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The contribution of a Technology Park for the improvement of educational system performance

Roundtable 3

STP Services and Regional Needs

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Executive summary

A formal and structured implementation of the concept of Triple Helix in the environment of a Technological Park has great potential to promote the development of a region in all its various aspects. This paper will present a case through a partnership coordinated by the Núcleo de Gestão do Porto Digital (Porto Digital Management Unit) that aims to improve the educational indicators of the state of Pernambuco by the application of games with educational content in a lively Olympiad among students from public schools in the region. Besides promoting the growth of school performance of the state as a whole, the partnership model presented here can be applied in other locations and replicated in several areas of the state as health, safety and transportation. That shows that technology park has evolved a long time from the initial concept of a large "condominium sales" becoming the key for implementation of public policies.

Key Words

Triple Helix, technology park, strategic partnerships, education and electronic games

INTRODUCTION

The State of Pernambuco, in Brazil, offers its population a large and complex educational network, with about 900,000 students, 29,000 teachers and 1,108 schools. Despite the universality of the offer, the network presents serious problems of performance, as repeatedly demonstrated by the performance of their students in national examinations such as SAEB - Evaluation System of Basic Education and ENEM - National High School Exam and highlighted by BDI - Development Index of Basic Education (Ideb) as the state with the worse assessment of the country, rating 2.4 from the 5th to 8th grade in 2007, a rate below the national average which was 3.2.

In such context, actions aimed at strengthening the diverse forms of teaching and learning must be undertaken, through the assembly of strategic partnerships that have an impact on the network's macroscopic point of view.

Based on this scenario, in May 2007, the Secretariat of Education of the State of Pernambuco asked the Management Unit of Porto Digital (NGPD) to look for innovative solutions that could create mechanisms to support the educational activities in order to improve the educational indicators in the state.

Porto Digital is a Technology Park, one of the mainstays of the State of Pernambuco's new economy. It is a result of a joint and coordinated effort between Universities, Government and Market to create in the city which is inserted (Recife - Brazil) a software development hub of world-class. To manage this environment, it was created the NGPD - Núcleo de Gestão do Porto Digital an entity accredited by the State Government for more efficiency and agility in the performance of their duties which, briefly are: institutional articulation, fund-raising, project management, attract companies, contribution to business competitiveness, and reputation management and brand promotion of the park.

DEVELOPMENT

About Porto Digital

Porto Digital is a technology park located in the neighborhood of Recife Antigo (Old Recife) which is in the historic center of Pernambuco. Porto Digital is a result of the innovation environment that was consolidated in Pernambuco in recent decades along with the coordinated effort of the university, the productive sector and government, in order to enter the industry of Information Technology and Communication in the economic matrix of the Pernambuco state. Sector with high growth potential, ICT is also the basis for increasing the competitiveness of a region in any economic development strategy contemporary.

Porto Digital is the main component of ICT in the State of Pernambuco. Its goal is to implement economic development, public policies for the state, urban regeneration, social inclusion, strengthening of the ICT cluster and other arrangements through the use of these technologies. With 11 years of existence, the Porto Digital is a leading technology centers in the country. The PD generate to the state 6500 jobs, attracted more than 200 institutions among universities, government ministries, research and development centres and technology companies on a national and international level. All sizes companies have already settled in PD and are producing new solutions and new technology products.

As a result of the success of all its actions, the PD was elected by AT Kearney¹, one of the largest consulting companies in the world, as the largest technology park in the country in number of companies and sales in 2005. In 2007 and 2011, the PD was recognized as the Best Technology Park and Habitat for Innovation in Brazil by the Anprotec - Associação Nacional de Entidades Promotoras de Empreendimentos Inovadores (National Association of Entities Promoting Innovative Enterprises)², which represents the interests of business incubators, technology parks and innovative enterprises in Brazil. The recognition came with the National Award for Innovative Entrepreneurship.

Moreover, in 2008, Porto Digital was the only Brazilian technology park to integrate the first edition elaborated by IASP - International Association of Science Parks of the book Learning by Sharing³ which is that featured four parks around the world. And in 2009, BusinessWeek, the largest business magazine in the world, recognized PD as one of the places where the future is being created. That same year, because of Porto Digital, according to a research conducted by Global Services Media, Recife was highlighted in 6th place (the only city in Brazil) in the ranking of 10 emerging cities of the world that will stand out in the coming years the market for outsourcing. Also in 2009 the park was recognized as a reference by Henry Etzkowitz Triple Helix⁴ model. In 2011, McKinsey pointed Porto Digital and the region of Campinas, in São Paulo, as the two innovation environments with greater potential for generation of technology-based businesses in the country

To manage the park, it was created in 2001 the NGPD - Núcleo de Gestão do Porto Digital (Porto Digital Manage Unit), a private and non-profit social organization. Its actions are guided by a strategic plan, whose essence is to strengthen the competitive capacity of enterprises to enable them to access regional, national and international markets, in another scale level and magnitude.

¹ AT KEARNEY. Desenvolvimento de uma Agenda Estratégica para o Setor de "IT Off-shore Outsourcing". Brasília, 2005.

² ASSOCIAÇÃO NACIONAL DE ENTIDADES PROMOTORAS DE EMPREENDIMENTOS INOVADORES. Panorama de Incubadora de Empresas e Parques Tecnológicos 2006. Brasília> ANPROTEC, 2005. Disponível em < http://www.anprotec.org.br/ArquivosDin/Panorama_2005_pdf_11.pdf> Acesso em 29 de junho de 2009. 15:32:57

³ INTERNATIONAL ASSOCIATION OF SCIENCE PARKS. IASP Learning by Sharing Series - Commercialising Science & Technology Parks, Book one. Spain, 2008.

⁴ ETZKOWITZ, HENRY. Hélice Triplíce: universidade-indústria-governo: inovação em ação/ Henry Etzkowitz. - Porto Alegre: EDIPUCRS, 2009.

This strategy involves actions such as increase levels of cooperation between enterprises; increase the capacity of human capital formation both at the technical and management level, improvement of urban conditions and social needs of people living in the neighborhood of Recife, among others. In this context, Porto Digital is a valuable active in Pernambuco's economy with the potential to contribute to improving the productive efficiency standard in any sector and therefore to improve competitiveness levels of domestic and foreign markets.

The role of Technology Parks

As defined by IASP⁵ - International Association of Science Parks, Technology Parks are organizations managed by specialized professionals who aim to provide for your community the promotion of culture of innovation and competitiveness of their companies and research institutions. For this, the park should stimulate and manage the flow of knowledge and technology among universities, R & D companies and their markets, facilitating the creation and consolidation of technology-based companies through incubation and process of "spin-off" as well as providing other value-added quality with space and infrastructure. Moreover, it is required public and private investments and strategic partnerships involving a regional and national economy and encourage the development of new business models, promoting the increase and perfect relation of supply and demand and the consequent creation of jobs.

Assuming such a role, when was requested by the State Department of Education to build an innovative solution that could contribute to improving the educational levels of Pernambuco, the NGPD established a forum for discussion between representatives of the Department itself, the Academy and the private sector to understand the State demand and to organize a proposal of a innovative solution.

Innovative strategic partnership

The triple helix model proposed by Etzkowitz & Leydesdorff⁶, believes that wealth creation and local development can be achieved through innovation and knowledge management, involving Academy, Companies and Government. This relationship, also in accordance with the theory, generates an ascending helix of regional development originated from the flow of knowledge between universities and companies, making these enterprises gain greater competitiveness through more dense products in knowledge.

Given this reality, and the role as a technology park that goes beyond generate synergy among the various actors and stimulate innovation, contributing to the region economic development as a whole, Porto Digital has identified the opportunity and the importance of expanding its activities in accordance with regional needs such as education. Thus, the NGPD promoted the interaction between the various components of the ICT cluster in the state.

NGPD mediated the demand from the Secretariat with the offer by the c resident in Porto Digital creating a consortium of game companies to generate the solution. It was necessary to create that consortium, because the small size of the firms would make them unable to meet the needs the Secretariat individually. Additionally, NGPD introduced the Center of Informatics from Federal University of Pernambuco (CIn/ UFPE) in the project to support the development of educational content in games.

So, by identifying local and regional vocations, and building the economic and technological feasible alternative, it was possible to establish an innovation strategic partnership aimed at improving the

5 INTERNATIONAL ASSOCIATION OF SCIENCE PARKS. IASP. About Science and Technology Parks - Definitions. 2002. Available at < <http://www.iasp.ws/publico/index.jsp?enl=2>>

6 ETZKOWITZ, H.; LEYDESORFF, L. (1996). The Triple Helix University-Industry-Government Relations: A Laboratory for Knowledge Based Economic Development. Amsterdam/New York. New York. USA.

educational indicators of the state and promoting the regional economic development. This strategy resulted in the construction of a Social Technology that is replicable methodologies and techniques, developed in the interaction with the community and represent effective solutions for social change. The initiative was materialized by the creation of the OJE - Olympics of Digital Games and Education, in which educational gaming content is the new strategic tool in the processes of state public education.

About OJE - Olympics Digital Games and Education

Electronic games and activities generated by its use, interaction with other individuals as well as more elaborate processes of reasoning and meaning production, encapsulate the entire operation which is typical of information systems that instrumentalize contemporary societies and at the same time, represent one of the best examples available of attraction for young people in the digital culture. The educational softwares, however, is, in general, very unattractive to the young, and the common electronic game (with "action and adventure") almost never deals directly with conceptual domains of interest in school and may, therefore, the first proves more attractive than the latter in the eyes of young people.

The quality and intensity of engagement of young people with video games in our culture, especially outside of school, create excellent conditions for entry of these individuals in school activities environments that are based on games and focused on significant learning, socially relevant and highly motivating in the point of view of affect.

Based on that, OJE - Olympics Digital Games and Education- was the best way identified to use information technology effectively to enhance communication and the relationship of teaching and learning in public schools of the state aiming to improve the student's performance.

The proposed solution accepted the digital culture language (games, social networks and online research) in order to enhance the immersion and knowledge of young people in Web environments, while they treated the content and knowledge in the context of the school playfulness of a platform composed of challenges and problems that students solve in alliance with their teachers. With this, it was created an environment of intrinsic motivation, regionalized, to the audience of elementary and secondary education in which are used the mechanical and interactivity of digital games to promote learning and training courses that are innovative compared to traditional teaching and with demonstrated efficiency.

OJE is an educational service based on a web platform that helps students and teachers in the teaching and learning through dialogue and the fun. It works as a social network rich in challenges that animate the activity of the players along a collaborative venture based on a set of applications geared for students, teachers and network managers.

On the platform competitions are held where students form teams with their teachers to meet the challenges proposed and score in different contests that give real and virtual prizes in online and live events during the year.

OJE also contributes to the management of schools and educational networks with monitoring tools and data mining that allow the visualization of the students and schools performance in all environments and challenges of the competition in real time. The system is designed with technologies that work on simple computers, considering the reality of the state system of education in Brazil.

Based on the tools of OJE, a large community of practice is formed which main activity is teaching and learning and, unlike what happens in open social networks on the internet, OJE participants feel safe in an environment of controlled access .

Target Audience

The action is aimed at students from public schools with between 12 and 19 years old, generally from lower social classes as well as teachers and managers of these networks. By 2010, the project had 150,000 students and 3.738 teachers registered. This quantity was distributed to 267 cities and 1,889 schools.

Since this is a project aimed to train young people, it is expected that the economic impact of such training can be measured in future surveys, but the social impacts are perfectly measurable by own drive social networking platform. This movement involves creating online relationship between classroom students and teachers.

Impacts in the school routine

In researches conducted with about 1,000 students from nearly 40 000 participants in OJE 2010 that happened in Pernambuco's public schools, 33 percent said that they use more school computer lab, 32 percent do more research for a school subject in books and on the Internet, 65 percent engage more in school activities and 55 percent also play the games of the competition at home. These data demonstrate the potential of the OJE as a pedagogical activity with major impact on young people school life.

In addition, interviews made with the students reveal the qualitative gains of the participants in school life, as demonstrated by the following statements:

"These are puzzles that we have to stop to think, because each word can change the meaning of the question"

"The other people who had no contact with other students, started to build a relationship even with the teacher"

"OJE requires you to think and also create a game strategic"

These statements suggest an improvement in the relationship between students and teachers obtained through an approximation of the teams engaged in academic initiatives. In general it can be seen in schools engaged in the competition a differentiated movement in relation to student motivation for the typical school activities such as research, study and social interaction.

Economic, Environmental and Social Impacts

Since this is a project focused for young training, it is expected that the economic impact of such training can be measured in future with specifics and appropriate surveys. As for the environmental perspective it is worth noting that the issue is addressed across the school curriculum and is also present in puzzles, casual games, wikigames and others. The social impact is perfectly measurable by own drive social networking platform. This movement involves creating bonds of relationship between online and classroom students and teachers.

Thus, the social network is the environment to build relationships, and to stimulate conversation and collaboration between the competition participants, through which all applications can be accessed and activities, including the Olympics itself. It is a platform that enables the maintenance of a network of contacts between teachers and students with whom you can talk through a public message board.

To illustrate the socialization potential of OJE, just know about its first edition that was held in 2008 in Pernambuco, with a pilot event that was attended by just over a thousand students and about 50 teachers from 20 schools in the Recife. In 2009, the second edition of the OJE was conducted in Pernambuco. This edition was attended by approximately 18,000 students and about one thousand

teachers from 368 schools spread across 126 cities in the state of Pernambuco. In 2010, the number of students reached 38 000, the number of schools participating has jumped to 754 from 175 of the 185 cities in the state. In 2009 the state of Rio de Janeiro held an event restricted to 24 schools in the city of Rio de Janeiro, which was attended by just over a thousand students and about 50 teachers. In 2010, the project attracted 60,000 students and over 2,700 teachers, with the participation of 1,143 schools in all 92 cities in the state.

Thus, the OJE plays a role of people aggregator who builds relationships that flow between the online and presence environment, mobilizing the youth for a healthy use of new information technologies and communication, promoting a great competition and collaborative dialogue and learning with fun.

Awards

- (i) E-gov Award, category "Excellence in e-government" (Brazil, 2011) - (<http://www.premio-e.gov.br/>).
- (ii) Finalist at the award "Viva Leitura", category "Society: NGOs, companies, individuals, universities / colleges and social institutions" (Brazil, 2011)" (http://www.premiovivaleitura.org.br/2011_finalistas.asp)
- (iii) Finalist at the Finep Innovation Award, category "Social Technology" (Brazil, 2011)

Replication

The technology was conceived in Pernambuco (2008), but has been applied in other states of Brazil such as Rio de Janeiro (2009 e 2010) and Acre (2011). The technology easily adapts to local contexts because of the infrastructure requirements easily found in the educational networks. Under the cultural perspective, technology finds a broad support in the main target audience due to an increasing insertion of technology and digital culture in the society, especially in schools.

Currently, the competition is present in at least one school in every city in the state of Rio de Janeiro and Pernambuco and has 23 schools in Acre joined.

CONCLUSION

Considering the various actors who interact in the ecosystem of a technology park, the figure of governance is vital not only in promoting the development of environmental technology as well as creation the necessary synergy to come out with innovative solutions. The management unit of the park, as NGPD, is capable of converging actions of various actors and of mediating their strategic relations of interest, contributing to the development of new technologies and implementation of public policies for a common well, developing, thus, the strategic partnership replicable model that can foster the growth of socioeconomic indicators as a whole.

The Technology Park, therefore, can articulate not only with local and regional innovation actors, but also with actors of other sectors, such as education, in order to overcome daily bottlenecks. In the case of the education sector the bottlenecks are evasion and low school performance leading to the failure. With the IT transversally the technologies solutions are used to overcome these kinds of daily challenges and to increase the competitiveness of the IT sector as well, that is strengthened more and more with actions focused in the regional needs and also contribute to more strengthened and homogeneous economic development.