NetStart – Achieving new abilities with ICT

Luís Barreto, Alexandre Vilaça, Cláudia Viana

***Abstract*- This work presents the NetStart project. The project main objective is to develop a set of tools and learning environments allowing people to develop, or update, their abilities. The first step of the project, as it is supported in a set of Web based tools and ICT technologies, is to give their users some basic computer skills. And then, users through a cycle o continuous improvement, supported in virtual learning environments, will be able to gain, or improve, abilities. This continuous improvement cycle is called IPAT- Personalized Itinerary through Technological Adaptation. In its first phase IPAT will allow disfavored people like unemployed, young people with low qualifications and older actives to acquire the necessary abilities to use the basic Web and ICT tools. This phase is supported in a Flyer and a CD-Rom. The Flyer shows the basic steps of turning on a computer and accessing the CD-Rom. The CD-Rom has a set of interactive tutorials that, in a very clear and simple manner, will allow the user to acquire skills for using the basic ICT tools and, also, the tools used in the project. In its second phase the IPAT will lead the user to trace its goals of career, using for that, professional profiles adjusted to the work market and to the new and emergent job types, in order to take a place in the work market.**

***Index Terms*— abilities, e-learning, professional profiles, training**

I. INTRODUCTION

Northern Portugal region, and specially the region of Viana do Castelo, is facing a real problem. New jobs are emerging; unemployed people and older employees need to develop new abilities and competencies [1]. Another problem is the lack of knowledge and utilization, among this group of people, of the new Information and Communication Technologies (ICT). This region also has a relevant number of young people with very low qualifications that only can get low qualification and low wage jobs [2,3,4].

ICT allows in a more flexible and easy way, namely through e-learning, to rapidly achieve or develop new abilities [5]. So it's necessary to increase the knowledge and the dissemination of these new technologies within our region.

Luís Barreto is with Escola Superior de Ciências Empresariais do Instituto Politécnico de Viana do Castelo, AV. Miguel Dantas, 4930-678 Valença (e-mail: lbarreto@esce.ipvc.pt).

Alexandre Vilaça is with Exertus - Consultoria em Organização e Estratégia Empresarial, Lda. Centro Empresarial da Maia - Sala 206, Rua Eng. Frederico Ulrich, 3210 - Bloco B - 2º, 4470-605 Maia (e-mail: alexandre.vilaca@exertus.pt)

Cláudia Viana is with Associação Empresarial de Viana do Castelo, Largo João Tomás da Costa, 41 – 1º, 4900-509 Viana do Castelo (e-mail: claudiaviana@aevc.pt)

Publisher Identification Number 1558-7908-062008-44

II. MAIN GOALS

NetStart Project main goals are the development of several instruments that will allow, in an independent way, people, and especially unemployed, young people with low qualifications and older actives, to begin using ICT and then being able, supported in those technologies, to develop new abilities, thus becoming more competitive and capable of facing new career challenges.

Netstart is a project within the EQUAL[1] Initiative, and is funded through the European Social Fund. The EQUAL initiative is a laboratory for new ideas, implemented in and between Member States, to the European Employment Strategy and the Social inclusion process. Its mission is to promote a more inclusive work life through fighting discrimination and exclusion based on sex, racial or ethnic origin, religion or belief, disability, age or sexual orientation.

Netstart Project is focused on the abilities development, beginning with basic computer skills needed for accessing the project web based tools, and proceeding, according with the established objectives, through a cycle of continuous improvement of the abilities. For the achievement of all these goals it was defined the Personalized Itinerary through Technological Adaptation (IPAT). This Personalized Itinerary consists of two distinct phases. The first phase will emphasize in giving the target users the first steps in using and accessing the basic ICT and web tools. This phase is supported in a Flyer and a CD-Rom. The second phase, the more important and also core of the project, will lead users to trace its goals of career, using professional profiles adjusted to the work market of the region and, also, adjusted to the new emergent jobs, in order to take a place in the work market. This phase is composed by a web based application and an e-learning platform.

III. DIAGNOSTIC

All the members of the NetStart partnership noticed, while developing their normal activities, that people were worried with their professional development. This was a way of increasing their employment capacity and also their opportunities for better wages. But their concerns, regarding their professional development, were not followed by the organizations main concerns and, also, by the market needs. This was leading to low levels of employment and qualification.

A question arose: "What is the most suitable model to develop, in a continuous way, training, that could be used equally by unemployed and employed people, conciliating practice and theory?" This problem was, in an initial

[1] http://ec.europa.eu/employment_social/equal/index_en.cfm

1558-7908 © 2008 IEEE Education Society Students Activities Committee (EdSocSAC)
http://www.ieee.org/edsocsac

phase, formulated in an empirical manner based in the experiences of the partnership. Afterwards, this was validated through the diagnose phase.

For the diagnostic analysis was taken in consideration micro, macro and local data. To obtain micro data it was used an inquiry in all the companies of the region (mainly Small and Medium Enterprises- SMEs). This inquiry was related to four distinct areas: target users/public, Internet access and type of connection (low or high bandwidth), analysis of the technological evolution within the organization and evaluation of their training programs and, finally, their sensibility to training supported in e-learning [6,7,8].

The macro data was obtained consulting National and European Governmental Organizations such as: Instituto Nacional de Estatística [2], the National Action Plan for Employment [1] and the European Employment Strategy [9]. Finally, to obtain local data meetings - called focus groups – were organized with all the local entities concerned with the employment/unemployment issues. Unions, Enterprise Associations, Regional Associations and the National Employment Institute/ Instituto de Emprego e Formação Profissional [3] were the participants in those focus groups.

After all the data analysis, it was clear that: there was a great gap between people's individual training and the real enterprise needs; ICT technology was not fully used within the organizations, unemployed people were mainly in the range of 35-40 years old having great difficulties in using ICT, in the region there was not a strategy for the development of ICT supported training, the region was not aware of the advantages of e-learning and b-learning. The main reasons for the inscription of unemployed people in the local employment service [10] are shown in Fig. 1 (it must be emphasized that "fired" and "end of short period job" are the most relevant components).

With all the previous results, it was evident that it was important to put organizations and people seeking, in terms of training and abilities, the same solutions and results and, thus, it was necessary to build a bridge that would be the shortest path between the enterprises and the society.

The NetStart Project was, therefore, organized in a way that could support and develop all the economic tissue in the constant acquisition of knowledge through a technological platform available to organizations and people. This platform would be concerned with the abilities development and the professional orientation, leading, consequently, to a high employment success rate.

IV. Learning Pathway Development

During the development of this project there were different moments for clarifying and redefining the problems to solve, and the goals to achieve. These moments were composed, mainly, of information research and analysis, ideas discussion and evaluation, test and assessment of its applicability followed by its validation. To, effectively, finish these tasks some project management tools were used.

These were very important moments for the partnership as it was possible, with the help of some SMEs and target

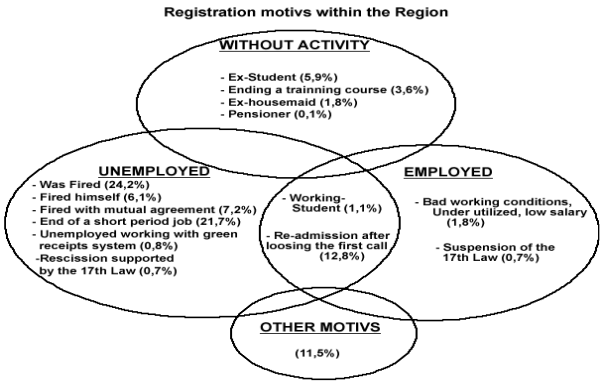

Figure 1. Main reasons for the inscription in the Local Employment Service.

users, make decisions that consistently guided all the work.

All the methodology used was supported in a constructive process where all the results of the initiatives taken (we can refer the target public participation) were effective contributions to the development of all the products.

Involving the target public was done through the realization of traditional training in basic ICT knowledge. This training allowed us to realize the real difficulties of the target public when using ICT. This training was, also, very important for the development of the first version of the flyer. Two more training courses were done, "How to become a successful commercial" and "ICT for life". These two courses were done in e-learning and with different pedagogical methods. They allowed us to define the best learning and training method for both the companies and the people. These two courses were also important to validate what type of technique, regarding electronic learning, would better suite people needs and, of course, companies needs.

Another important moment, in the development of the learning pathway, was the definition of the professional profiles that would guarantee a high level of employment in the region [11]. The definition of those profiles was done in close collaboration with the potential beneficiaries- organizations and people - leading us to a group of essential training modules. These training modules were specially adapted to the real companies needs. This result was very important and was used to simplify all the training developed.

As a way to validate all the work done defining this pathway - and to end the cycle –the trainees worked in real conditions in some of the companies, for an experience period of three months. This allowed trainees, in a practical manner, to evaluate and apply all the knowledge obtained during the e-learning sessions.

V. Pedagogical Models

As mentioned before different pedagogical models were used during two of our on-line courses. We used linear and nonlinear models [12]. We also used different kinds of collaboration and participation teaching techniques [13].

It was possible to realize that linear models were easy to establish but they were nor very effective in

1558-7908 © 2008 IEEE Education Society Students Activities Committee (EdSocSAC)
http://www.ieee.org/edsocsac

maintaining students/trainees motivation. Thus, we introduced some changes to this model. In one of the tests, the trainer would be seated in a different classroom, and using the chat tool would try to evaluate how the trainees felt about all the learning process.

Nonlinear models were more effective, but with trainees that have more language and interpretation difficulties the results were not very satisfactory. So it was important to use a mix of both models.

It was also important to realize that keeping trainees' motivation in high levels was of extreme importance for the courses success. Another conclusion was the need to use working groups and to use, during the learning process, games that allowed students to solve problems, and, thus, obtain the necessary knowledge in a more flexible way.

VI. Learning Model

As our main target public was a target group with a lot of difficulties, especially concerning the use and accessibility of the new ICT training/learning systems and tools, it was important to define a learning model that was able to keep their motivation in satisfactory levels.

It is important to mention that a person who does a learning pathway, which drives to a new professional profile, has to do a set of training modules that in a whole will be considered a training action.

Thus, thinking in our target public, and after having discussed the results of all the tests, the partnership decided that the learning model should have the following characteristics: each training module should guarantee the acquisition of abilities needed to the development of real tasks; each training module shouldn't correspond to more than 12 hours of trainee work, this is an important issue essentially related to people's motivation; all the content should be able to involve the participants, thus, the referred content should be interactive enough (too much interactive would arise new problems); all the training modules should have an initial and ending live sessions, the ending live session should be used for the trainees evaluation, this is important for training recognition among the SMEs; all the sessions should be supported with working techniques (individual work, team work, ideas discussions), this would allow a higher participation and intervention of the trainees. Also, as a way to keep the group of users motivated, it was decided that a Tutor should have an active participation and all the language used should be as simple as possible.

For supporting these results, we defined a set of professional profiles and we offered to fifteen users the possibility of doing a complete learning pathway. Among those users we had employed and unemployed people. Almost 87% of them finished his/her learning pathway, and were able to candidate to a new job. From those, 50% were able to get a new job. These were very encouraging results.

VII. NetStart Products

As mentioned before, NetStart Project had two distinct phases- they together realize the Personalized Itinerary through Technological Adaptation - and each phase has also a set of tools and products. The following sections will describe each of its products and tools.

A. *First Phase Products- Flyer and CD-Rom*

The products that belong to this phase are a flyer (Fig. 2) and a CD-Rom (Fig. 3). The flyer will give all the necessary directions, to someone without any computer skills knowledge, to start using a Personal Computer (PC) until the stage of inserting and start using the CD-Rom. All the language used within the flyer and the CD-Rom is very simple and easy to understand. This is a very important factor, as we are dealing with low qualification people. Thus, it was also decided that all the language in the development of the project would have a special attention, allowing more people to use all the project tools.

The CD-Rom consists of several games and tutorials that will allow the user to access, in an independent way, the second phase tool and the e-learning content. The CD-Rom is divided in four main subjects: Knowing better your PC (using the mouse and the keyboard, how to use programs/applications, etc.), the Internet (browser, hyperlinks, search engines), E-mail as an important communication tool (how to create an email account, how to use e-mail) and how to use NetStart (portal, tools and e-learning platform). All the tutorials in the CD-Rom are interactive and have the user as a privileged participant in them. This will allow the user to get all the necessary knowledge in a pleasant and simple way.

Figure 2. Flyer

1558-7908 © 2008 IEEE Education Society Students Activities Committee (EdSocSAC)
http://www.ieee.org/edsocsac

Figure 3. NetStart CD-Rom.

B. *Second Phase Product- Diagnostic platform*

This phase is supported in a web based application. In this application, developed within the project partnership, the user, after an initial registration, selects the job functions were he already has abilities and then regarding those job functions he has to select what tasks/roles he has skills. Going on, the user has to select the level of ability that he has for each task. For simplifying all the process, three levels were defined: simple, medium and advanced. Then, the user has to select how he will prove those levels. He can prove it with a document, for example with a certificate; his employer can also prove its abilities levels and he can also ask for a diagnose test. The next step will make a match between the profiles and needs that are stored in the system and the information introduced by the user. For a better reading and understanding, the results are graphically represented and show how approximate is the information introduced by the user to the profiles needed or stored in the system. For finishing all the process, the user selects a profile that satisfies his career goals and the system will return his Personalized Itinerary. The itinerary will inform the user his training needs to entirely satisfy, considering as a starting point his actual abilities, the professional profile chosen.

The web application stores all the information introduced by the users and keeps track of all changes occurred, and, as needed, users can access and update the information. The web application retrieves what activities - namely training courses, proof of task/roles levels - are done and what need to be finished.

Employers or organization managers can, also, use the web application to submit and/or introduce specific needs, and to manage the training needs within their own organizations. The development of this web application was preceded by the definition of a functional analysis (Fig. 4). For the development of this functional analysis was important the participation of the target people, the technicians and, also, the partnership. They together worked as a whole, satisfying all the requirements and defining a tool that can increase the competitiveness of the region. The functional analysis was supported in the work of [14,15,16].

When the user has his Personalized Itinerary, he can participate in online training courses and reach the goals and abilities asked by the selected profile – this

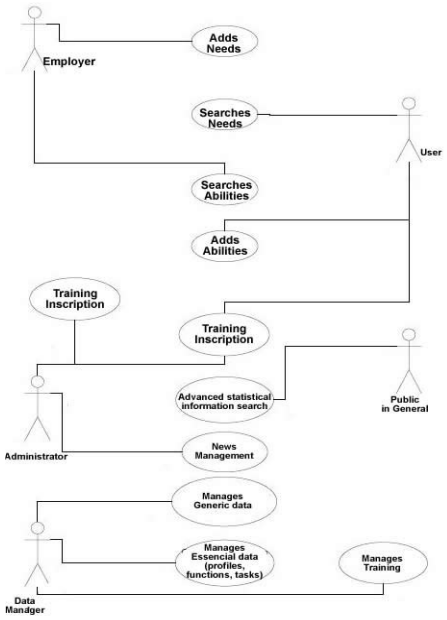

Figure 4. Functional Analysis.

corresponds to the third phase. This phase only depends on the motivation and the needs of the user. It was privileged the e-learning system known as blended learning (b-learning), and it was also defined that all the evaluation would be done physically in a classroom. This is important for the credibility and recognition of the abilities among the employers. The training courses, if chosen by the user, can be done externally, even through traditional training systems (physical classroom). After the completion of the courses the user will be able to update its itinerary. Such process allows the user to choose what best suits its interests and needs.

Architecture

The Diagnostic Platform allows the collection, integration and availability of professional profiles. The system uses a traditional three layer approach composed by presentation, business/application and data layers.

The presentation layer is composed by a web application, developed with Flash [17], JavaScript [18] and PHP [19]. The web interface was designed to include graphical components and layouts to summarize user data and reproduces the personal professional profile of each user.

The application layer is composed by an integration engine and a set of web services that allow access to the data layer. The data layer includes a repository, developed with MySQL [20] database management system.

The core system is composed of four modules: a module for the individual access, a module for enterprise access, a matching abilities module and a administration module. All these modules store information in the MySQL database. This allows the integration of new data efficiently and also to retrieve statistical information very easily and quickly.

1558-7908 © 2008 IEEE Education Society Students Activities Committee (EdSocSAC)
http://www.ieee.org/edsocsac

The four modules access the database through PHP functions and procedures

VIII. Conclusions and Future Work

NetStart is a powerful mean of competitiveness improvement supported in abilities development and ICT. These together, surely, will make the difference and will start changing the training paradigm in the region and possibly in all European countries. Nowadays, the traditional training is used; the tools and results of the NetStart project firmly advise that it is time to move on and to assume that training can be more flexible and accessible. All these results will be in a web portal (www.netstart.pt – Fig. 5); from here it will be possible to access the web application, the e-learning platform and also relevant information.

NetStart set of tools also allow people to increase their ICT abilities. The utilization of these tools will result in an increase in ICT usage and, also, in a more efficient exploration of all the information and content created and delivered by those technologies.

NetStart web portal wants to be, to all people with low qualifications, an open door to the digital world. Its main development characteristics, such as ease of use and simple language, will allow a low qualification person to find their real needs in terms of professional competencies and will, also, allow this same person to select and begin new training, supported in ICT, which will satisfy the organizations real needs.

All the tests done allowed us to conclude that this is an effective model. Easily and quickly it is possible to acquire the basic abilities for the development of a task/ function. This functionality facilitates not also employment but, and sometimes more important, the integration of any person in an organization or even in the society.

Nevertheless, we have to evaluate the results of the project application in a more real scenario, i.e. in presence of a higher number of SMEs and users. It is also necessary, after a period of further utilization, to make a comparative evaluation of the employability level in the region.

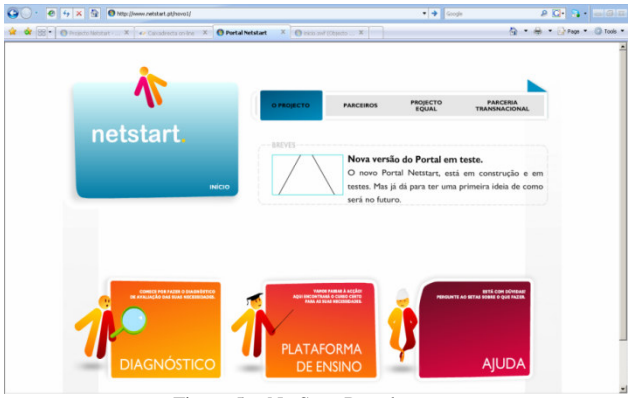

Figure 5. NetStart Portal.

References

[1] National Action Plan for Employment, http://www.dgeep.mtss.gov.pt/estudos/pne.php. Retrieved September, 16, 2008.

[2] Instituto Nacional de Estatística, http://www.ine.pt. Retrieved September, 16, 2008.

[3] Instituto de Emprego e Formação Profissional, http://www.iefp.pt

[4] Confederação do Comércio e Serviços de Portugal, http://www.ccp.pt. Retrieved September, 16, 2008.

[5] Sarojni Choy, *Benefits of e-Learning Benchmarks: Australian Case Studies*. Queensland University of Technology, Australia

[6] International Labour Office – Genève, Recommendation concerning Human Resources Development: Education, Training and Lifelong Learning, Recommendation 195.

[7] Programa Operacional Temático Potencial Humano (FSE) – QREN, http://www.qren.pt/item3.php?lang=0&id_channel=34&id_page=203 /. Retrieved September, 16, 2008.

[8] TRICTSME- TRaining of Information and Communication Technologies for Small and Medium Sized enterprises, http://vegnet.beds.ac.uk/trictsme/index.htm. Retrieved September, 16, 2008.

[9] European Employment Strategy, http://ec.europa.eu/employment_social/employment_strategy/task_en.htm. Retrieved September, 16, 2008.

[10] IEFP: Relatório Trimestral, Evolução e Situação dos Mercados Locais de Trabalho, 2º Trimestre 2004.

[11] Catálogo Nacional de Profissões, http://portal.iefp.pt/portal/page?_pageid=177,139188&_dad=gov_portal_iefp&_schema=GOV_PORTAL_IEFP&id=4. Retrieved September, 16, 2008.

[12] Ronald Robberecht, *Interactive Nonlinear Learning Environments*. Department of Rangeland Ecology, University of Idaho, Moscow, ID, USA

[13] Karin Tweddell Levinsen, *Collaborative Online Teaching – the inevitable path to deep learning and knowledge sharing*? Copenhagen Business School, Institute of informatics, Copenhagen, Denmark

[14] HR Online Inc.: Performance Development Smart Suite: A comprehensive integrated web enabled suite of HR workflow process, (2004).

[15] Lavoro Regione Emilia-Romagna, http://www.provincia.bologna.it/lavoro. Retrieved September, 16, 2008.

[16] Servicio Basco de Empleo, http://www.lanbide.net. Retrieved September, 16, 2008.

[17] Adobe Flash Professional, http://www.adobe.com/products/flash/, Retrieved September, 16, 2008.

[18] Core JavaScript, https://developer.mozilla.org/en/Core_JavaScript_1.5_Guide, Retrieved September, 16, 2008.

[19] PHP Hypertext Preprocessor, http://www.php.net/, Retrieved September, 16, 2008.

[20] MySQL Open Source Database, http://www.mysql.com/, Retrieved September, 16, 2008.

Luís Barreto received the B.A. degree in Electrotechnical and Telecommunications Engineering from the Oporto University, Portugal, and the Master degree in networking systems and security by the same University. He is a Ph.D. student in Electronical Engineering at the Aveiro University, Portugal. He is currently a Professor, Vice-President of the direction board of Business Science Superior School, Polytechnic University of Viana do Castelo (Escola Superior de Ciências Empresariais- Instituto Politécnico de Viana do Castelo) and Coordinator of the Business Computing Course.
He is, also, the manager of different R&D projects, namely: NetStart (http://www.netstart.pt), CSI- Cooperation Servicing Innovation and SeeLe (Seeking Learning Evaluation- http://seele.ipvc.pt). The following subjects are Luís Barreto main interests: Networking Protocols, Wireless Security, Ad-hoc and Wireless Networks, E-learning, Web 2.0, Informal and Formal Learning.

1558-7908 © 2008 IEEE Education Society Students Activities Committee (EdSocSAC)
http://www.ieee.org/edsocsac

Alexandre Vilaça received the B.A. degree in Industrial Engineering from the Minho University, Portugal. He is currently a senior consultant of Exertus - Consultoria em Organização e Estratégia Empresarial, Lda.
He participates in different R&D projects, namely: NetStart (http://www.netstart.pt), InnovCom (http:// http://www.innovcom.info/), CSI- Cooperation Servicing Innovation and SeeLe (Seeking Learning Evaluation- http://seele.ipvc.pt). The following subjects are Luís Barreto main interests: E-learning, Learning evaluation, Web 2.0, Informal and Formal Learning.

Cláudia Viana received the B.A. degree in Management from the Polytechnic Institute of Viana do Castelo, Portugal. She is currently the Coordinator of the AEVC Enterprise Services Department.
She participates in different R&D projects, namely: NetStart (http://www.netstart.pt), InnovCom (http:// http://www.innovcom.info/), CSI- Cooperation Servicing Innovation and SeeLe (Seeking Learning Evaluation- http://seele.ipvc.pt). The following subjects are Luís Barreto main interests: E-learning, Learning evaluation, Web 2.0, Informal and Formal Learning.

1558-7908 © 2008 IEEE Education Society Students Activities Committee (EdSocSAC)
http://www.ieee.org/edsocsac