MICROWORLD TO SUPPORT DECISION MAKING AND ORGANIZATIONAL LEARNING IN A DEPARTMENT OF A COLOMBIAN UNIVERSITY

Jorge Eduardo Báez Serrano
José Daniel Cabrera Cruz
Ricardo Sotaquirá Gutiérrez
Guillermo Rueda Rueda

Computer Science Department
Universidad Autónoma de Bucaramanga
Bucaramanga, Santander. Colombia
e-mail: jcabrerc@bumanga.unab.edu.co, rsotaqui@bumanga.unab.edu.co

INTRODUCTION: THE IDEA OF THE NARRATIVE

This article was written in order to rationalize a series of experiences lived by the authors during an investigation that is still not complete (Báez, 1998). This investigation is about the application of computer microworlds based on System Dynamics models at the Computer Science Department in Universidad Autonóma de Bucaramanga, UNAB (a Colombian University).

In order to achieve this we will present a narrative about the research, in other words, an interpretation of the facts that link them and make them look like a unit. This narrative is moved in three different time periods, the past, present and future. During each time period reference is made to events that have happened, are happening or could happen. These events get a special meaning within the narrative that allow its grouping in phases, this meaning is evidenced at the light of the intention of the phase.

The organizing of the project by phases and the purpose of each one of them are properties that emerge from the narrative itself. Therefore the narrative allows us to organize the past with the benefit of hindsight and recognize its purpose and it makes us conscious in advance about the present and future.

THE NARRATIVE OF THE PAST

A starting point for this story could be the moment in which the basic idea about the project came about, in other words to do an investigation concerning the use of computer microworlds supported on System Dynamic models at the Computer Science Department of the UNAB. Although this did not come about spontaneously, on the contrary, there were some conditions that led to this and made it possible. The importance of revealing these conditions lies in

understanding what were the forces that led to the investigation and how they set everything in motion. These conditions and the facts that led to the investigation make up the first phase, where it all began, which was called genesis.

PHASE 1. GENESIS

Possibly the idea came about because of the growth and learning of the regional researchers community on system thinking. This community started in the Computer Science Department of Universidad Industrial de Santander in Bucaramanga (Colombian University) at the end of the 80's and now has expanded to other universities in the city and even in other parts of the region. This expansion process in the community allows us to understand how an investigation about system thinking started, specially in System Dynamics at the UNAB.

The growth of the community begins in a learning context in which skills and abilities develop to apply and spread system thinking. The uncovering of this context allows you to understand the expansive character of the community and also justify the diversity of work and fields in which this has been applied among them we can mention: health sciences (Gélvez, Muskus, Andrade and Muñoz, 1994), Economics (Sotaquirá, Andrade and Panqueva, 1994; Andrade, Mejía, Jaime and Pinto), Industrial Processes Engineering (Andrade, Ramirez and Cabrera, 1996), Education (Parra and Andrade, 1997) and also organizational.

In the organizational field a group of works (Sotaquirá, Andrade and Gélvez, 1996a and 1996b; Sotaquirá, Gélvez and Cabrera Cruz, 1997 and 1998) creates the conditions, theories, methodological guidelines, tools, experiences and questions so research ideas can be created in the organizational area. In these works you can see the concern to make a system thinking application that is conscious of the social and cultural context in which this happens, that sets the groundwork so System Dynamics studies about organizations in the region can be made.

Another part of this contextual web rises to the surface when you ask yourself Why does this idea emerge at a computer science department? In search of answers, you come back to the beginning of the regional community on system thinking and you find that in the Computer Engineering program there were favorable conditions: a group of subjects with topics related to system thought. In other words, the system seed was already planted. There were similar conditions present at the Computer Science Department in the UNAB before the idea of the project emerged.

And finally the idea is born

The research idea emerged at the Computer Science Department at the UNAB where there was a group of professors and students who were part of an extensive research community with a lot of inquiries and with an additional fundamental

ingredient, the initial concern shared among some of the members of the organization, because of the reduction in the number of applicants for the undergraduate program that the Computer Science Department offers and for the consequences of the program's restructuring process.

It is important to point out part of the investigative process started: the idea of applying Dynamics System does not come from the directors of the department. This aspect determines the role that they have to play from this point each one of the members of the investigative group: promoters of ideas.

The promoters of the System Dynamics: the first contact

To guarantee that the project would begin it was necessary to receive the approval of the directors of the organization. This is how the presentation to the dean of the Computer Department came about. This presentation centered on pointing out the possible results of the study. The study that got the most attention was the computer microworlds to support decision-making. This interest is understandable because of the value placed on "visible results" by the organization culture. This idea gave headway to the project.

It is not very risky to say that most of the studies done with dynamic systems on organizations in the region require initial phases that the members of the research group play a role as promoters of the System Dynamics ideas. This must be done until you hear in some organization: We must use System Dynamics here!

We must use dynamic systems here!

Even though this is expressed by some of the members of the organization it does not mean that the project will survive. Step by step you must get the members of the organization to think this way, therefore this is not achieved overnight. To achieve this it is necessary to put into practice a strategy that will allow the project to approach the organization.

PHASE 2. THE APPROACH

They way you enter the organization can be a determining factor on how significant the impact of the project will be. The path chosen to approach the department can make the difference between getting as a result organizational learning, or simply, a very attractive computer tool based on a System Dynamics model in which management games can be made. Without being conscious of this danger, the research group set out to have a series of activities that because of this narrative they get a special meaning that allow its grouping in a phase that was named approach.

At the approach phase you can give the intention to leave the research group in a position from where it can work closely with the organization.

The mediator: We need to find someone that will help us to get in!
Finding someone within the organization, the mediator, that will serve as an initial connection can be essential to the success of the project. To achieve it you have to think that person chosen should have credibility over the rest of the members, which does not necessarily mean that he or she must occupy a high position within the organization. What is important, is that with his or her help the research group can have direct contact with the rest of the members of the organization, in which they can be available most of the time. This mediator should expect the possible results of the project and he or she should have the potential to develop a commitment that will encourage him or her to fulfill his or her role. The person chosen as mediator was the dean of the computer science department who hooked up the research group with other members of the organization like the coordinators, academic secretary, professors and secretaries.

It is very important to make sure that the mediator does not create very high expectations about the results for the other members of the organization that could put unnecessary pressure on the research group to generate tangible and immediate results.

The organization culture: It has to be from inside!
A basic task to get closer is to reveal some of the characteristics of the organizational culture, in other words, the belief and behavior system shared by the members of the organization. The importance of knowing these characteristics lies in the possibility of benefiting from them. Therefore for example, the research group can take some measures, which are apparently useless in the short term that will be well received within the organization culture, and will leave the project in a more favorable position in order to achieve its goals. But, also, the case might be that it might be important to rule out an important measure for the project but unacceptable in the organizational culture because if it is put into practice it might cause a rejection of the project that might make it fail.

In conclusion, about the organizational culture, the research group should be cautious to take advantage of the opportunities and avoid or minimize the negative effects for investigation.

One of the risks that is associated with the organizational culture is that the project allows itself to give in; in such a way that it will easily fall into the temptation of taking very well received organizational measures, possibly without any apparent negative impact, but that waste time and resources that could be needed later to achieve its purposes.

The Flight Simulator: You have to see to believe!
Unconscious of the cultural effects, the members of the research group dedicated themselves to create a dynamic system model about the previously mentioned worrisome situation. Such a model should have interface software, the simulator that will make it easy to use by different people other than the modelers.

This task was done with the help of some of the members of the organization that limited themselves to providing information about current policies, data, procedures, behavior tendencies, among others, but the direct participation on the modeler was scarce. One possible justification of this shortage is based in the first place, in the upsetting caused by the absence of several months of the mediator which delayed the approaching of the project to the organization and also the passiveness of the modeler group in the development of its role as promoter of ideas. Due to this an important organizational learning space is wasted such as the participation in the building of a model.

Despite the difficulties, the modeler group concentrated in the making of the model until they could make the first version that included aspects such as students, professors, applicants, income from tuition, groups by levels, graduates, and costs a among others. This model allowed you to evaluate the impact that changes in the number of applicants that enter the undergraduate program have on the Computer Department. This model was enriched by the ideas from the computer theory students, a subject offered by the Department that is associated with system thinking and with other contributions from other similar works such as (Barlas and Dicker, 1997; Tapias and Torres, 1997). Although it is important to point out that in order to give rise to this enrichment is advisable to build the first model proposal before checking others because this way you can gain a critical position on them.

As far as the simulator is concerned the interface of the model should be pointed out that it became the way to attract attention to the project, creating conditions for the approach. This is understandable since the simulator is a visible result in other words, of the ones that the organization likes. In this sense you can say that the members of the organization needed to "see in order to believe."

THE NARRATIVE OF THE PRESENT

This narrative attempts to be an interpretation of what is now happening in the project that although it has one difficulty: the present is elusive, when you attempt to refer to it, it becomes part of the past. This does not prevent us from referring to the current phase since the present remains within this which is a part in the past and another in the future, where it seems the path taken by the investigation leads.

PHASE 3. THE PERSUASION

This phase is meant to build a credibility platform for the project that will support the organization's learning because this could mean the execution of a series of activities that are not well received by the culture of the organization.

Recently the use of micro-world, based on the model built, to support the making of decisions in the Department is a fact that could allow the members of the organization to believe in the possibilities of the project.

The Microworld supports the making of decisions: You must show results!
The use, now of the simulator, in an adequate space, to support the process of decision making in the Department constitutes the organizational microworld. In this context the conditions for the members are created –dean, coordinators, professors, and secretaries– can:

In the first place, evaluating the efficiency of the department, in the short and long term to continue with current policies or to put in practice the new policies related to the hiring of professors, full time as well as part time, fixing the tuition rate, selection of applicants to the pre-graduate program, maximum and minimum size of the student groups per course, among other things.

Second analyze the organizational impact, in different stages of the making of certain decisions associated with the structure changes of the study plan in the computer engineering program offered by the department.

Third, the design of organizational strategies that will help to face the problem of the decrease of applicants and the effects of these changes on the study plan.

The attainment of these results could create an environment of credibility that could give rise to the development of the following phases of the project. Besides this, around the simulator a space for discussion is created naturally about the validity of behaviors generated by simulation and the assumptions, included in the model, which are determinants in such behaviors. It is like this how the microworld becomes the source, a catalizer “pill” of organizational learning in the Department.

This article: the learning of the research group
At the moment, the present part of the investigation is writing this article. The importance of this lies in that the research group has been able to think about the route taken –the past– with what can enable to gain an understanding about how the present place has been reached and where it is headed –the future–. It is like this how an article becomes another catalizer “pill” of learning, the space for the

research group to reflect and to learn. This space to reflect and its consequence, learning that are produced during the making of the article are more important than the article itself. Therefore the micro-world is less important that the space for discussion that is generated by it.

Based on the previous statement and assuming the risk of generalizing, you could say that the reflection and the learning processes that are generated around the achievement of a result are more valuable that the result itself. Therefore what is important is not what is "visible" the result- although in some contexts it may be important, but the journey taken to search for it.

Another aspect to point out in the article is that also it becomes one of the "visible" results that are well received by the organizational culture. It also contributes in an important way, in the creation of a credibility climate for the research group's work.

THE FUTURE: SOME THOUGHTS

Like it was pointed out previously, the purpose of this part of the article is to visualize where the journey taken in the investigation leads to possibly, although, it is not suppose to be a conclusion but, some recent thoughts.

Having gotten a solid credibility platform for the continuation of the investigation, some conditions that promote organizational learning continue to be created.

PHASE 4. LEARNING

The main purpose of this phase would be to create a series of conditions in the Department that promote organizational learning. To achieve this purpose the course of action would center on making appropriate organizational spaces for learning. One possibility is based on the use of System Dynamic microworlds.

A space for learning: microworlds

The main idea is to create a field revolving around computer System Dynamic microworlds, where the members of the organization can test their recent ideas about the situations they face in the Department, where they can participate actively in the building of models, where they can contrast different mental models, where they can learn to make decisions together, in other words where a new way of thinking is developed in its entirety deep within the organization. This new way should expand through all the organization, allowing the individuals and teams to sort the different situations they face every day.

It is important that through all the process the research group maintains a very thoughtful attitude so that the biggest benefit can be drawn from the experience and to apply the necessary corrections.

And now what? The learning virus is spread through out the UNAB
From the success-visible results-that are achieved in the Department depend on the learning that is spread like a virus by the rest of the Universidad Autonoma de Bucaramanga. It is important to check if the experience with the Computer Department can be reproduced in the rest of the UNAB.

CONCLUSION: THE REGIONAL DYNAMIC SYSTEM COMMUNITY KEEPS GROWING AND LEARNING

The experience and the results of the thinking done in this article are very important results in terms of learning by the local research community on how SD should be applied to organizations in our region. To this legacy we add a series of results from the investigation that can be useful by the research community like the model, microworld and the article.

With this experience about an organization of the region, the authors want to take one more step towards the building of a concepts methods, tools and experiences platform that will establish a ***styl*e**, a way of applying System Dynamic thinking to the organizations that is conscious of the social and cultural context in which it is applying it.

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