Decision-making in the forum of distance Master of Project Management

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Abstract. Project management requires the mastery of documentation for decision-making in project management. Lack of knowledge and inexperience in decision-making affects the project quality. Developing a system based on ICT in remote education systems, and knowledge management, it enables more efficient training of specialists, in order to get results in less time, within budget and with the quality required by stakeholders. The research aims to develop a procedure for decision-making through a discussion forum, using ICT and project cuts. That project cuts reflects the status of the indicators and enable search for the causes of the damages on tasks, identify the effect on the project and analyze the damages and synthesis in an integrated process. It also enables navigation and simulation of possible solutions, select the best and proceed to decision-making. Research show the indicators for decision-making, navigation, simulation, evaluation and forum example of the Master of Project Management.

Keywords: Decision-Making, Distance Education, Project Management

1 Introduction

For organizations that guide production targets towards project management, proper application of knowledge, processes, techniques, skills and tools has a significant impact on their success. Business system needs a management process that allows you

to organize projects, control and direct. This is done in order to shorten time, within the established budget and with the quality required by the customer and stakeholders. It aims to establish an effective decision-making supported by tools. Continually needs generalization of management systems applied to projects, construction, maintenance, investment, research, advocacy and increase the teaching process,

Integration in the context of project management is to make decisions about where to focus resources and efforts every day, anticipating potential controversy so that they can be treated before they become critical [1]. To achieve the success of the project is necessary to develop a team management work where the director's role as a leader is decisive for cuts evaluating a set of indicators. These indicators should cover key knowledge areas of project management: scope, cost, time, quality, logistics and human resources [2].

Among skills that a person should have to management projects, is undoubtedly the combination of defining problems, identifying alternatives and decision-making; all with the goal of supporting the strategic objectives of the organization [3]. One option to support people during the process of implementation and monitoring of a project is the use of IT tools; these to clarify the current situation and propose specific alternatives for solving the problem. This is thanks to IT tools to support decision-making, which are founded on clear and measurable indicators. In recent decades they have been developed numerous tools for project management [4-11].

The current stage of development of the Integrated Project Management (IPM) allows use of Information Technology and Communication (ICT) throughout the life cycle of the project, from conception, design, implementation and project closure [12]. That is why the present research is intended to identify key moments where it is necessary to define the decision-making within the framework of the subproject, the conditions for it and the quality of this process, supported by the use of IT tools to ensure effective decision-making in the courts of projects.

Decision-making is defined as selecting an alternative among a set of solutions to a problem, based on the evaluation of a set of weighted indicators that identify the causes of the problem. However, the decision is part of a process in which it is just one step and its quality depends on the level of information to provide the system to solve the problem. The need to make strategic decisions on project teams should not be entirely limited by distance. Today, ICTs make disappear the obligation to coincide in time and space to members of a team.

Installation of technological infrastructure refers to investment in acquiring and operating the telematics system resources. The information system allows instant communication and interpersonal distance between groups or between a person and a documentation center. And the exchange of information of all kinds: graphic, spoken, document and process simultaneously transmitted and documentation centers access through the links established.

Team members should be trained to develop technological skills, know how to plan and conduct remote meetings [13]. It is very important to use basic technologies such as cell phones, video conferencing, corporate e-mail, commercial e-mails, instant messaging, application sharing documents, internet, smartphones, cloud computing, Wi-Fi, internet devices mobile and other auxiliary equipment [14].

Networking, keep people informed and request data from team members will always be an integral part of the job of a leader of a project team. These leaders will

spend more time and effort creating networks across geographic and organizational boundaries of the team.

2 The Master of Project Management

The content of the class of Cost and Procurement Management, is aimed at the basic and fundamental concepts with a theoretical basis for the subject, which allows the student during the development of evaluations and designed tasks, master the basic knowledge, which encourages seek continuity in-depth study in complementary materials, developing research and innovation. The development of the basic content of the tasks must achieve pass the subject, improving the evaluation will be as long as the student develops its research capabilities to provide intelligent answers with good participation in organized forums.

The proposed method is applied in a project management platform (GESPRO) [15]. This tool is a generic and adaptable software ecosystem, capable of assisting users in project management of any type of organization. The proposed method and GESPRO are aligned with PMBOK [2] and CMMI [1] standards, providing the appropriate interfaces for users to introduce the information to the system, according to the needs and maturity levels specific to the organization.

2.1 Project Management Forum

The forum needs a content design, from the cut of a project where problems related supplies and its impact on the cost, time required, quality and human resources through the indicators presented board command that feeds the Balanced Scorecard and the selection of five students with their participation roles. The forum used on the platform of the National Center for Distance Education (CENED).

Virtual team members must have technological skills, among which is:
1. Knowing the ground rules for classroom use CENED and GESPRO.
2. Knowing how to use the classroom CENED and GESPRO to communicate, coordinate and collaborate, given the tasks or share experiences among other members of the team or class group through forums or chat.
3. Learn basic technology such as videoconferencing and chat rooms.

2.2 Dashboard and Balanced Scorecard

The dashboard gives students the status of indicators in cutting project and lets you search for the causes that affect indicators through the navigation system project management. The main indicators used are: Performance Index Performance (IRE) Performance Index planning (IRP) Performance Index Cost (IRC), Performance Index of effectiveness (IREF), Performance Index human resources (IRRH) performance Index logistics (IRL), data quality index (ICD) [15]. Figure 1 shows the report in a section of the indicators evaluated allowing comprehensive assessment of the tasks

and the project, according to the weights primarily defined in the IRP and IRC, defined in the GESPRO Procedural Manual.

Fig. 1. Dashboard on a project cut in the GESPRO tool.

Systematic updating of the result of the cuts in the database of IPM, the indicators reflected in the dashboard, allows managers of the organization evaluate the performance of the project indicators, identify trends and diagnosis develop strategic from making forecasts, with the purpose of making decisions in the courts, with the validation of the functional structure of the organization projections.

Using the Balanced Scorecard is widespread in the literature and conceptually provides an updated status about the indicators on a cut of a set of projects according to priority information. The Balanced Scorecard powered by assessments dashboard of projects in cuts and other indicators of the organization, can diagnose the state of the organization, in order to take appropriate strategic decisions.

The method of weighted interval allows the assessment of a fund of shared resources, a program, a faculty and a department among other organizations projects, from the use of indicators in assessments cuts of projects and priorities, to proceed to decision-making within the organization, considering the prospects designed for the Balanced Scorecard, where project evaluations have an important role in strategic decisions integrals of the organization.

When it comes to making adjustments from the solutions in the courts, damages arise in the system that generate other conflicts. The setting is propagated in the system affecting chain processes and tasks based on structured sequence execution. In these cases, we proceed to simulate the system for new conflicts and their damages Naturally, conflicts arise in post-dates the court date, so that preventive factor is of great importance for achieving finding solutions to conflicts before they occur. In the

shared resource, the setting of a project may affect others and therefore it is necessary to simulate them to identify conflicts and proceed to solve them.

2.3 Simulations and Alternatives

The simulation, navigation and seamless integration process allows the analysis of variants of resource allocation, construction sequences, safety, assemblies and other forms of preparation of the executive project for assessing the changes in resource allocation, increased cost and time.

It is how to identify project problems before implementation, evaluate specialized systems such as energy, climate, thermal conductivity, ventilation, audio, intelligent systems, green areas and orientations among others. It is a term that can give rein to the imagination and creativity of the project team and analyze solutions before risks arise, the environmental conditions and problems listed in the database of completed projects as development of good practices. It allows evaluating several solutions where cost, time, quality, logistics and resource generate variants to select the best.

In conflict resolution where it is not possible balance of resources for its unavailability, hiring the same with the possible increase in cost compared to the cost of the project affected by time increment it is evaluated. Cost analysis provides a possible solution in the majority of cases and is an issue to be solved by students in the forum to discuss possible solutions.

Distribution curves of key resources shared by project management, can quickly identify conflicts and perspectival highlighted in red, indicating a necessary resource allocation or balance the capacity to resolve the conflict. Sometimes it is preferable to reduce earnings under hiring resources with increased cost to lose credibility and image in the market environment for failing to meet the time requirements of the customer. System provides all necessary information to make the best decision in each case, by applying appropriate with help of technical tools. Win guarantees customer in project ensures business in the process operating in the after-sales service.

2.4 Interactive Simulation Process

It is the procedure that the teacher uses to develop students selected stimulation forum to find solutions to the problem identified in the schedule. It is a process that stimulates creativity student looking for a variety of possible solutions. These may be specific or comprehensive. See Figure 2.

The interactive manual process simulation to stimulate knowledge, allows developing students creativity in generating possible solutions to the problem, in order to select the best and proceed to decision-making. It is the process in which the information provided by the system through the navigation to make it knowledge in the process of decision-making is analyzed.

The combination of the application process combined with the causal analysis and synthesis, manages the creation of alternatives, as possible sources for decision-making. Shares of solutions, are reflected as possible outcomes of variants, offering the effects on indicators of cost, time and quality, so as to achieve robust solutions for

decision-making, both for the next cut, as strategic aligned to project results and the mission of the organization.
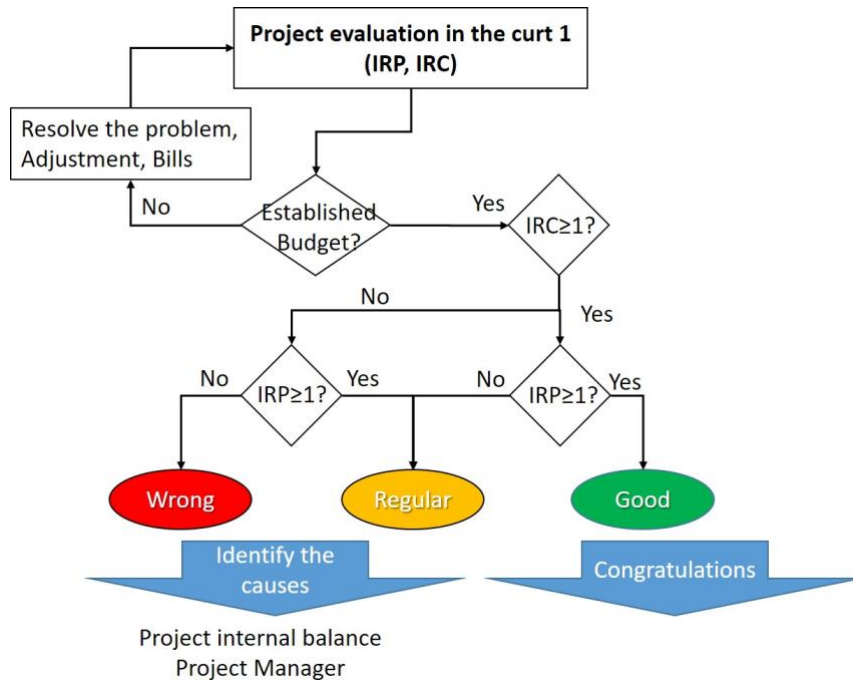
Fig. 2. Project evaluation. Use of accounting in decision-making.

In the project evaluation, the basic indicators to assess are IRP and IRC that from the affected indices and variables, it is possible to develop a strategy for finding the causes that affect indicators to evaluate the impact on the project.

2.5 Decision-making in project control

Decision-making requires good identification of the causes reflected in the cut, the impact on project analysis and study simulating through navigation, evaluating cause and effect, for a process of analysis and synthesis proceed to integrate the effects, evaluate possible solutions and proceed to decision-making.

Decision-making is present in all phases of the project, from conception to feasibility analysis, through planning, implementation and project closure process. Decision-making requires an analysis of the simulated system to detect potential induced conflicts and their causes. Sometimes it is important to have enough for the characterization of conflicts time, but Delinquent decisions may induce other conflicts. Moreover, decisions lack of information, do not correspond to the solution requiring the conflict. In each case it is necessary to clarify what is required and

proceed according to their characteristics. This is part of the experience of the project manager in decision-making.

It is preferable to study and try to solve the next conflict will be presented in the product draft decision, to be entangled with the problems of low priorities that have not been resolved at the present time. Diagnostic processes, simulation and forecasting, contribute to the implementation of strategic management techniques. The trend of indicators in the behavior provides information for decision-making. Improper trend requires deeper causes for decision-making.

2.6 Slacks use in decision-making

The systemic approach and optimization of time, a logical strategy work, technological and resource dependencies allow you to define a critical path maximum time, which defines the duration of the project and other roads less time than have certain clearances. The use of techniques of operations research applied to the calculation of the graph, allow you to define the critical path, total, free and interference gaps, providing the ability to characterize the conflict in accordance with the clearances of tasks to proceed in decision-making. If the requirement of time needed to resolve the conflict is greater than the total float, conflict resolution is more important than another in which the gap can take time requirement.

In conflicts with requirements exceeding the availability of slack time, you need to evaluate what is more convenient, if you assign the resource required or let the project fall behind the schedule. This same conflict can occur in the critical tasks, which have free play and clearances interference. Decisions to allocate resources or do not involve a cost and requires an analysis of alternatives which costs almost always play the key role in decision-making. In other cases, it is necessary to sacrifice part of the profits based on customer satisfaction and maintain the image and competitiveness of the company.

When conflict occurs in a critical task direct involvement with the project, it is necessary to quantify the economic amount needed for the job and compare the economic impact of project delays and these elements make the appropriate decision.

When conflict is a task with ease, it is necessary affectation and compare it to the total float, free and interference. Sometimes it is necessary to balance internal resources, balance the capacity or an external resource allocation time dependence of affectation and slacks.

In the balance of resources, it is necessary to determine where conflicts represented in the curve for resource red zones is, split the screen and in the bar chart to identify tasks that cause conflict with the objective of evaluating the criteria and select tasks will be moved or divided. Balances capacity are executed following this logic.

In conflicts with requirements exceeding the availability of slack time, you need to evaluate what is more convenient, if you assign the resource required or let the project fall behind the difference in the time allotted.

In all cases, the need for information for conflict resolution is very wide and varied depending on their characteristics. Integration at enterprise level by taking the project as a basis and support of ICT, sharing information and make better use in terms of decision-making to resolve conflicts.

2.7 Knowledge management in decision-making

In all threads exist a set of valid concepts for decision-making, which develop below. It constitutes an important support database of completed projects in which past experiences are reflected in the project execution as shown in Figure 3. It is possible through a search engine to find information related to the problem or situation analysis, evaluate solutions offered previously and based on them, proceed to decision-making in the current "conflict" if time he allows it. At the conclusion of the project, it is saved in the database and this in turn contributes to the knowledge management system project.
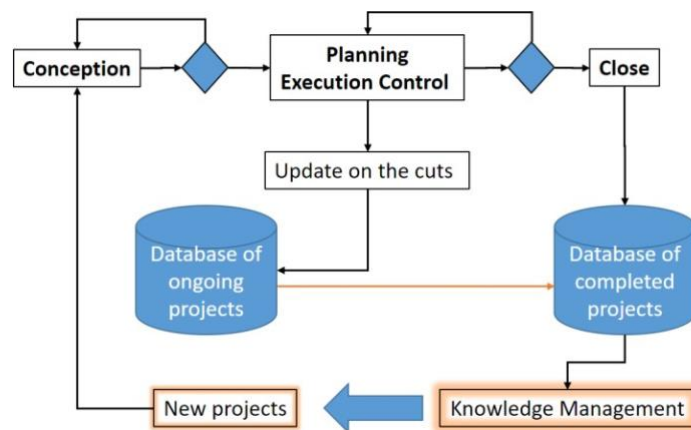

Fig. 3. Database of completed projects.

2.8 Design and development forum

Distance Education offers multiple alternatives for evaluating a target from integrated a group of student and asynchronous forum facilitates participation this participation an important issue such as the analysis of alternatives simulated for the purpose of action to choose the best to proceed to decision-making.

    Title: Decision-making in the execution control process.
    Objective: Develop student skills in decision-making.
    Previous Knowledge: Lesson 3 about the Cost and Procurement Management.
    Preparation: Schedule in GESPRO with a cut and indicators as shown in Figure 1.
1. Selection of five students and assign their roles.
2. Description of court by the teacher, specifying the value of the indicators.
3. Problem identification by the student selected as project manager.
4. Proposed solution to the problem. Navigation in search of contract, causes, effects.
5. What if? Setting variables and effect indicators.
6. Participation of the rest persons, evaluating the solution, innovation, creativity.

7. Rotation of roles. Other solutions to the same problem. Criteria and intelligent opinions.
8. Evaluation of possible solutions priorities. Simulation.
9. Analysis of alternatives and integration variables. Analysis and synthesis.
10. Selecting the best solution.
11. Run the solution in the schedule. Keep record. Agreements. Status report.
12. Evaluate recording the forum. Evaluate students.

2.9 Assessment system Students

The development of the forum allows you to select five actors and develop the process exchanging their roles and from the responses of each, the opinions of a student on resolving the other, the question of an actor to another, the teacher's questions and evaluation recording by the teacher, we proceed to perform customized assessment for publication on the system platform. The evaluation of the solutions in a number of projects through the use of fund shares is a pending development issue in the discussion forum.

3 Conclusions

In the content of research developing a procedure for decision-making is developed from a set of solutions to problems that arise in the courts of the projects through a discussion forum distance, applying the ICT and information provided by GESPRO.

The procedure allows to develop the knowledge, skills and competencies needed to develop decision-making in project management, with solutions and greater efficiency, applying analysis and synthesis, simulating the possible solutions to select the best and proceed to decision-making in an integrated with the participation of a group of students with different roles, they receive depending on the quality of their participation in the forum evaluation process.

It is necessary to strike a balance between management techniques, the increasing level of capacity of human potential and high-tech resources used in the execution of projects, to make decisions with the rigor and effectiveness requires project management. An inopportune decision puts at risk the work of a group of specialists uses high value resources, jeopardizing project success.

Developing a system based on ICT in education systems remote procedure forums, simulation and knowledge management enables better training of specialists with more efficiency and less time in order to get the results in planned, within budget and with the quality required by the customer and stakeholders term.

Databases of ongoing and completed projects in GESPRO tool, with good use of indicators, allow to develop the simulation of possible solutions, in order to select the best in the development of decision-making. The procedure applying knowledge management and continuous improvement, can be implemented in the most advanced IPM processes such as Building Information Modeling on a project program.

References

1. Software Engineering Institute: CMMI para Desarrollo, Versión 1.3. Mejora de los procesos para el desarrollo de mejores productos y servicios. Technical Report, Software Engineering Institute, EE.UU. (2010)
2. PMI: A Guide to the Project Management Body of Knowledge. PMBOK® Guide, vol. 6th Edition. Project Management Institute, Pennsylvania, EE.UU. (2017)
3. ISO: ISO 21500:2012 Guidance on Project Management. International Organization for Standardization (2012)
4. Stang, D. B.: IT Project & Portfolio Management Magic Quadrant. Stanford: Gartner Inc., (2013)
5. Zandhuis, A., Stellingwerf, R.: ISO21500: Guidance on project management - A Pocket Guide. Van Haren Publishing (2013)
6. Bath, M.: Project Classification Using Soft Computing. ACT. International Conference on Advances in Computing, Control & Telecommunication Technologies, pp. 537-539 (2010)
7. Gao, H.: A fuzzy-ANP approach to project management performance evaluation indices system. International Conference on Logistics Systems and Intelligent Management, IEEE, pp. 273-277 (2010)
8. Certa, A., Enea, M., Giallanza, A.: A synthetic measure for the assessment of the project performance. Business Performance Measurement and Management. Berlin: Springer-Verlag, pp. 167-180 (2010)
9. Liu, Y., et al.: Research on Evaluation of Project Management Maturity Model Based on BP Neural Network. Advances in information Sciences and Service Sciences (AISS), 5(2), 693-701 (2013)
10. Govindarajan, A.: A Novel Framework for Evaluating the Software Project Management Efficiency - An Artificial Intelligence Approach. TELKOMNIKA Indonesian Journal of Electrical Engineering, 12(9), 7054-7058 (2014)
11. Kelemen, A., Liang, Y., Franklin, S.: A comparative study of different machine learning approaches for decision making. Recent Advances in Simulation, Computational Methods and Soft Computing, pp. 181-186 (2002)
12. Delgado, R.: La Dirección Integrada de Proyecto como Centro del Sistema de Control de Gestión en el Ministerio del Poder Popular para la Comunicación y la Información, CENDA, Caracas, Venezuela (2011)
13. García J.: Evolución histórico-social y cultura organizacional del sistema nacional de institutos tecnológicos en México. Revista Iberoamericana de Educación, No. 35/7. Disponible en: http://www.rieoei.org/deloslectores/926Garcia.pdf (2005)
14. Cooperberg A. F.: Las herramientas que facilitan la comunicación y el proceso de enseñanza-aprendizaje en los entornos de educación a distancia. RED. Revista de Educación a Distancia. Disponible en: http://www.redalyc.org/articulo.oa?id=54700302 (2002)
15. Lugo, J. A.: Modelo para el control de la ejecución de proyectos basado en soft computing. PhD Thesis. Universidad de las Ciencias Informáticas, Cuba (2016)