AN EXPERIENCE IN THE EVALUATION OF E-LEARNING FOR IT TRAINING AND CERTIFICATION

Louiza An [*] **and Luis G.Restrepo** [**]
Translation from Spanish into English by Tom Secretan and Diego Burgos

Summary - **Looking to promote within the country a socially wide ranging IT exposure that would be sustainable and have a positive impact on the country's development, the Colombian Government was inspired by India's experience in the development of its own successful Information Technology sector and went on to construct a programme called the 'Connectivity Agenda'. This programme is comprised of the following six strategies: infrastructure access; education and training; e-commerce; e-government; boosting the IT industry and increasing Colombia's website coverage. One of the components of the Education and Training strategy is the National Project of Training and Certification in Information Technology which looks to train, to an international standard, some 5000 professionals within 7 years. After a year of development the Project's advances were evaluated in various cities around the country. Using the evaluation from one of those cities we have set out the following, principal results which can act as a reference for other countries who wish to implement similar IT projects.**

Key words – **e-learning, evaluation, training in information technology, certification in information technology, Colombia.**

1 National Project of Training and Certification in IT

As a result of a visit in 2001 by the then President of Colombia Andres Pastrana to India, a country which had previously developed a successful strategy in the training of information technology [1], the idea arose to design and develop an IT training model in Colombia. The National Project of Training and Certification in Information Technologies was initiated under the framework of the Connectivity Agenda [2]. The programme looks to expand the use of Information Technologies (IT) in order to increase the competitiveness of the manufacturing sector [3][4], modernise the government and public institutions [5] and open up the access to information technology and to the Internet. The institution designated to carry out the project was COLCIENCIAS, Colombian Association for the Advancement of Science.

1.1 Project's Objectives and Development

The project's specific objective is to offer to an estimated 5000 colombians over a period of 7 years training, to a world ranking certification level, in software development and other related services.

In order to achieve those high levels of quality it was vital to have, as partners, manufacturing technology companies of an international reputation who could supply their own course material and proven methodologies. This was to insure that the training was to a certified international quality and agreed with the profiles demanded by the worldwide IT industry; for example, network specialties of the Cisco Academy and software from Microsoft.

The project looks to support the consolidation of the national IT industry in order to take it to levels of international competitiveness [6] [7].

To develop the project, COLCIENCIAS selected – through bids – 13 training institutions of a national level. Each one of these institutions had to be associated with an IT company of international renown in order to guarantee the validity and quality of the e-learning content and methodology.

---

[*] Louiza An: Director of National and International Cooperation, Colombian Polytechnic J.I.C., Medellín, Colombia. louizaan@epm.net.co.

[**] Luis Guillermo Restrepo Rivas: Researcher & university teacher, Medellín, Colombia. x@LuisGuillermo.com

1.2 Beneficiaries and credit

Those incorporated into the project as students are beneficiaries of a credit for the cost of the training programmes with the possibility of gaining parcial debt cancelation. This credit is administered by the Colombian Association for the Advancement of Science (A.C.A.C)

The requisits needed in order to become a beneficiary are as follow: Colombian nationality; aged between 21 and 45 years old; in posession of a professional, technological or technical degree; coursed in a minimum of 6 semesters of university study or with two years of programme-related work experience; admittance into one of the project's training institutions; presentation of the certification exams during, or at the end of, the training; and finally to be in a financial capacity that otherwise would not permit the student to participate in the programme.

2   Evaluation

As one is able to apreciate, this project is a first in the country, novel because it is e-learning [8] with international partners and unique because of the number of beneficiaries it embraces.

With the objective of making a monitoring and evaluation concerning the development and impact of the project a year after it was initiated, COLCIENCIAS contracted various consultants in order to carry out these evaluations in the different cities where it was in place.

This evaluation would have to take into account the quality of the e-learning process, the number of people certified in the estimated time and the impact on the IT sector due to improvements in the companies within the sector or by the creation of new companies. In short, the objectives of the consultation were as follows:

- To evaluate the service given by the training organisations.
- To evaluate the follow up process on the training organisations.
- To propose corrections in order to guarantee the quality of the service given.

The authors of this present article were comissioned to implement the evaluation in the city of Medellín [9] where the national educational institutions, with their respective international partners, were as follows: Information Technology and Education S.A with Aptech Ltd (India); Alliance Group S.A with Executrain Enterprises (USA); National University of Colombia (Medellin headquarters) with Cisco Systems Inc. (USA); New Horizons S.A with New Horizons Computer Learning Centers Inc. (USA).

2.1 Evaluation Methodology

In order to realize the evaluation, the following activities were carried out:

- Design of a Simplified Model of Quality.
- Identification of information sources.
- Elaboration and testing of the survey forms.
- Preparation of aids for the field investigation.
- Planning the information harvesting activities.
- Processing the data.
- Analysis of collected data.
- Validation and adjustments to the information.
- Summary of recommendations and conclusions.
- Production of the final report and the executive report, and the presentation of both of them.

2.2 Simplified Model of Quality

The evaluation of e-learning with international partners was based on a Simplified Model of Quality and comprised the following components:

- The marketing of the programmes: This includes the promotion and reach of the project, the criteriors in the selection of students, the price and finally the credit conditions.
- The programmes' content: Provided by the international partner in the form of e-learning. Here, the coherency, topicality, coverage and relevence of the contents are evaluated, just as are the quality, language and availability of the study materials.
- The training and certification methodology: The suitability, adaptability, efectiviness, balance between theory and practice, continuity, evaluation tests, schedules and work load are all evaluated.
- The teaching staff: Evaluated in their command of the subjects, methodology and style, consultations, handling of equipment, time management and interpersonal skills.
- The students: They were evaluated in their previous knowledge, dedication, self-learning discipline, handling of the English language and their commitment to achieving the final certification.
- The administration: The evaluation looks at the relationship between the organisations involved: the training institutions, the project administrators and the international partners; just as it details the relationship between the teaching staff and students.
- Technical infrastructure and location facilities.
- The orientation towards the labour market.
- The degree of student satisfaction.

2.3 Collected Information Documents and Tools

- Documentation about the project, the training institutions, the international partners, the conditions on franchising the training programmes.
- Surveys for students.
- Surveys for teaching staff.
- Surveys for computer sector employers.
- Interviews for directors and administrative staff of the training institutions in order to find out about the characteristics of every institution and their franchise agreements with the international partners.
- Workshops with focus groups [10] in each training institution in order to complement and validate the collected information from the surveys made.

All the surveys, interviews and workshops were designed according to the Simplified Model of Quality, shown previously.

2.4 Participants Consulted

- Directors and administrative personnel from the project's training institutions.
- Beneficiaries: the students
- Graduates: Beneficiaries who have already completed their training programme.
- Teaching Staff: Personnel who carried out the teaching role within the project.
- Employers: IT business directors and managers, potential employers of the trained and certified graduates.

2.5 Processing of information

Running parallel to the qualitative analysis of the information collected, the quantative indicators were calculated [11] in the form of percentages and are representative of each one of the quality factors, for each training institution, considered in the Simplified Model of Quality.

3 Main results and recommendations

Up to the date of the evaluation, the total number of beneficiary students in the project, from the four institutions of Medellin, was 259.

After summarizing the results using the student's degree of satisfaction, an indicator which reviews how the different factors involved in the teaching process are perceived and evaluated by the students, we found that in two of the training institutions the percentage of those who declared themselves to be very satisfied was low: 32.8% and 42.4%, whereas in the other two institutions evaluated the percentage was much higher at 71.4% and 84%.

After critically analysing and evaluating the collected and measured information, the following recommendations were produced. These recommendations can be taken into consideration by any regional or national administration which wishes to implement IT training and certification projects similar to the one implemented in Colombia.

- Adapt the e-learning methodology to suit local charateristics because although some methodologies have been proven by the international partners in other cultures it is still necessary to adjust them to the particular conditions of the students in their own environment. This means making changes to the instructional approach and amount of content in the course.

- When opening new programmes, look for a balance between the current state-of-the-art techniques and the actual requirements of the local population.

- Continually market the project and supply to those interested clear, precise and complete information about the training and qualification programme. This should be done before students are admitted to the project and, in particular, the publicity's focus should be centred on attracting people with a suitable profile and not creating false expectations.

- Design and apply suitable entrance exams in order to guarantee from the students a defined profile in IT and a sufficient proficiency in the English language.

- Implement a system of e-learning evaluation and monitoring.

- Exchange between the training institutions their best practices and methodologies.

- Reinforce the commitment of international partners.

- Promote the administrative autonomy of training institutions and, in particular, that of their regional headquarters.

- Define and apply appropriate criteria for the selection of teaching staff, concerning both their specific technical knowledge and their pedagogical qualification, and encourage them for good performances.

- Overview the quality and appropriateness of course material, especially with the accuracy of any translations used.

- Inform and guide the students about starting up a business.

- Involve other government organisations, for example the ministeries, in order to leverage the project and increase its impact on national development.

- Establish and maintain excellent relations with the business sector so that they are familiar with the project and are ready to take on students for pratical training, and also employ them once they have graduated.

4   Conclusions

It was found that the training institutions have really taken on the project and shown all their determination in achieving the set goals. However, considering that training is a process, the recommendations stated above are there in order to reduce the risks of failure, improve the project's development and impact on the socialeconomic development of the IT sector and assure that the project's set objectives are reached.

Although it is necessary to make certain adjustments to the development and monitoring of the project, we consider it is necessary for the country to continue with initiatives of this kind which count on the participation of international partners, look for a quality according to international standards and which profit from the e-learning methodology.

5   References

[1]   Bomsel, O. Ruet, J. Cognet, S. et al. (2001) *Digital India: Report on the Indian IT Industry*. Centre d'économie industrielle Ecole Nationale Supérieure des Mines de Paris, Paris.

[2]   Departamento Nacional de Planeación República de Colombia (2000) *Agenda de Conectividad*. Documento CONPES 3072. Bogotá. Available on the web:

http://w3.agenda.gov.co/documents/files/CONPES%203072.pdf

[3]   Tapscott, D. (1996) *The Digital Economy*. McGraw-Hill.

[4]   Quinn, J.B, (1992) *Intelligent Enterprise*. The Free Press.

[5]   See the website of the colombian e-government initiative: www.gobiernoenlinea.gov.co

[6]   COLCIENCIAS. (1993) *Nuevas Tecnologías para la Modernización: Bases para un Plan del Programa Nacional de Electrónica, Telecomunicaciones e Informática*. Bogotá.

[7]   COLCIENCIAS. (1997) *Plan Estratégico: Programa Nacional de Electrónica, Telecomunicaciones e Informática*. Bogotá.

[8]   Wilson, D., Callaghan, T. and Honore, S. (2000) *E-learning The Future of Learning*. Whitepaper. eLearnity Ltd. Cirencester (Glos), UK.

[9]   An, L. (2003) *Evaluación del servicio prestado por las entidades de capacitación participantes en el Proyecto Nacional de Capacitación y Certificación en Tecnologías de la Información en la ciudad de Medellín*. Medellín.

[10]   Krueger, R.A. and Casey, M.A. (2000) *Focus Groups: A Practical Guide for Applied Research*. 3rd edition, Sage Publications, California.

[11]   Hernández, R.H., Fernandez, C. and Baptista, P. (2000) *Metodología de la Investigación Científica*. 2[nd.] edition. McGraw-Hill Interamericana.