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SIMACoop: a Framework Application for the Governance of University Cooperation

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ABSTRACT

The management of the cooperation is the process of establishing and ensuring the continuation of constructive and productive relations, consistent with partners. It requires the allocation of time and resources needed to maintain the existing partnership and communicate regularly with partners, and to enable all parties to track the functioning of the partnership. Management system applies to all categories of partners with universities, which include governments, international funders, local authorities, chambers of Commerce and Industry, consulates and embassies, etc. The areas of partnership with universities include academic and research fields but also institutions management to contribute to community service, implement joint projects, provides common services, share and exchange information, implementation joint activities, etc.

For a good piloting of the cooperation, an information system becomes an obligatory requisite to manage better partnerships, to evaluate the research performance and to establish a sound policy for the development of the institution relationship.

Based on the use of an effective application developed by aAbdelmalek Essaâdi University (UAE) team, SIMAcoop is a monitoring system aimed at supporting the governments and universities plan of cooperation, partnership and students exchange programs. The objective of SIMAcoop is to enhance communication, collaboration and integration among universities and their partners, to improve in performance management, strategic planning, and monitoring and evaluation by leveraging the use of spatial data. This emphasis on flexibility to align to national priorities will strengthen mainstream data collection and analysis procedures and, therefore, improve the quality of data reported top management of institutions.

1 Introduction

What any higher education institution can do alone is very limited if not accompanied by partnership relations with external parties who are able to provide support and expertise and advice to the first party. The governments and International funders goal is to support people who will create intellectual property and clusters of high-tech consortium. A great academic and research university is not a sufficient condition for creating such a cluster. It can't do it without cooperating with more great universities and

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socioeconomic organism at national and international level. For this reason, all the higher education institution attaches crucial importance to the theme of partnership and the establishment of strategic partnerships that will contribute to facilitate the work of the university and enable it to achieve its mission [1].

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For a good piloting of the cooperation, an information system becomes an obligatory requisite to manage better partnerships, to evaluate the research performance and to establish a sound policy for the development of the institution relationship[2].

The needs of universities at this level are very important. Such a system of steering the cooperation should allow to detect the stronger points in the cooperation to overcome the own weaknesses, reduce costs, profit from the exchange of experiences, skills and competencies and raise the level of efficiency and productivity[3]. Thisinformation system must also facilitate the process of managing partnerships signed between the university and between various kinds of partners. It should permit to track the implementation of partnerships signed provisions and the extent to which each party is abided to its obligations and undertakings entrusted to it, and respect for agreements and memorandums of understanding to the missions of the partners and their strategic goals[4].

2 The information system SIMAcoop

Based on the use of an effective application developed by a UAE team, SIMAcoop is a monitoring system aimed at supporting the governments and universities plan of cooperation, partnership and students exchange programs. The objective of SIMAcoop is to enhance communication, collaboration and integration among universities and their partners, to improve in performance management, strategic planning, and monitoring and evaluation by leveraging the use of spatial data. This emphasis on flexibility to align to national priorities will strengthen mainstream data collection and analysis procedures and, therefore, improve the quality of data reported top management of institutions.

SIMAcoop is a coherent global information system with three main components:

- Management of participation in cooperation projects.
- Management of agreements and agreements signed with other national and international universities.
- Managing the mobility of foreign students.

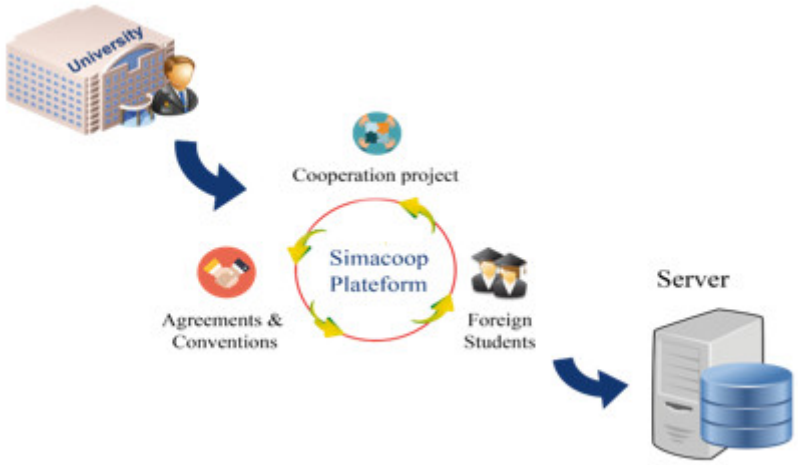

Figure 1: Platform SIMAcoop

- ✓ The cooperation project component manages the general information of the projects, the information concerning the partners who contribute to the implementation of the cooperation projects and programs, the activities, the budget and the expenditure.

- ✓ The agreements and conventions section manages the information concerning the framework agreements and specific agreements signed by the university, the signatories, the actions and the budget of these agreements.

- ✓ The foreign students section deals with the management of information concerning foreign students benefiting from cooperation agreements signed with universities to pursue their higher education.

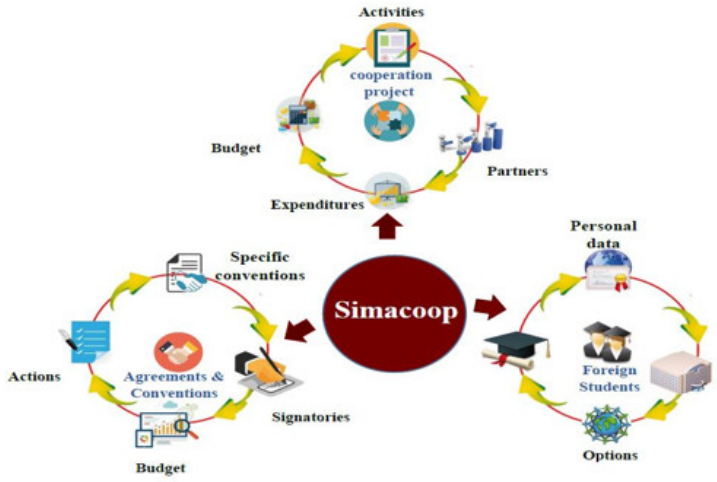

Figure 2: The different parts of the information system SIMACOOP

3 The SIMAcoopTechnologies:

SIMArech is based on open-source technologies that the UAE team contributes to develop and maintain. It was developed using a Framework called Symfony which was quickly adopted by professionals active in this field following its launch in 2005. This Framework today is a stable environment that is both well-known and recognized internationally. Basically, Symfony is a framework chosen by the community, thus it can take advantage of all the efforts of the OS developers around it: from automated deployment tools to fully integrated ORMs, from testing frameworks to tutorials and best practices, through native, advanced debugging tools, Symfony is, as of today the most complete framework available in the PHP ecosystem when you take in consideration learning curve, integrations, stability and performances. The number of its references attests to this, as they have grown significantly since its launch. This Framework is also an active community; developers, integrators, users and other contributors who participate in the on-going enrichment of this tool [5-7].

The choice of Symfony as a framework was based on the fact that it is well decoupled, so unit testing becomes very easy since you can mock objects, isolate classes and inject stub dependencies very easily. It provides a first layer for functional testing (with PHPUnit): being an HTTP-centric framework. It provides also a base class that lets you simulate HTTP requests and examine the output.

At the end, we can see how Symfony and the ecosystem around it provide the proper toolset to run unit, functional and behavioral tests. From the beginning, we take care about testing and we don't want to waste a huge portion of time doing manual testing. For this reason, we looked-for to take advantage of technology to automate heavy tasks that harms the application development.

This Framework have also a very powerful debug toolbar that would present all of these informations in order to ease debugging. Database inspection permit to realize how many queries are running and see the SQL of all of them, with a nice overview of the time they take, while the profiler itself includes informations about every step of the application. Since we are working with a Service-Oriented Architecture, we take advantage of easy integration that Symfony provides for Doctrine [5-7].

Doctrine 2 provides natively support for multiple DB connections and object-relational mappings, we can safely use this tool, within Symfony, to handle read and writes to different databases without polluting the domain model of each of the services that take advantage of Doctrine. On another note, sharing the data model among different services helps as overcoming though situations where webservices or messaging queues are not enough [5-7].

Finally, the probably most powerful concepts of Symfony are the Bundles. They are micro-applications inside your main application, being able to totally separate logics from different domains helps you in keeping a clean separation of concerns and autonomously develop every single feature of your domain[5-7].

Figure 3: Architecture of the actors

4 Functional structure of SIMAcoop actors

In SIMAcoop system, we distinguish mainly three actors who are the following:

- The project manager: he is the project manager who already has an account created in the SIMAcoop platform, he is in charge of project management of cooperation, monitoring of the budget and the project development team, and he has the right to introduce into the system:
  - General information about the cooperation project, partners, activities, budget and expenditure of the project.
  - The general information of the agreements and conventions, the signatories, the budget, and the actions of these conventions.
  - Personal data of foreign students and information on their graduate studies.
- The Establishment administrator: the dean of the institution, responsible for the addition of the project managers belongs to his institution in the SIMAcoop platform, and can be a project manager.
- The university administrator: he is the president of the university, the manager of the platform; he has total visibility on the databases. He is responsible for managing the entire system and responsible for creating and validating accounts so it specifies the access rights of each user, he can be a project manager.

5 Modeling of the information system (input-output):

In the SIMAcoop information system, information management is based on the input-process-output (IPO) model.

- ✓ **Input :** The different users of the system (Project manager, establishment administrator, university administrator) introduce the information and data concerning their cooperation projects, agreements and conventions, and foreign students to the platform SIMAcoop.
- ✓ **Process:** the process of the system receives the data from the users, these data passes a set of operations of transformations, processing, calculation, analysis).
- ✓ **Output :** data processed by the system process is transformed into project reports of cooperation and conventions, budgets, expenditures, CVs, statistics, search engines.

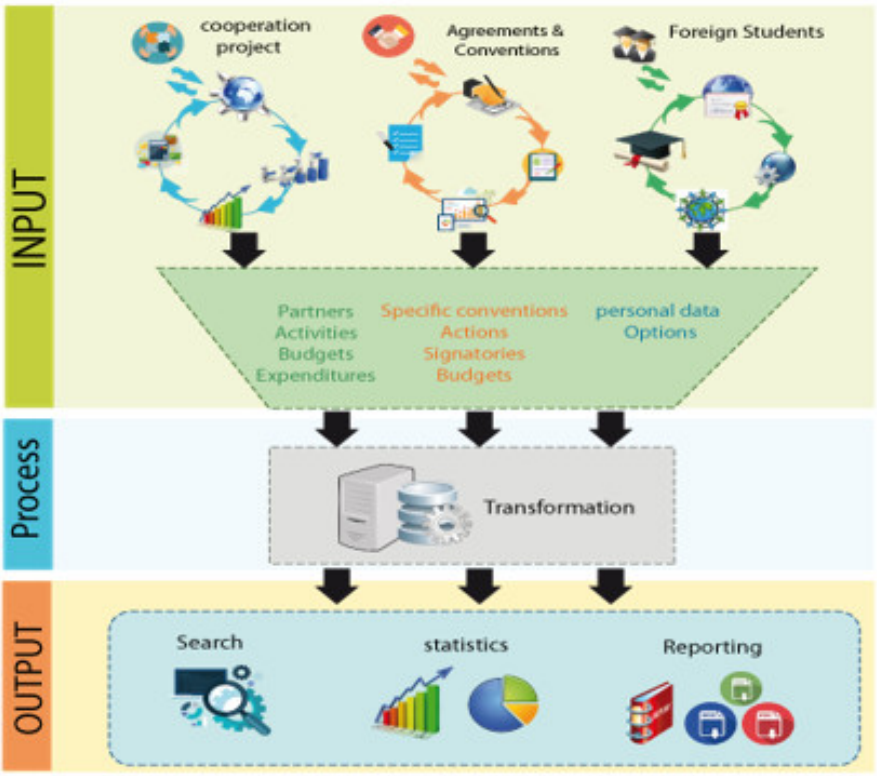

Figure 4: The input–process–output model

6 Internal references in SIMAcoop:

The project manager has the right to add several cooperation projects, partners, activities, budget and expenditure of each project. To differentiate between the data of each project, the Simaccoop information system process is based on the concept of the internal reference of each data relating to the cooperation project.

The internal reference is an assigned identifier for each record of the cooperation project, including the project number followed by the number of the data associated with this project.

Figure 5:the internal reference of cooperation

The same procedure for the internal references of agreements and conventions, and foreign students.

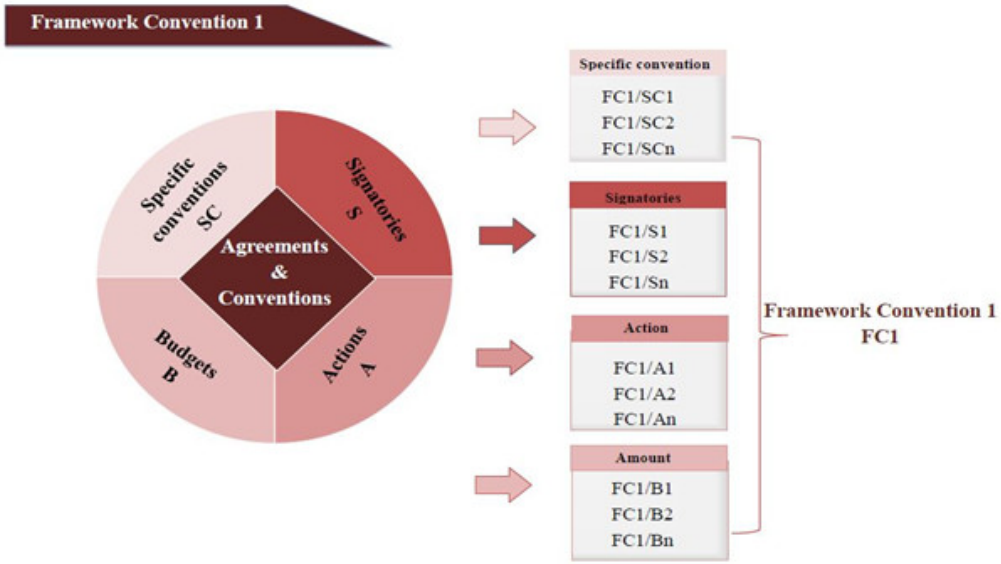

Figure 6: The internal reference of agreement and convention

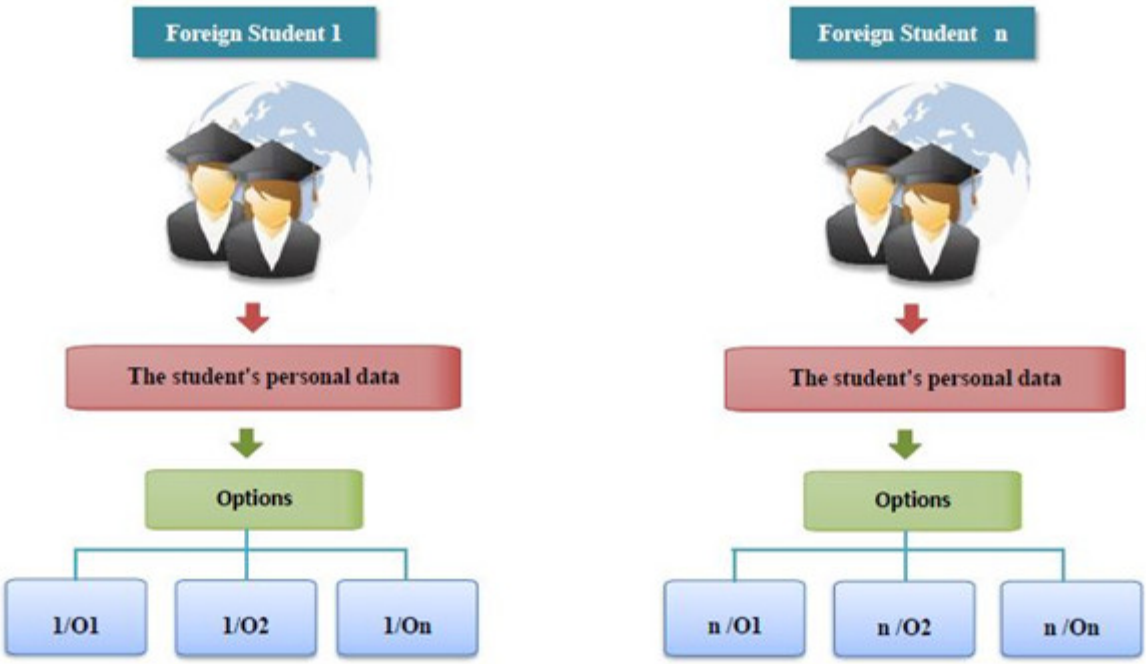

Figure 7:the internal reference of foreign student

7 Warning system in SIMAcoop:

The SIMAcoop information system is enriched by a warning system to send warning notifications to inform the user of the activities of unrealized cooperation projects, framework agreements and specific conventions. Thus, it plays the role of a system of classification.

- For notifications of unrealized activities are based on the comparison of the start date with the system date:
  - ✓ If, the difference between the dates is less than one month, the unrealized activity will be filtered with the green color.
  - ✓ If, the difference between the dates equal one month, the unrealized activity will be filtered with the color orange.
  - ✓ If, the difference between the dates is greater than one month, the unrealized activity will be filtered with the red color.

- For notifications of framework agreements and specific conventions are based on the comparison of the end date with the system date:

  - ✓ If, the difference between the dates is less than one month, the convention will be filtered with the color orange.
  - ✓ If, the difference between the dates is more than one month, the convention will be filtered with the red color.

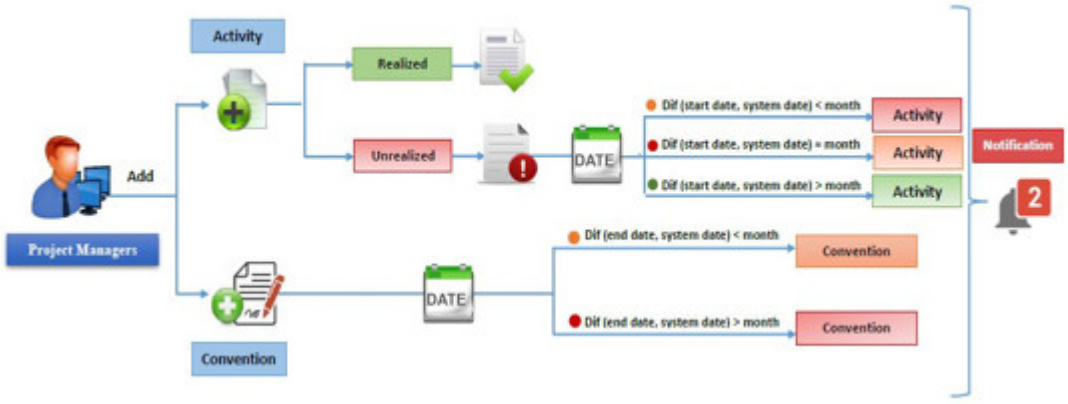

Figure 8 : warning system Process

8 Conclusion

As pressures on universities increase and the issues faced by our community become more complex, the idea of a cooperation information system can hold much promise. Through partnerships the university can contribute its part and also reap the benefits of others' high education institutions efforts. Thanks to a cooperation information system, we can accelerate learning and distribute skills and knowledge. Also, we can add depth and breadth to our scientific community impact.

Deciding on and developing a successful a cooperation information system involves a great deal of thought, planning, and coordinated effort. The SIMAcoop cooperation information system was developed after to consult with all relevant stakeholders to establish the needs for all the actors.

SIMAcoop is an application that permits to identify the members' shared vision and goals and then develop documents that outlines the terms of the partnership. SIMAcoop set up procedures for maintaining and monitoring the partnership as it evolves. It permits to detect the successes actions as well as challenges.

If setting up a partnership is important, it is more important to determine the type of partnership needed and ensure the monitoring and evaluation of cooperation actions for to maintain that there's commitment from the senior management of all partner organizations.

SIMACoop was developed by Symfony framework whohave powerful routing capabilities, annotation and regular expression usage and provides a greater choice of configuration file formats - XML and YAML. This framework template engine (Twig) allows for better template structure organization as it supports nested template blocks.

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