K12 INITIATIVES: A PATH TO THE FUTURE OF CITZENSHIP

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Abstract —*This work shows the political and educational efforts of a project for K-12 that one of the main goals consists in the enhancement of young people to choose carriers like engineering. The social dimensions of it are clearly leading to a deep change in that particular society showed by the very positive feedback. Everything has been conceived to make it particularly attractive to young students of K-12 mainly the name "Let's go folks!" The project has been developed and applied by the City Hall education coordination in a joint venture with Supportnet, a private enterprise with the support of COPEC – Council of Researches in Education and Sciences. The overall results of "Let's go folks!" are highly encouraging and it could be seen as a paradigm for the other Brazilian education public institutions.*

Index Terms — paradigm, pedagogy, policy, qualification, teamwork, technological illiterate.

INTRODUCTION

Lately less and less young people are choosing engineering as a career. There are some reasons for this, among which two of them appear as of high relevance as the fall of social status and the low level basic sciences teaching in high school.

Certainly this issue has generated many discussions in academic and scientific communities in Brazil and some practical actions at governmental level have took place. And among them there is one that is the object of this work. It is the initiative of São Vicente City Hall that has decided to implement special programs for K12 in public schools in the city.

In order to attract more students into engineering, which is so necessary for the development of a country, an innovative approach was taken at the K-12 public schools in São Vicente city. The project has been developed and applied by the City Hall education coordination in a joint venture with Supportnet, a private institution with the support of COPEC – Council of Researches in Education and Sciences.

The chosen name Let's go folks! Is a slogan that speaks the language of young people and the Fortress of knowledge is the special space created in the schools where the students can spend some hours of the week enjoying the good time of learning in a complete new way. It has been dimensioned to make the students to feel special, a space to hold their interest and to get them excited about new technologies, informatics and so on.

It started in February of 2002; it has been planned to serve 10 thousand students per year, including the qualification of teachers and technical staff.

The creation of a public University in the town is the next step that will be accomplished in a medium to long period of time, which is the city demand due to the enlargement of population and the new mentality of the new politicians presently in charge. A new policy era has started in the country inspired in the new Presidency that express the Brazilian population hue and cry for the betterment of its society. It is time for changes and deep changes in education in order to combat the technological illiteracy.

BRAZIL'S ENGINEERING HISTORY

Colonization of Brazil plus the insurance aspect of Portugal made the royal government to recognize the necessity of forming the national engineer and so becoming it of crucial importance. It was made always attending the evolution of French Schools of Engineering also in 1641 in Lisbon born the Artillery and Square Classes becoming in 1647 the Special Class of Fortification and Architecture. The Portuguese engineer Luiz Serrão Pimentel (1579-1613) managed the school and it is considered the starting point of Lusitanian-Brazilian engineering [02].

Engineering schools still keeps the European schools style obviously because of the great influence of its countries along the colonization process. The evolution of engineering in Brazil follows very close the world trends. From the construction of Fortifications through electrical engineer to what is called today Mechatronic engineering in the country has developed in according to the necessities of promoting its development always seeking for the best applications of sciences achievement to the local resources.

Through the time many huge proportions accomplishments can be seen, not only public buildings and houses but also practical applications of electricity like telegraphy, telephony and lighting. Electrical energy conquests that were applied in Europe and USA shows that similarly the insertion of electrical energy in Brazil happened in the same historical moment of industrial expansion and development of developed countries.

Since the Fortification Classes and Military Architecture founded in Bahia, in 1699 until more than 200 engineering schools of present time, engineering education has had a

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history of success full of many conquests and accomplishments [03].

EDUCATION CONQUESTS THROUGH TIME

The Public Universities that raised in the many states of the country and that have worked very well for many years, made the country to achieve and built a solid reputation even abroad also creating generations of Brazilian scientists and educators [04]. These people fortunately have refused to accept the ominous and narrow-minded neo-liberal policies for education having started a fighting to keep up the achievements already gotten and actions that help to maintain and to enhance the researches in every field of science and technology [05].

For many years large discussions about national scientific and technological directions at national level took place and still take place in conferences, all communication medias like radio, TV and etc, despite it may seem to be a lonely fight once economical speculations seems to be more powerful with more sharp actions world wide.

Professionals and educators of every field of science and technology have been discussing the destiny of education in the country taking into account the historical moment of the world. Certainly some of these discussions have generated some practical actions at governmental level as a response to the society that see itself as the most interested part in the issue. In Brazil in engineering and technological fields the situation is very delicate. Although the proliferation of private universities all over the country expanding the number of 3rd grade students it does not assure the increase of students in engineering and technology areas. Looking through this perspective the K12 appears as one way to help students to develop skills to follow careers in these fields.

São Vicente City Hall management is one example of the new political mentality and so after some social conquests has decided to implement a special program for K12 in its public schools. Conscious of the importance of eradication of the so-called "technological illiterate" (that is now as important as the eradication of the "illiterate"), has been working hard to get the goal to enhance the number of students to choose the engineering and technology fields.

TECHNOLOGICAL EDUCATION: VALUABLE ASPECTS OF ITS INSERTION IN EDUCATION

Valuable workforce in a technology-based society of XXI century depends on an educational system that prepares students in mathematics, engineering and sciences. To accomplishment such task São Vicente City Hall is counting with the excellence of a national private enterprise located in the city, which is Supportnet that has been acting in the market for many years and that has a reputation of quality services and credibility. It is essentially the appliance of solutions for technological problems oriented to the clients/students necessities, in the several areas of knowledge.

Educational informatics in the development of students' cognitive potential is of great importance. The informatics knowledge is a powerful educational instrument to turn young people their own agents of learning process and in the building and acquisition of their knowledge; at last students more autonomous in the solving of problems using their logical - deductive reasoning in an effective way becoming them more capable to interact with people and the reality that surrounds them. Let's say that this is the technological literate citizen [06].

Technology high-speed advancement and globalization made essential the use of informatics in all human environments. The intelligent use of computers becomes effective when it is used in a way to make the student to explore her/his capabilities and to develop skills. It contributes to their further development and the seek for sustaining values, including a commitment with her/his own learning [07].

LET'S GO FOLKS! – A DESIGN STRATEGY FOR YOUTH

This special program is based in an integrated educational method using computers as the tools to increment the learning process aiming the betterment of fundamental education system, the K12.

Engineers, Pedagogues, Social Agents and others scientists and technicians involved with education have been working in the implementation and development of this project.

It encompasses top technologies with access to Internet and complete didactic material designed for this kind of proposal.

The project has been named "Let's go folks!" as a strategy to reach the young students. Another strategy of marketing to get the attention of them is the name of the labs, so called "Fortress of knowledge".

FORTRESS OF KNOWLEDGE – THE HISTORICAL ASPECT CONTRIBUTING TO THE STUDYING EFFECTIVENESS

Unfortunately, many K-12 students loose interest in subjects that are considered very difficult like mathematics, physics and others. The implementation of this new K-12 program aims essentially to generate the intellectual excitement among the students toward the acquisition of knowledge. The new approach with the computer as a powerful tool has showed to be effective to enhance the learning process.

It is a student-centered paradigm of education and with pedagogic proposal the Fortress of Knowledge is the special space created in the schools where the students can spend some hours of the week enjoying the good time of learning in a complete new way. It looks like the ancient fortresses

that were built in the city in the XVI Century to protect it from the pirates and invaders. Nothing more charming! It contains in its space the computers around 20 (in each space) connected in a network, with Internet access.

The implementation of the program started in February of 2002; it has been dimensioned to serve 10 thousand students per year, including the qualification of teachers and technical staff for the next four years.

PROJECT BODY

Its physical infra structure contains 16 laboratories with 20 points of network each, in according to the international pattern EIA/TIA 568-A, where each lab contains one Rack with key and the local network active element (Switch 24 doors 10/100 MBITS).

The whole project is compounded by:

- 320 Celeron computers 800 MHZ/ Disk of 20GB and 128 MB RAM/ Colored monitor with 15"/ CD-Rom/ Stabilizer.
- Supply of 32 printers, 2 for each lab.
- Large band internet access

The laboratories dimensions are large enough to attend the necessities of the schools for present and they can be enlarged with the time and the new demands.

Internet access infra structure:

- The chosen technology for Internet access is the frame-Relay and 512Kbps speed.
- All labs have local and remote connection equipment (Switch, rotator and modem).

Supportnet offers a didactic material that has received special attention that provides the students all the necessary information for the correct use of computers.

PEDAGOGIC METHODS

Teaching Methodology:

- The proposal of teaching methodology in this program is based mostly in the interaction and real experience.
- The qualification is gotten by means of 25% of theory and 75% of practice [08].

The use of computer in education has been showing as an important agent in the promotion of closer and so important between adviser/instructor and pupil.

Evaluation Methodology is based on some methods, some orthodox and some non-orthodox. It depends on the teacher and they can be [09]:

- Presentation of works developed with the use of the computer developed during the course.
- Frequency of classes' presence, at least 75%.
- Lectures and practical exercises.
- At the end of the course the students have a test to evaluate the knowledge acquisition based in a minimum quantity required to be approved and get the certificate [10].

TIME STRATEGY

In order to accomplish the task the students have a schedule that has:

- 60 hours of Office package (Windows, Word, Excel and Internet);
- Professional certificate for 8th year of Fundamental School;
- 45 hours of basic Windows, Word, Excel and Internet form the 5th to the 7th years of Fundamental School.

TEACHERS QUALIFICATION

Qualified teachers with knowledge in informatics are so important as good technical staff [11].

Teachers and students have a schedule to attend the necessary courses to improve their knowledge and also to help the students that will be as well transformed by the use of this new technology.

To get this goal the teachers have:

- 08 hours of typing;
- 80 hours of Office (Windows, Word, Excel, Power Point and Internet);
- 40 hours of informatics in Education.

Teachers and students have full time technical and pedagogical assistance and support of the staff for anything at all.

INNOVATIVE APPROACH

Presently one of the most important aspects to be taken into account is the challenge to make the program more attractive for the students so it should have a kind of content that is equally cultural and appealing. Bellow there are some examples of extra available topics plus the program content:

- Availability of Internet access;
- Virtual Bulletin;
- Web mail;
- *Let's go folks!* Journal;
- Best students of the month;
- Download areas (tutorials)
- Educational games;
- Chat;
- Know your City!
- Test your knowledge;
- Virtual Library;
- Internet Challenges;
- News;

These are some material available that are constantly updated to help students to develop a framework for understanding effective knowledge and cultural achievements [12].

ACCOMPLISHMENTS

The most important objective is to provide the public school students the possibility to develop the skills to choose careers in engineering and technology fields. It is done by:

- Training and qualification of public schools teachers in technology education and pedagogic design;
- To promote the betterment of its citizens qualifying them through the informatics specialization.

Social dimensions of this program for sure exceed the school borders and its first goal.

CONCLUSIONS

The history shows visibly that engineering in Brazil has started with the military engineering, which military actions at that time, in the country were basically the construction of fortifications and the seek for solutions of defense and attack evolving to what is today the civil engineer. Since its origin in Brazil, engineering has evolved altogether world's trends.

Presently Brazil has been facing the challenge of managing the effects of such rapid science and technology development achievements combating the technological illiteracy in order to provide its people a better quality of life. It is a fight for surviving the environmental problems, the wild economic war between the big enterprises among others. Problems that will become worse for developing countries in a near future if they do not find a way to over come the inner problems and start to build a true nation for its citizens.

The overall results of "Let's go folks!" project conceived and implemented in São Vicente public schools have got very good results so far and the students are very pleased with their performance and the feed back has been very positive.

The implementation of the project has been so good that it is going to be amplified to the qualification of poor communities citizens of the city.

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