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ABSTRACT

There is a growing recognition in Argentina for the need of more technological and professional management, administration, operation and planning. Of the 215 computers installed in the country (and growing in number at the rate of 25%, a year) only a few (15%) have university graduates on the staff of analysts who organize their work. Most of the analysts and programmers only have a primary school level of education. A forecast for the next three years indicates that the Argentine universities will have to train 1,300 students in systems analysis and systems engineering. (Author)

Impact of Computers in Argentina, and the attitude of private sectors, the need for professional training, the Universities' action, what lies ahead.

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In the last two decades computers have become an important component of our evolving world. The planning, executing and control of our activities and projects are becoming increasingly complex in a constant competition where stepping aside of progress is fatal. Computers and information systems are a consequence of this evolution and the instrument to cope with the increasing rythm.

In well developed countries, where computers originated, they appeared as a tool to implement solutions to problems which were already being considered and to apply the newest techniques to those that had been exhaustively treated with previous methods. In Argentina, as well as in other countries which are in their development process, this is not the case.

The need to speed up the rate of evolution in this exploding world is easily perceived if we want to shorten the gap between ours and other developed areas, and this is where computers are really welcome. But the social, economic and administrative structures, though they have been changing in the past thirty years, are not prepared to receive the benefits of the latest technologies. The country has been dedicated to its own internal affairs and has therefore not been aware of the profound change and enormous increase in the evolution process in other parts of the world.

There is in the country a growing recognition for the need of more technical and professional management, administration, operation and planning. Many leading businessmen and public officials feel these changes and updatings are badly needed, but there is a reaction against the solution to the problem because it calls for younger people with a higher level of education imposing new techniques for management, new organization structures, new technologies and concepts.

The change can only be gradual, the young professionals fighting, pushing, educating and selling the new ideas and concepts.

But this also faces us with a new situation and that is the lack of management training for these young people by well established and respected managers.

All these problems are more evident in the new concepts and techniques of the Computing Systems world.

So, even though everyone recognizes the fact of the convenience and possibilities of the systems, when it comes to applying them, the specific economic justifications and applicability in each case is rarely accepted.

In the cases where the recognition of the need materializes (getting a Computer) there is still a long way to go to fully obtain the benefits it can produce. Usually it is dedicated to simple administrative applications in a non-integrated way. This is mainly because the computing operation is staffed only with programmers of medium education level, some of which have evolved, through experience only, into analysts.

Another concomitant factor is the lack of knowledge of managers or professionals in other areas of the same companies regarding the extent to which the computer can help them in their management and technical activities, as they have not been exploring the use of the latest techniques previously available.

As the result of all that, computers came, not only as a tool but as a catalists, forcing profound changes and opening up the doors to a higher level of professionalism in every activity.

So that this may be fully accomplished, a large amount of teaching and transmitting of concepts is required.

But who are the leaders in this activity ? Private companies with direct commercial interest are by far the ones. Computer manufacturers have gathered the largest groups of professionals giving them special training and in their selling and installing activity they are constantly transmitting concepts and adapting organization ideas.

They are the most experienced groups. They know that in our countries computers need more support and there is a lot of systems concepts to be handed out to really take advantage of them.

Consulting firms and consultants have also an important part in spreading the new ideas. They aim at the higher level and their executive seminars, business games and presentations play an important part in development.

Their activity, though started long ago by some industrial consultants and auditors, is only lately being accepted in management and government agencies, with emphasis in model building for decision:

(social security, harbour administration, hydraulic resources, production lines, etc.).

Among the firms which more actively implement computer systems and use them in sophisticated applications, the local subsidiaries or branches of international companies are the most numerous. It is easier for their

professionals to justify trying out new solutions based on experiences abroad. Or the solution comes as imported know-how.

In any case, the local implementation and use builds up experience and competing firms may try to follow their lead. They are also schools for training professionals in those techniques as they also pioneer in having groups dedicated to develop modelling or statistics.

As a result of all this the process is on its way and is part of the total Development. The first part, recognition for the need and initial steps towards the solution, is done.

The second part, full implementation of the solutions, avoiding reactions, needs a lot of education and trained professionals. And this is the most important problem we have to face if we want to profit from the new techniques and technologies.

Of the 215 computers installed in the country (and growing in number 25% a year) only a few (15%) have university graduates in the staff of analysts who organize their work. Most of the analysts and programmers only have a primary school level.

A forecast for the next 3 years tells us that our universities will have to train 1300 students in Systems Analysis and Systems Engineering.

The Universities have recognized this problem some time ago. In 1963 the Buenos Aires University organized a 3-year computer curriculum with a title of " Computador Científico " heavily oriented towards applied mathematics and some topics on computers and applications. This was not the total solution but the approach of the School of Sciences people at that time.

Being that the first and only university curriculum on the subject, it started growing in student attendance, because the graduates were eagerly requested in the market. State Universities are free and almost any secondary graduate can enter into any one of the assignments. Also the professors who wanted to teach those subjects were joining that school.

In 1969 there were 270 new registrations in that career (for a total of about 500 students) . Several optional subjects were added to the curriculum thus bringing in the computer applications and techniques:

Programming languages
Remote computing
Simulation, etc.

(see attachment A) .

Other schools and Universities have followed, Universidad Nacional de La Plata, Universidad Tecnológica Nacional.

Lately, the School of Engineering of the U.B.A. has seen the need to offer their graduates a two-year postgraduate career training them in Systems Engineering. This is the most advanced training leading to systems integration and management (see attachment B) .

The school also offers to all its students (2500 a year) a class on elements of computing.

Final Conclusions:

The present situation shows the natural evolution of the application of new technologies and with the natural time lag in respect to more developed countries.

As we feel we should increase the rythm of our development, we foresee several weak points in the structure for higher degrees of sophistication. We have to increase the professionalism of our people, giving them a higher university training and we are not equiped for the number of graduates we should turn out.

In related subjects as Management Science, Business Administration, Production Engineering, for which computer systems should be an invaluable tool in their action for development, little is being done.

But the greatest hole in the structure is the lack of a staff-forming activity that will provide the future faculty to teach classes on computers, computer-theory and computer applications.

Up to now the greatest body of knowledge in the latest developments and techniques is with the professionals of the Data Processing industry. They participate in the University teaching but this reflects in syllabuses being heavily application oriented.

None in the Universities has started yet to teach Computer Science concepts.

There are practically no full-time professors devoted to research in Computing.

There are few research projects in this area with professors and students working on them. Very few are the sources that could originate and

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support such projects.

As I mentioned before these activities should provide the professors, trained scientists and professionals for the more sophisticated use of computers our development requires.

In the southern part of Latin America our countries experience an additional problem. Distance to other countries which practically isolates us.

It is very difficult to justify an expensive trip to USA or Europe to see what their current activity and trends are.

So the leaders in the state-of-the-art in Argentina have a personal view of the outside world every two to five years and those in the middle level never get to visit outside centers, or attend meetings, or symposia.

Similarly, very occasionally a computing expert tours our countries and has time available to transmit part of his knowledge to a substantial number of people in the field.

This is a self-substaining situation where the lack of contact with leading progressive groups provoques a lack of stimulus and challenging spirit which would encourage the present passive attitude so as to oppose the more than normal difficulties and resistance that the new technologies create.

Some of the possible actions to overcome these problems are:

Establish graduate students exchange programs with American or European Universities. There have been some isolated trials in this respect but an organized program would help.

Coordinate research programs with American or European Universities. Our source of programs and support are very scarce.

Based on these trained people and research projects, organize and support research and development centers. This will be the way to attract and pay full-time professors and researchers.

Organize Conferences and Seminars based on specialists from abroad as visiting Lecturers.