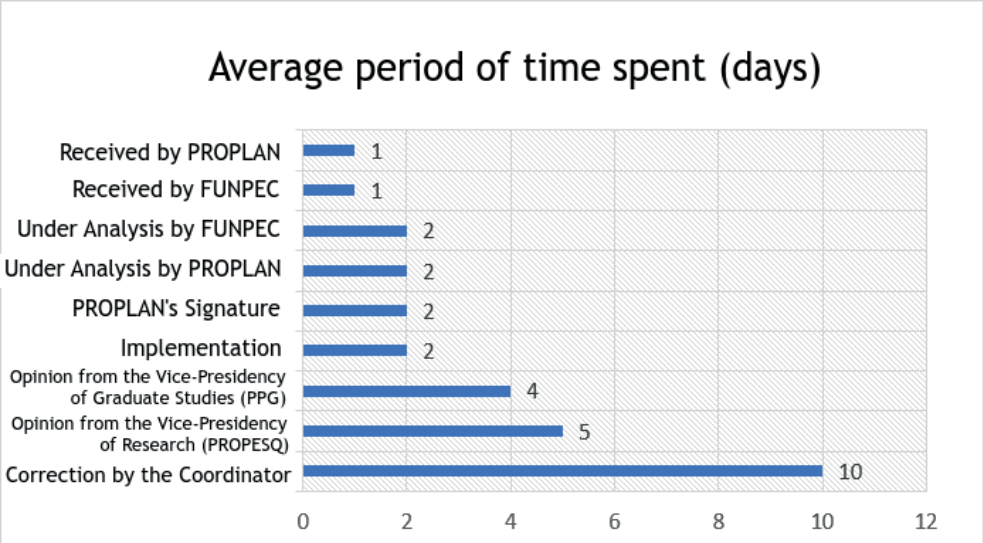
Depending on their nature, the complexity can vary greatly and those with high complexity may require a greater number of reformulations than others of lesser complexity.

In addition, other criteria that still need to be debated by the participants may influence the number of reformulations of a project. The team, therefore, decided to create project categories that allow them to be grouped according to their complexity, study these categories to then identify a variable that explains the demand for reformulations for each type. Therefore, at this moment, the team felt that they still didn't have enough information to define such an indicator.

Average period of time the reformulation remained in the Vice-Presidency of Research – PROPESQ. Figure 5 shows possible phases which the reformulation process goes through and the average period of time spent in each of them. According to the mapping of the process, the simplest procedure for a reformulation (shortest path) involves the phases "Received by FUNPEC", "Under Analysis by FUNPEC", "Received by PROPLAN", "Under Analysis by PROPLAN", "PROPLAN's Signature" and "Implemented by FUNPEC". Taking into consideration this shortest path, a reformulation takes, on average, 10 (ten) days to complete. If a reformulation has to go through PROPESQ for the issue of an opinion, this period of time becomes 15 (fifteen) days, as the average period of time it remains in this Vice-Presidency is 5 (five) days.

Figure 5

Average period of time spent (days)



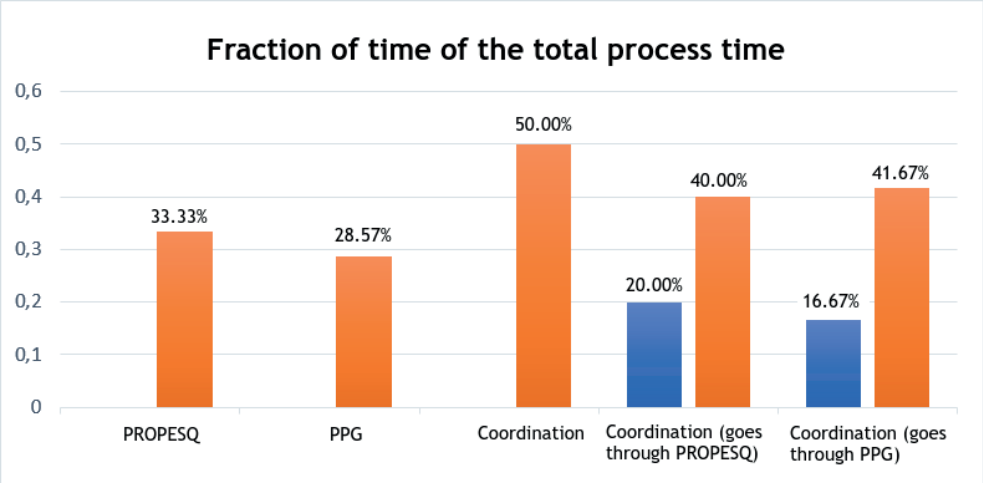
Thus, considering a reformulation that necessarily goes through PROPESQ and does not return to the coordinator (shorter flow for a process of this nature), one has that the average period of time spent at PROPESQ corresponds to 33.33% of the total process time.

In process management, this office can be considered the "bottleneck" stage of the entire process. Because it is the one which limits the speed at which activities can be completed, and in the end, tends to generate dissatisfaction among users/researchers due to the slowness of the processing.

This aspect of the reformulation being processed can be seen in Figure 6.

Figure 6

Fraction of the total process time



This measure proved to be high and was even registered as a problem by the respondents. From this perspective, it was proposed the indicator "average period of time the reformulation remained in the Vice-Presidency of Research

– PROPESQ", as described in Table 5, with the objective of reducing the time spent in this Vice-Presidency.

Table 5

Average period of time the reformulation remained in the Vice-Presidency of Research (PROPESQ)

Name of the indicator	Average time the reformulation remained in the Vice-Presidency of Research (PROPESQ)
Objective	**To reduce the average time of the process of reformulating the work plan and the plan for employing the academic projects' financial resources**
Item to be measured	Time the reformulation remained in the Vice-Presidency of Research (PROPESQ)
Type	Index
Responsible	DPA/PROPLAN
Source of data	Trello
Frequency	Monthly
Goal	3 days
Formula	Sum of the time all reformulations spent at PROPESQ / Number of reformulations which had an opinion issued by PROPESQ

This indicator works in the time dimension and will contribute to reducing the average time spent at PROPESQ and, consequently, the total average time of the reformulations. Therefore, the smaller its measure, the more aligned the process will be with the objectives of DPA/PROPLAN.

Average period of time the reformulation remained at the Vice-Presidency of Graduate Studies – PPG. Still analyzing Figure 5, it can be seen that the process takes an average of four days to have the opinion issued by the Vice-Presidency of Graduate Studies – PPG. Following the same analysis carried out in the previous section, the total average time of the process that requires an opinion from the PPG is, on average, 14 days. In this case, according to Figure 6, the PPG time corresponds to 28.75% of the total process time, constituting, like what happened with PROPESQ, a long time and which was mentioned by research participants.

To monitor and control this measure, it was suggested the indicator "average period of time the reformulation remained in the Vice-Presidency of Graduate Studies – PPG", as shown in Table 6.

Table 6

Average period of time the reformulation remained in the Vice-Presidency of Graduate Studies (PPG)

Name of the indicator	Average period of time the reformulation remained at the Vice-Presidency of Graduate Studies (PPG)
Objective	**To reduce the average time of the process of reformulating the work plan and the plan for employing the academic projects' financial resources**
Item to be measured	Period of time the reformulation remained at PPG
Type	Index
Responsible	DPA/PROPLAN
Source of data	Trello
Frequency	Monthly
Goal	3 days
Formula	Sum of the time all the reformulations remained at PPG / Number of reformulations which had an opinion issued by the PPG

Therefore, the period of time the reformulation remained at the PPG must be up to 3 days and the measurement frequency, monthly. This reduction will directly contribute to reducing the average time spent at the PPG and, therefore, the total average time of the process, which will increase customer satisfaction, as this was a point mentioned by almost all form respondents, constituting a critical point in the entire process.

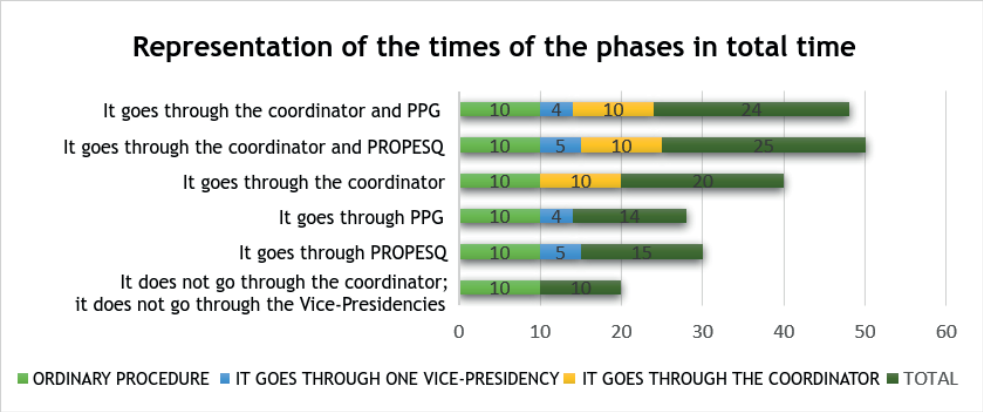
Average period of time the reformulation remained in the coordination. One reformulation may need to return to the coordination for correction or receiving additional documentation. When this occurs, the average time becomes 20 (twenty) days. If this reformulation requires an opinion from PROPESQ or PPG, this time reaches 25 (twenty-five) or 24 (twenty-four) days, respectively.

According to Figure 6, it is observed that the time the reformulation remains in the coordination is, at best, 40% of the total average time required for the execution of a reformulation.

In Figure 7, it can be seen that the process spends in the coordination the time equivalent to the total average time needed to be executed in its simplest processing (scenario in which the reformulation does not return to the coordination and does not require an opinion from PROPESQ or PPG).

Figure 7

Representation of the time of the phases in total time



The Lohman, Fortuin and Wouters (2004) study, focusing on operational activities, presents time measurement as an important aspect for improving performance. It defined the following as relevant indicators: on-time deliveries, fill rate, customer response time. Tracking these measures allows for the measuring of performance over time, so that improvement actions can be monitored and increase the agility in operations.

This 10 (ten)-day time was considered by all participants in the third workshop as high and, therefore, over which the need for control and monitoring prevails. For this purpose, it was proposed the indicator "average period of time the reformulation remained in the coordination", as described in Table 7.

Table 7

Average period of time the reformulation remained in the coordination

Name of the indicator	Average period of time the reformulation remained in the Coordination
Objective	**To reduce the average duration of the process of reformulating the work plan and the plan for employing the academic projects' financial resources**
Item to be measured	Average period of time the reformulation remained in the coordination
Type	Index
Responsible	DPA/PROPLAN
Source of data	Trello
Frequency	Monthly
Goal	6 days
Formula	Sum of the length of stay of all reformulations returned to the coordination / Number of reformulations returned to the coordination

This measure was considered very high, which allows us to define a bolder goal with a view of accelerating the reduction of this time. Therefore, it is suggested to reduce this time by 40% and establish six days as the average length of stay of the reformulation in the coordination.

The process of creating a set of indicators focuses the analysis on each player involved, so that it becomes possible to identify elements that contribute to the transformation of the business process (ABPMP, 2021).

This process of creating performance indicators presents a logical sequence for identifying critical factors in the organization, methodically developed with the team, generating engagement for the application of performance measures in public institutions. Therefore, it was possible to identify gaps that interfere with the operational processes of research funding, in order to avoid errors, reduce rework, minimize costs and increase response speed in organizational procedures.

This strategic construction allows the organization to know in detail its business processes, enabling the identification of critical points, which must be treated with due relevance, as well as sub-processes that do not add value to the rendered service, and must therefore be eliminated. With these changes, DPA/PROPLAN will achieve an increase in the quality of the service it provides and a reduction in the duration of the process under study and, therefore, will act effectively in changing a scenario unwanted by users, highlighted at the beginning of this study.

To translate the organizational strategy into action, it is necessary to create operational performance metrics which are appropriate and valid for the reality of each organization, which is a challenge because the creation of these indicators requires specificity of context to be considered meaningful to employees and administrators (Groen et al., 2017).

FINAL REMARKS

This study had the purpose of defining a measurement system for the process of reformulating the work plan and the plan for employing the academic projects' financial resources underway at UFRN, using action research as the methodological technique.

To achieve this purpose, through forms, interviews and meetings, we became aware of the difficulties faced, as well as of the expectations of the stakeholders with respect to the achievement of the process in question. Thus, it was concluded that there are failures in communication between the parties, which cause rework and waste, such as poorly formulated requests, due to lack of knowledge of the legal foundations involved, lack of documentation needed to the analysis of the reformulation request, a high number of reformulations per project, among others. Still from this perspective, it was observed great customer dissatisfaction resulting, to some extent, from lack of knowledge of the process flow, leading the customer to believe that the process is too bureaucratic and, therefore, quite time consuming.

In view of this scenario, with the aim of improving understanding of the functioning of the process, a graphical representation was created – mapping of the process as it is performed (as-is), in which it is possible to identify what, by whom and when a given work activity is performed. For this, the BPMN model was used to model the processes.

Based on this mapping, it was possible to observe high times in some of the phases of the process, as well as identifying opportunities for

improvement in order to align its performance with what is expected by the stakeholders.

Thus, through the two meetings held with the aim of defining what should be measured, through monitoring and controlling of the performance of the process under study, it was possible to achieve greater productivity, improvement in quality and a reduction in execution time.

A set of six indicators were proposed and widely discussed with the stakeholders. Among them, five were accepted and defined for future implementation, and one remained as a proposal, as, at the time, it was felt the need to verticalize the discussions so that it could be possible to define goals and formulas appropriate to the reality of the process.

It is important to stress that, still in the phase of discussing the indicators, there were suggestions for the process flow, which have already been implemented, and which will be responsible for a reduction in the number of denied requests. This decision will directly impact the efficiency of the process, taking into account that reformulations previously denied and which returned to PROPLAN with the same request to be authorized, now will be authorized in the first attempt, as long as the error can be corrected during the execution of the process. This means that there will be one instance of the process instead of two, as was the case until then, reducing rework. This fact is a typical example that defining performance indicators inevitably imposes improvements and alignment of the process with the organizational objectives, changing the undesirable scenario pointed out by users/clients.

This sequenced process of identifying priorities, from the perspective of the team and users, and organizing the creation of a performance measurement system in a collaborative manner can contribute to a change in the mindset of public institutions due to the benefits that are generated, such as improvement in internal processes, increase in employee commitment, improvement in communication, facilitation to achieve the proposed objectives and promotion of continuous improvement in the organization.

The study was developed in an educational institution, but provides an insight for creating performance measures and the established indicators themselves can be used in other types of public institutions, as well as in business organizations.

An important limitation is the fact that the organizational environment does not have a database with time series for some measures, in particular, the duration of the process, causing this definition to occur through a collective construction.

For future studies, it is suggested to use this collaborative process to create and implement measurement systems in other organizations in order to compare their effectiveness; implement the indicators in other DPA/PROPLAN processes and in other educational institutions; expand the examination of one or more of the indicators created, submitting them to experts; define a manual of continuous improvement process with the use of indicators for the practice of business process management in public institutions.

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