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KNOWLEDGE AND PROJECT MANAGEMENT IN UNIVERSITY RESEARCH: A CASE STUDY ON THE DEPARTMENT OF SERVICE TECHNOLOGY OF VENEZUELA'S SIMON BOLIVAR UNIVERSITY

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— Abstract—

It is possible to create new organizational knowledge and take advantage of the one that already exists, with the help of projects from organizations and the processes to carry them out. These projects take into consideration integration, scope, time, cost, quality, human resources, communication, risks, procurement, and stakeholders' management. In the particular case of universities, where different kinds of projects constantly take place, which produce results that go beyond these institutions in a way that impacts society in general. The use of appropriate tools and methodologies for project management is essential as it contributes to maintaining the necessary scientific rigor. Even more so when the linked processes can be considered as fundamental factors for knowledge management in people, processes, content, and information and communication technologies. Thus, we carried out descriptive research with a non-experimental design. It had as a general objective to determine knowledge management executed by teachers from the Department of Service Technology of the Simon Bolivar University Litoral Campus, of the State of La Guaira in Venezuela. We took into consideration the processes and knowledge areas for the research projects management carried out in the said Department. Through a self-evaluation, we diagnosed how teachers manage their projects to then link the information obtained to the elements that promote knowledge management.

Keywords

Knowledge management, project management, processes, knowledge areas, university projects.

The university research process follows a scientific and methodological approach, which corresponds to Cobo's definition (2006) about knowledge management, through which organizational knowledge is produced, captured, transformed, and used; besides, it must be considered that while researching, different mundane activities are carried out, such as projects or temporary programs that can answer the researchers' personal and professional concerns, as well as to the institution they belong to and society in general.

Therefore, according to the scientific rigor, on top of following the appropriate procedures for each field of study, when it comes to projects, tools and methodologies from the project management that "cover strategic, tactical, and operational strategies as direct responsible of their correct management" (Álvarez, 2016: 348) must be used, without forgetting that knowledge management has, as Cobo points out (2006), a practical and operational perspective that has to be taken into consideration.

But sometimes, teachers' basic training affects the research when they do not follow the appropriate methodologies or they do not use the proper tools to manage projects, especially if these cover knowledge areas outside of their professional field, for example, lack of time management for not using timetables or neglecting costs due to a lack of budget. Additionally, there are other factors that Figueredo (2017) names setbacks of the university researcher, which are: time factor, not having chosen a major within the institution, scarce budget, the psychological aspect and the lack of coincidence between personal research interests and those of the institution, which also impact on the research carried out and which, in some cases and with increasing frequency, are enhanced given the current political, economic and social situation in Venezuela, which affects the universities and all their personnel.

Given these conditions, it is essential that the research projects that are still being carried out in the country's universities can satisfy the needs that motivated them, in addition to maintaining the required scientific and methodological rigor, and that they are adequately managed by taking into account the processes that they require to reach completion within the existing restrictions, which are limited by the areas of knowledge linked to project management; thus the general objective of this research, which is of a descriptive type with a non-experimental design, where by means of a case study, it is intended to determine the knowledge management carried out by the professors of the Department of Service Technology of the Simon Bolivar University Litoral Campus, of the State of La Guaira in Venezuela, for this purpose, the processes and knowledge areas were taken into account for the management of the research projects they carry out and it was diagnosed, through a self-evaluation, how the professors manage

their projects, to later relate the information obtained with the factors that promote knowledge management.

KNOWLEDGE MANAGEMENT

When it comes to professors, these are "social agents with greater responsibility in the realization towards the internal, and visibility towards external aspects of scientism and the research function, attributed to the universities" (Figueredo, 2017: 325), to comply with the social commitment of these institutions, which they must do under an organizational and strategic approach explained below. For Cegarra and Martínez (2017), a strategy is an instrument for action and involves the act of directing or managing to meet goals, adjusted to the uncertainty of the organizational world and the highly changing environment; on the other hand, no one can currently doubt that intangible assets are strategic elements in organizations that contribute to their growth, and their management is increasingly relevant, especially in the case of developing countries because "it has become a tool for performance improvement" (González & Rodríguez, 2016: 12), and as stated by Quintas *et al* (1997) it is a process of continuous management of all types of knowledge, with which it is possible to satisfy existing and emerging needs, which identifies and uses present knowledge assets to develop new opportunities.

A business strategy, in its most classic approach, considers the organization's resources and capabilities, as opposed to knowledge-based strategies which, as indicated by Sveiby (1997; cited by Cegarra & Martínez, 2017), are sustained and have as an advantage: a high level of personalization, knowledge is focused as a procedure, there are benefits derived from efficiency and the investment made in personnel training. On the other hand, González & Rodríguez (2016: 19), state that knowledge management considers "activities such as initiate, generate, use, model, transfer and feedback, such knowledge for their purposes and strategic objectives", which is required for knowledge to become organizational assets, for this purpose first one must coordinate individual knowledge given their competences, studies, skills, and repetition of facts, which must be shared and distributed tacitly with other members of the organization to create its internal memory (Cegarra &Martínez, 2017), without forgetting that all the processes related to this management, in addition to generating, searching, storing and transferring knowledge, they seek to increase productivity and competitiveness (García, 2002; quoted by González & Rodríguez, 2016).

Olivares (2002; cited by Machado *et al*, 2007) contributes that on some occasions there is no coordinated management among the functions of the university since some teachers lack necessary managerial training, which is even more complicated without knowledge management that allows them

to face challenges inherent to the organization and the environment by providing "tools and processes that allow them to generate new knowledge and make existing knowledge profitable, thus improving the performance of the workers and, therefore, of the organization itself" (Rodríguez-Gómez & Gairín, 2015: 73). Knowledge management, according to Angulo (2016), must include a permanent and managed flow of knowledge within the organization, as this stimulates innovation, improves decision-making processes, and generates new knowledge.

Optimizing knowledge management implies organizational learning that allows operationalizing the "generation and permanent use of the existing and developed knowledge" (Rodríguez-Gómez & Gairín, 2015: 76), which should motivate a process of continuous improvement and, even more so in training contexts such as universities, which goes beyond the individual field of researchers and encompasses the entire institution. To achieve all this, knowledge management must be based on four pillars that influence its effectiveness: people, processes, content and information and communication technologies (Gómez- Vargas & García, 2015); table 1 below shows the fundamental components of knowledge management.

Table 1
Knowledge management components

Knowledge management components	Description of knowledge management components
People	Human resources
	Internalized organizational culture
Processes	The context in which knowledge management takes place
	Vision and mission of the organization. Business strategies
	Organizational methodologies and routines that people carry out
Contents	Knowledge related to each field
	Internal and external information that is gathered in documents, database, or people
	Monitored documented languages
	Presentation support and formats (documents, yellow pages, learned lessons)
Information and communication technologies (ICT)	Means to gather, store, and distribute data, information, and explicit and tacit knowledge
	Alignment with the organization's strategy and needs, especially those required when studying the other three components

Source: Gómez- Vargas y García, 2015

The components of knowledge management follow a route that starts with people acquiring and using knowledge from the initial stages of learning to

continuous improvement, creating processes and content that, under the appropriate media and environment, are stored, distributed, and captured by the members of the organization, making it the heritage of the organization.

As indicated by Gómez-Vargas and García (2015), the studies carried out on knowledge management in higher education centers and specifically in the field of scientific research, focus on analyzing only one or some variables of the processes of knowledge management, particularly those related to the creation of knowledge and ways of transferring it, but in any type of organization and through the components of knowledge management, one can develop and analyze one's capacities and, in the case of universities, this can be done with the research projects they carry out, specifically evaluating the strengths and weaknesses of professors in the area of project management, therefore, it is logical to consider metrics of this subject when evaluating knowledge management.

PROJECT MANAGEMENT

Project management is part of a broader process that the organization, as a whole, must analyze and adapt to the strategies to be developed (Álvarez, 2016). It is necessary to note that, as pointed out by Barbosa and Moura (2013), projects allow to obtain results that go beyond the scope of management of the daily routine, therefore they should not be left to chance, especially because of their particularities, which can be summarized as follows: their results are of unique characteristics, subject to a series of operational restrictions (with a hierarchy of interdependent activities) and resources (human, material and time), their teams are multidisciplinary, the execution is affected by the uncertainty and risks associated with each activity, given the interaction with different organizational and environmental variables.

The Project Management Institute defines project management as "the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements" (2013): 5); for this purpose, a series of processes must be carried out that are linked to the knowledge areas of project management. In the case of research projects carried out from universities, the impact that they have goes beyond the particular interests of the researchers and the institution, since it extends to all of society, in addition to becoming, as Gutiérrez-Vallejo *et al* (2016) state, "a meeting point for the members of the educational community to reach agreements to work together and be aware of the power they have when they act as a team and in an organized manner."

The project management process groups, according to the Project Management Institute (2013) are:

- Initiating: includes all the activities or tasks that need to be done to turn an idea into a viable project (Ollé & Cerezuela, 2017), as well as defining and authorizing the project or a stage of it.
- Planning: covers the definition of the project's scope, as well as "the elaboration of attainable objectives, based on available resources and economic, social and cultural conditions" (Pérez, 2016: 37), as well as the course of action needed to realistically achieve them.
- Executing: is the integration of resources to carry out the management plan to satisfy its specifications, completing the deliverable of the project (Wilson, 2015), when carrying out all the work that was previously defined.
- Monitoring and Controlling: considers those activities related to monitoring and regulating the project's regular progress, to identify variations from the management plan, and initiate changes or corrective actions (Wallace, 2014: 22), if necessary, at the right time.
- Closing: processes that involve the completion of all project activities as well as the formalization of the acceptance of the product, service, or result, for which the manager in charge of the project must ensure that from the technical and legal point of view, the project has been completed (Turner, 2016).

The knowledge areas of project management summarize the tools and techniques necessary to obtain results in each process group, in addition to "defining the variables that intervene in a project and that affect the product, service or expected result" (Ugas, 2008: 78); for the Project Management Institute (2013) there are ten such areas: Integration Management, Scope Management, Time Management, Cost Management, Quality Management, Human Resources Management, Communication Management, Risk Management, Procurement Management, and Stakeholder Management; each requires, on the part of those involved in the projects, competencies related to personal knowledge, skills, and abilities. Thus:

- Integration management: "includes the processes and activities necessary to identify, define, combine, unify and coordinate" the different knowledge areas (Project Man-agement Institute, 2013: 4), to obtain the desired result.
- Scope Management: definition of the work and the fundamental requirements of the project (Torres & Torres, 2014), to ensure that all the work necessary to achieve the result as planned is included.
- Time Management: considers the processes needed to complete the activities within the stipulated time frame, by defining, sequencing,

estimating resources and dura-tion of activities, and developing the schedule (Másmela, 2014).

- Cost Management: consists of budgeting and "keeping the actual cost within ap-proved limits" (Zandhuis *et al*, 2014: 93), which also includes the processes linked to obtaining financing.
- Quality Management: to verify that the project satisfies the needs for which it was planned, fundamentally complying with what Toala *et al* (2019) call client require-ments.
- Human Resources Management: it implies the assignment of roles and responsibili-ties that allow the realization of the objectives, as well as their participation in the planning and decision making of the project (Romano & Yacuzzi, 2011).
- Communications Management: ensures that the information required by all those in-volved in a project is collected, stored, and distributed promptly and by appropriate means so that there are comfort and confidence throughout the project (Turner, 2016)
- Risk Management: is done to identify, analyze, plan, anticipate, and control re-sponses to potential risk situations, all based on conceptual ideas about how the pro-ject deliverables will be (Wilson, 2015).
- Procurement Management: includes the rental or contracting of all those goods and services required by the work team and that is "necessary for the project to evolve" (Estrada, 2015: 86).
- Stakeholder management: allows the identification of "people, groups or organizations that may affect or be affected by the project", to analyze their expectations and develop strate-gies based on their possible impact (Project Management Institute, 2013: 391).

Image 1 below presents a summary of the knowledge areas and how they are linked to the processes mentioned above.

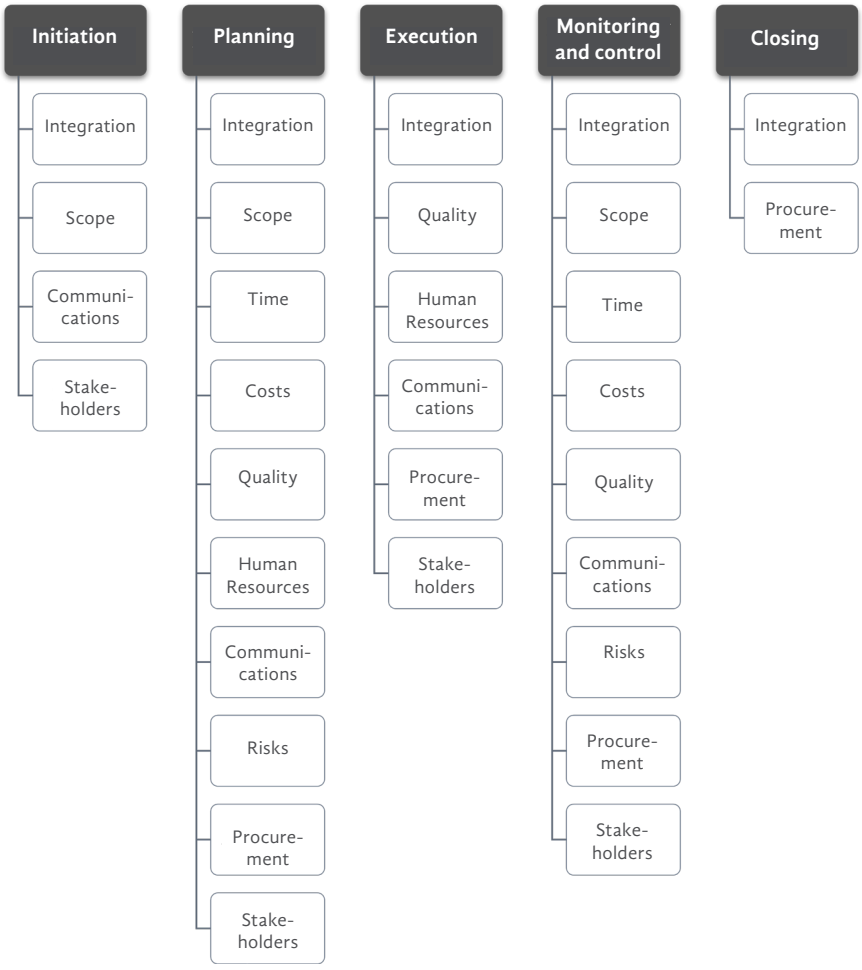

Image 1. The link between knowledge areas and project management processes.Source: adapted from Mariné and Rodríguez, 2014 (cited by Ollé & Cerezuela, 2017) and the Project Management Institute, 2013

METHODOLOGY

The present research is of a descriptive type with a non-experimental design since it was intended to describe, record, analyze and interpret "the current nature, composition or processes of the phenomena" (Rodríguez, 2005: 24), which was achieved with the general objective of determining the knowledge management carried out by the professors of the Department of Service Technology of the Simon Bolivar University Litoral Campus when considering the processes and knowledge areas for the management of the research projects they carry out. To achieve the general objective mentioned above, the following specific objectives are considered:

- Diagnose through a self-evaluation how professors manage their projects.

- Relate the information obtained with the factors that promote knowledge management.

The population under study are the professors of the referred university department, while the sample was intentionally collected to select only those professors who meet the theoretical criteria and not the statistical ones that allow for answering the research questions (Fàbregues *et al*, 2016), the sample was made up of those professors who, due to their contract, carry out research projects within the university (since some only teach within a few stipulated hours of classes).

The data collection instrument, with which the information related to the projects carried out by the professors was obtained, is a self-evaluation questionnaire proposed by Palacios (2009), in which, for each area of knowledge and each project management process, he proposes a series of questions, which are evaluated considering a weighting by scales. Later, the information collected allowed to relate the factors that promote knowledge management, through the projects carried out by the professors.

CASE STUDY

The professors of the Department of Service Technology of the Simon Bolivar University Litoral Campus who, given their contract, participated in the study to self-evaluate the management of research projects carried out, are grouped in what are called "divisions" linked to their undergraduate and postgraduate degrees, to the professionalization courses they have taken and to the subjects they teach within the institution. As can be seen in table 2, some of the teachers have methodological bases or tools that can allow them to manage projects in general, without necessarily having studied in the field, given the multidisciplinary nature of the knowledge areas that the projects require.

Table 2
Divisions of the Department of Service Technology and the professors' knowledge

Divisions	Percentage of Department Teachers per Division	Undergraduate, Postgraduate Degrees and Training Courses
Tourist and Hotel Services Division	24%	Tourism Hospitality Management Chemistry Nutrition Gastronomy Cultural and tourist heritage Marketing Economy Management Law
Customs and Commercial Services Division	33%	Economy Legal Science Customs Administration International Relations International Marketing International Business Project Management Law
Business and Transport Technologies Division	43%	Management Accounting Economy Transport Administration Human Resources Finances General Management Project Management Industrial Engineering Systems Engineering Computing Law Coaching

Source: elaboración propia, 2019

As can be seen in the table above, some teachers claim to know about project management, but there are many others who, although not specifically trained in the subject, their studies provide them with the necessary knowledge to manage at least one or several of the project management knowledge areas, which corresponds to what is reported in Chart 1, which shows the teachers' perception of the previous project management knowledge they possess.

Source: Own elaboration, 2019

To determine knowledge management, considering project management indicators, first the teachers had to make a self-evaluation about the processes they carry out and the knowledge areas linked to the projects, which was done following the questions of the questionnaire proposed by Palacios (2009), clarifying that by the time of its making, the Project Management Institute had not yet considered the Stakeholders Management as the tenth knowledge area, however, the questionnaire made included questions linked to processes that consider stakeholders, so it is relevant for this evaluation. Subsequently, the indicators derived from the self-evaluation were related to the fundamental components of knowledge management ("people", "processes", "contents" and "information and communication technologies"), to determine how professors use knowledge management through the research projects they carry out.

Next, in Table 3 it is observed how the component "people" presents weaknesses in all the processes linked to human resources, which implies that the planning of the necessary roles to fulfill the tasks and the assignment of those responsible for each activity must be improved, as well as the development and motivation of the work team and the evaluation of its performance; these weaknesses are maintained when the professor is evaluated as a manager of the projects he or she carries out, by not weighing well the work he or she carries out as an integrator of a plan that covers all knowledge areas. From these results it is necessary to emphasize that: the majority of those consulted indicated "not applicable" for their particular cases and it is congruent with the university policy that requires new professors who have not yet entered the university ranks to work on their research projects individually and, considering that most of the department's professors are in this condition, there are no staff or team members available to them when it comes to research in the early stages of their university careers, it

is also noteworthy that, despite having professional experts in management and human resources, there are significant weaknesses in these areas.

Table 3

"People" component of knowledge management linked to the project management self-assessment questionnaire

Knowledge management components	Description of knowledge management components	Questions from the self-evaluation questionnaire in project management linked to the component	Percentage of the answers indicated in the self-evaluation		Project Management Knowledge Area
People	Human resources	Organizational Planning: Roles required to adequately fulfill the different tasks identified were detected	Deficient	0,00%	Human resources
			Regular	14,29%	
			Basic	21,43%	
			Good	7,14%	
			Excellent	7,14%	
			Not applicable	50,00%	
		Recruitment of personnel: Responsible individuals with the appropriate profile for the different tasks were sought and assigned	Deficient	14,29%	Human resources
			Regular	7,14%	
			Basic	7,14%	
			Good	14,29%	
			Excellent	0,00%	
			Not applicable	57,14%	
		Team development: Improvement of the team's effectiveness through training, physical distribution, motivation, and other actions that contribute to good work	Deficient	7,14%	Human resources
			Regular	21,43%	
			Basic	0,00%	
			Good	21,43%	
			Excellent	0,00%	
			Not applicable	50,00%	
		Performance evaluation: Some kind of performance evaluation of the project participants was carried out, leading to their professional improvement	Deficient	7,14%	Human resources
			Regular	14,29%	
			Basic	7,14%	
			Good	7,14%	
			Excellent	7,14%	
			Not applicable	57,14%	
	Internalized organizational culture	Comprehensive plan: A comprehensive and coherent planwaspre-pared that considered the different areas of project management (scope, time, costs, quality, human resources, communications, risks, and procurement)	Deficient	21,43%	Integration
			Regular	28,57%	
			Basic	35,71%	
			Good	7,14%	
			Excellent	0,00%	
			Not applicable	7,14%	

Source: Own elaboration, 2019

When self-evaluating the "processes" component (see table 4), the results are similar to the previous component, since despite having teachers who are experts in topics related to the knowledge areas: scope, time, costs, quality, risks, and project integration, there are shortcomings that affect the context in which knowledge management takes place, by underestimating the probability of occurrence of risks, as well as the impact and design of a plan of response to them; also, the organization's strategic planning is affected, since as managers of the projects they carry out, a global plan that groups the execution of all activities in all processes and areas is not considered. The same happens when considering the methodologies and organizational routines carried out since it became evident that there is no system to manage changes correctly and on time; costs have not always been controlled (possibly due to the hyperinflationary context of the country, which distorts them and makes budgets out of date in hours, even if they are made in foreign currency), no indicators or corrective actions were considered given their results to maintain the requirements of the projects; the same happened in the case of risks to which there was no accurate control of responses, nor for changes that affected the projects. Special mention in this topic is made of the verification of the scope to monitor that the activities contemplated in the plan were being fulfilled, as well as the definition of these, which globally had shortcomings, although almost half of the professors stated that they carried out a "good" self-qualified management for them.

The situation is no different when evaluating the knowledge associated with each area since most of the time no economic and social feasibility studies of the projects were carried out, nor was a clear schedule built and controlled in terms of dates of completion of the activities, nor were methodologies applied to carry out corrective actions in terms of changes in the schedules; in terms of costs, a coherent budget adapted to the schedule was not created, nor was there, in many cases, adequate management of the cash inflows and outflows generated by the projects; furthermore, there was a lack of clear specifications for quality, which is reflected in the lack of planning and the absence of indicators to measure the final results, according to the projected specifications.

Table 4

"Processes" component of knowledge management linked to the project management self-assessment questionnaire

Knowledge management components	Description of knowledge management components	Questions from the self-evaluation questionnaire in project management linked to the component	Percentage of the answers indicated in the self-evaluation		Project Management Knowledge Area
Processes	The context in which knowledge management takes place	Rating: The probability of occurrence of the detected risk events and their impact or effect was evaluated	Deficient	35,71%	Risks
			Regular	28,57%	
			Basic	0,00%	
			Good	7,14%	
			Excellent	0,00%	
			Not applicable	28,57%	
		Response plan: Response plans were designed to anticipate risks, either to mitigate or absorb the risk	Deficient	35,71%	Risks
			Regular	21,43%	
			Basic	7,14%	
			Good	7,14%	
			Excellent	0,00%	
			Not applicable	28,57%	
	Vision and mission of the organization. Business strategies	Global execution: The main elements of the plan were considered in the execution of the activities and were managed as a whole	Deficient	28,57%	Integration
			Regular	28,57%	
			Basic	28,57%	
			Good	7,14%	
			Excellent	0,00%	
			Not applicable	7,14%	
	Methodology and organizational routines that people carry out	Scope verification: It was checked at the same time the project was implemented and the activities contemplated were being carried out	Deficient	7,14%	Scope
			Regular	14,29%	
			Basic	28,57%	
			Good	42,86%	
			Excellent	7,14%	
			Not applicable	0,00%	
		Scope control: A system was employed to manage scope changes correctly, taking corrective action	Deficient	14,29%	Scope
			Regular	50,00%	
			Basic	14,29%	
			Good	14,29%	
			Excellent	7,14%	
			Not applicable	0,00%	
		Description of activities: Actions that resulted in specific products were correctly delimited	Deficient	14,29%	Time
			Regular	7,14%	
			Basic	28,57%	
			Good	42,86%	
			Excellent	7,14%	
			Not applicable	0,00%	

Processes	Organizational methodologies and routines that people carry out	Costs control: The budget was controlled by taking corrective action when changes in the budget arose	Deficient	28,57%	Costs
			Regular	21,43%	
			Basic	7,14%	
			Good	14,29%	
			Excellent	7,14%	
			Not applicable	21,43%	
		Quality control: Indicators were measured and corrective actions were taken when deviations were detected	Deficient	35,71%	Quality
			Regular	14,29%	
			Basic	21,43%	
			Good	21,43%	
			Excellent	0,00%	
			Not applicable	7,14%	
		Responses control: Periodic risk reviews were made, verifying possible risks and activating contingencies	Deficient	42,86%	Risks
			Regular	14,29%	
			Basic	7,14%	
			Good	7,14%	
			Excellent	0,00%	
			Not applicable	28,57%	
		Global control: The changes and their effects on each area of the project were managed integrally, reviewing the varia-tions and their repercussions	Deficient	28,57%	Integration
			Regular	21,43%	
			Basic	35,71%	
			Good	7,14%	
			Excellent	0,00%	
			Not applicable	7,14%	
	Knowledge related to each field	Initiation: The project was formulated and economically evaluated or its social impact was determined to decide on its implementation, with a descrip-tion of the project indicating its relevance and the desired products	Deficient	42,86%	Scope
			Regular	14,29%	
			Basic	42,86%	
			Good	0,00%	
			Excellent	0,00%	
			Not applicable	0,00%	
		Activities programming: A coherent schedule was con-structed to allow us to see when the activities would be done	Deficient	7,14%	Time
			Regular	14,29%	
			Basic	35,71%	
			Good	35,71%	
			Excellent	7,14%	
			Not applicable	0,00%	
		Schedule control: A methodol-ogy was applied to measure deviations from the progress of the work and its possible cor-rections	Deficient	28,57%	Time
			Regular	28,57%	
			Basic	28,57%	
			Good	7,14%	
			Excellent	0,00%	
			Not applicable	7,14%	

Processes	Knowledge related to each field	Budget: A coherent budget was created to adjust the various estimated costs to the sched-uled dates	Deficient	21,43%	Costs
			Regular	14,29%	
			Basic	28,57%	
			Good	14,29%	
			Excellent	0,00%	
			Not applicable	21,43%	
		Treasury management: The incoming and outgoing money in the project was properly managed	Deficient	35,71%	Costs
			Regular	14,29%	
			Basic	0,00%	
			Good	21,43%	
			Excellent	7,14%	
			Not applicable	21,43%	
		Quality planning: The results to be offered by the final prod-ucts with management indica-tors were specified	Deficient	28,57%	Quality
			Regular	14,29%	
			Basic	14,29%	
			Good	28,57%	
			Excellent	0,00%	
			Not applicable	14,29%	

Source: Own elaboration, 2019

As shown in Table 5, when it was time to self-evaluate the "contents" component, the results improve in some aspects compared to previous components, particularly if we talk about information collected, for example, in plans and definition of the scope, for which methodologies were used to identify activities and those involved, as well as to sequence and determine priorities of activities to be carried out. The rest of the self-evaluation was consistent with previous results since the failures remain when estimating the duration of activities together with those involved in them, planning resources and estimating their costs, as well as for the identification of the risks associated with them and the needs that must be covered by purchases that must be reflected in a requirements plan, as well as the choice of the most appropriate suppliers. If we consider the controlled documentary languages that are supported through specific formats such as the purchase plan with the required contracts and the closing of these, the result of the self-evaluation does not consider effective management of these processes either.

Table 5

"Contents" component of knowledge management linked to the project management self-assessment questionnaire

Knowledge management components	Description of knowledge management components	Questions from the self-evaluation questionnaire in project management linked to the component	Percentage of the answers indicated in the self-evaluation		Project Management Knowledge Area
Contents	Internal and external information that is gathered in documents, database, or people	Scope planning: A methodology was used to define the scope of the project considering different stakeholders, users, clients, and interested in the results	Deficient	21,43%	Scope
			Regular	21,43%	
			Basic	0,00%	
			Good	57,14%	
			Excellent	0,00%	
			Not applicable	0,00%	
		Scope definition: Each activity of the project was identified so that it could delimit the scope of the project	Deficient	7,14%	Scope
			Regular	21,43%	
			Basic	14,29%	
			Good	50,00%	
			Excellent	7,14%	
			Not applicable	0,00%	
		Sequencing: Priorities between activities were identified, developing a network that allowed them to be properly sequenced	Deficient	7,14%	Time
			Regular	21,43%	
			Basic	21,43%	
			Good	50,00%	
			Excellent	0,00%	
			Not applicable	0,00%	
		The estimate of durations: Some criteria were used to assign execution times in con-sultation with those involved	Deficient	14,29%	Time
			Regular	21,43%	
			Basic	42,86%	
			Good	14,29%	
			Excellent	7,14%	
			Not applicable	0,00%	
		Resource Planning: A plan was developed to identify the re-sources required to do the activities	Deficient	21,43%	Costs
			Regular	7,14%	
			Basic	28,57%	
			Good	28,57%	
			Excellent	0,00%	
			Not applicable	14,29%	
		Estimated costs: Cost esti-mates were prepared using consistent information and estimation methods	Deficient	14,29%	Costs
			Regular	14,29%	
			Basic	28,57%	
			Good	21,43%	
			Excellent	0,00%	
			Not applicable	21,43%	

Contents	Internal and external information that is gathered in documents, database, or people	Identification of risks: It was determined that risky events can affect the effectiveness of the project, using checklists, brainstorms, etc.	Deficient	21,43%	Risks
			Regular	42,86%	
			Basic	0,00%	
			Good	14,29%	
			Excellent	0,00%	
			Not applicable	21,43%	
		Requirements plan: How pur-chases would be made was designed according to the needs detected	Deficient	21,43%	Acquisitions
			Regular	7,14%	
			Basic	28,57%	
			Good	28,57%	
			Excellent	0,00%	
			Not applicable	14,29%	
		Application cycle: A good process was made, looking for suppliers, obtaining offers, and choosing the most suitable one	Deficient	14,29%	Acquisitions
			Regular	7,14%	
			Basic	28,57%	
			Good	28,57%	
			Excellent	0,00%	
			Not applicable	21,43%	
	Controlled documentary languages	Purchasing plan: A pur-chasing plan was created to identify the materials or sub-contracts required to make the projects	Deficient	21,43%	Acquisitions
			Regular	7,14%	
			Basic	28,57%	
			Good	21,43%	
			Excellent	0,00%	
			Not applicable	21,43%	
	Supports and presentation formats (docu-ments, yellow pages, lessons learned	Closing of contracts: The closure of the contracts awarded and the accountability of these contracts were properly carried out	Deficient	35,71%	Acquisitions
			Regular	21,43%	
			Basic	7,14%	
			Good	14,29%	
			Excellent	0,00%	
				21,43%	

Source: Own elaboration, 2019

The evaluated means of collecting, storing, and distributing data, information, and knowledge (presented in table 6), show that the self-evaluated processes with the best weights correspond to the management of communications, particularly at the time of planning, identifying information needs, and when periodic reports on project progress should have been made to those involved. The rest of the processes linked to this component had concentrated responses among deficient, regular, and basic results, affecting quality assurance and compliance with specifications, follow-up of contracts and communications, but this time in the processes related to the timely and optimal distribution of information, as well as the collection of lessons learned at the project closure.

Table 6

"Information and Communication Technologies" component of knowledge management linked to the project management self-assessment questionnaire

Knowledge management components	Description of knowledge management components	Questions from the self-evaluation questionnaire in project management linked to the component	Percentage of the answers indicated in the self-evaluation		Project Management Knowledge Area
Information and Communication Technologies (ICT)	Means to gather, store, and distribute data, information, and explicit and tacit knowledge	Quality assurance: A quality system was used to ensure proper compliance with speci-fications	Deficient	28,57%	Quality
			Regular	14,29%	
			Basic	50,00%	
			Good	7,14%	
			Excellent	0,00%	
			Not applicable	0,00%	
		Communication planning: Stakeholders' information needs were identified	Deficient	7,14%	Communica-tions
			Regular	21,43%	
			Basic	7,14%	
			Good	35,71%	
			Excellent	7,14%	
			Not applicable	21,43%	
		Distribution of information: Team members were well in-formed, knowing where or how to get the data they needed	Deficient	7,14%	Communica-tions
			Regular	21,43%	
			Basic	7,14%	
			Good	14,29%	
			Excellent	7,14%	
			Not applicable	42,86%	
		Progress reports: Periodic reports and meetings were held to keep the various stakeholders informed	Deficient	21,43%	Communica-tions
			Regular	14,29%	
			Basic	14,29%	
			Good	14,29%	
			Excellent	7,14%	
			Not applicable	28,57%	
		Administrative closing: A final closing was carried out that allowed collecting in a system of informa-tion management the main learnings of the project	Deficient	21,43%	Communica-tions
			Regular	21,43%	
			Basic	7,14%	
			Good	14,29%	
			Excellent	14,29%	
			Not applicable	21,43%	
	Alignment with the strategy and needs of the organization, especially those required when studying the other three components	Contract administration: An efficient work in the manage-ment and inspection of the contracts was carried out, with some system to follow up	Deficient	21,43%	Acquisitions
			Regular	21,43%	
			Basic	28,57%	
			Good	0,00%	
			Excellent	0,00%	
			Not applicable	28,57%	

Source: Own elaboration, 2019

CONCLUSION

It is increasingly recognized the importance, for any organization, to consider the processes and components that lead to optimal knowledge management as key success factors, because it is an organizational strategic element, even more so in universities, whose ultimate goal is the creation and dissemination of knowledge, and the impact of the activities and projects carried out have influence at local, national and even international levels. However, if an organization has not been aware of the need and importance of this, either because of temporary problems, such as the country's situation that prioritizes other types of management, which give weight to urgent actions over those planned or if the so-called stumbling blocks of the researcher are added, it ends up affecting one of the pillars of the teaching career within universities; this affects the processes to not be optimized, therefore, the objectives are not achieved and the results do not have the desired impact or scope.

To correct and improve the management of projects or knowledge, it is necessary to first identify what is being done and how it is being done, to detect faults, which will then allow the necessary corrective actions to be taken. As was seen in the case study, failures in project management could be linked to knowledge management, by evaluating the impact that some facilitating and inhibiting factors currently have on management in the institution, which are linked to the actions and processes of projects carried out by professors and at the institutional level, the information they handle and the format in which they collect and share it through information and communication technologies.

If the component "people" is analyzed, it is notorious that currently, the teaching staff that participates in the research projects of the studied department does not adequately manage the project's processes related to human resources, neglecting until now the assignment of roles and responsibilities, the development of work teams and the necessary feedback, which can also be observed with the integration management when considering each teacher as a manager of the projects he or she carries out. The situation is similar when the "processes" component is self-evaluated, since the weaknesses manifested in the study, to generate knowledge, are linked to the management of the project management areas of scope, time, costs, quality, risks, and integration, thus, professors of the department have problems verifying the scope, they lack systems or methodologies for change management as well as management indicators, they do not verify the full compliance of the plan, activities, schedules, costs, and budgets, they neglected corrective actions designed to maintain project requirements, failed to evaluate economic and social feasibility, they underestimated risks when identifying them and designing a plan to respond to them, and as project managers,

there was no overall vision that linked organizational strategic planning with all processes and areas of project management, nor was the impact of changes within the project as a whole assessed.

In the case of the "contents" component, professors stated that they plan projects and define the scope as a means to collect information, they also indicated that they use methodologies to identify, sequence, and prioritize activities and stakeholders; failures occur when they have to estimate the duration of activities, plan resources, estimate costs, identify risks, plan purchases that cover all needs, choose suppliers and manage contracts.

When the "information and communication technologies" component is considered, there is a better self-evaluation in the processes that allow to identify information needs and periodically report the progress to those involved, however, there are results that compromise quality assurance and compliance with specifications (and therefore the final result of the projects); nor do they follow up on contracts, or the timely and optimal distribution of information so that all those involved are notified of progress and results, and they do not collect the lessons learned at the end of the projects, so there is nobody of knowledge available to the university community.

It is necessary to clarify that at no time does this research have the purpose of distorting the work carried out by the professors of the department, to which the researcher precisely belongs to. Furthermore, it should be pointed out that the control system required by the Dean's Office and the Research Coordinators by areas of study of the Simon Bolivar University, requires the delivery of results to justify the money invested, as well as to renew the professors' contracts, so it was verified that the projects in their great majority fulfilled the objectives for which they were proposed; with this work it is evident that a) many professors intuitively carried out the required processes, and b) there is a need for training in project management, so it is ideal that within the current budgetary restrictions, the university supports the professors by providing the necessary training and promoting an organizational culture with dynamic and multidisciplinary processes, supported by optimal management, forming a common body of knowledge that covers the entire university community and that reinforces the motivation of teachers by various means so that they achieve professional recognition as academics and with quality results that impact positively on society as a whole. It is necessary to clarify that this situation may be similar in other university contexts, so similar research is encouraged in the rest of the institution and other universities.

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