Available online at www.sciencedirect.com

ScienceDirect

Procedia - Social and Behavioral Sciences 237 (2017) 1316 – 1322

Procedia
Social and Behavioral Sciences

7th International Conference on Intercultural Education "Education, Health and ICT for a Transcultural World", EDUHEM 2016, 15-17 June 2016, Almeria, Spain

Diagnosis of educational needs for the implementation of blended courses based on the blended learning model. The case of the Social Sciences Faculty of the National University of Costa Rica

Rebeca Soler[a], Juan Ramón Soler[a] & Isabel Araya[b]*

[a]*University of Zaragoza, Zaragoza, Spain*
[c]*National University of Costa Rica, Heredia, Costa Rica*

Abstract

This study is accomplished from the educational needs assessment in the framework of educational research. The objective is to identify, analyse and assess human resources and materials. In this sense, didactic principles will also form part of the analysis. In particular, those applied in studies offered by the Social Sciences Faculty of the National University of Costa Rica (SSF) to implement blended courses based on the blended learning model. Quantitative and qualitative research techniques were used to gather information from a complementary approach, in order to describe and interpret the different sources. That process included three phases: document review; surveys done to students and teachers; structured interviews to school principals and deanship. The results show there are appropriate curricular elements to venture into innovation proposals regarding academic offer in terms of flexibility and ICT incorporation in training programs. Likewise, the blended learning is an option which contributes to the quality of education, access opportunities and the educational processes improvement.

Peer-review under responsibility of the organizing committee of EDUHEM 2016.

Keywords: Curricular diagnosis, blended learning, university education, curricular flexibility, ICT in training programs

* Corresponding author. Tel.: +7-903-740-44-16.
E-mail address: isabel.araya.munoz@una.cr

Peer-review under responsibility of the organizing committee of EDUHEM 2016.
doi:10.1016/j.sbspro.2017.02.216

1. Introduction

This research is contextualised in the Costa Rican public higher education field, in order to analyse the basic curricular elements for the blended subject design of learning blended courses. Subjects design is part of the curriculum planning carried out on the basis of a prior diagnosis and this constitutes the theoretical benchmark in contrast with reality. According to Soler (2015) the information emerged from this analysis is the basis for its design and in turn, it points didactics as an overall vision between the intentions and the training project development.

Following that point of view, Escudero, Área, Bolívar, González, Guarro, Moreno & Santana (1999), point out two axes which determine the different meanings of the curriculum: the plans or intentional learning results (target or goals), and the processes and experiences in the classroom. From this definition, three fundamental aspects can be drawn: intentions and principles, scope and development, and assessment.

When it comes to subjects design, in the blended learning model, diverse elements are theoretical and practical which serve as base for the construction of knowledge. The following authors were considered for this study: Valdivia (2009), about online practice communities and collaborative work were considered; Vieira (2011), on how to understand the virtual space, how to use it, and how this environment modifies the methodology, resources, and interactions; López, Pérez & Rodríguez (2013), the relationship between motivation and school performance; Bartolomé & Sandals (1998), the importance of the computer in the teaching-learning processes; Baños (2007), the platform Moodle as a tool developed from a constructivist philosophy of learning; El-Hmoudova & Tejklova (2016) assessment of the e-material learning potential. Moreover, subjects such as web 2.0, social networks, Google Drive, Mooc, (Massive Open Online Courses), WhatsApp, Mobile learning, biolearning, Big6 model for the problem-solving solution, etc.: (Fuentes, 2010); (Camacho & Lara, 2011); (Shaidullin, Safiullin, Gafurov, & Safilullin, 2014) and (Siew-Ling & Anak, 2015).

According to Porter, Graham, Spring, & Welch (2014); Krasnova & Demeshko (2015) and López (2011) fundamental elements in a blended learning training program are taken up again and were settled on to study the following categories: technical assistance and infrastructure; pedagogical-teaching support, learning development, professional development and institutional strategies. Based on those categories, the following research objective was established: identify, analyse and assess the human and material resources from SSF for the implementation of blended courses based on the blended learning model.

2. Material and method

This hermeneutic-interpretative educational research Pérez (2004) offers relevance the already existing points of view and trends and to the verification of facts from a quantitative and qualitative application for information collection and data analysis.

The study population on students (409), teachers (74), headmasters (1), Deanary authorities (7), institutional platform coordinators (3), all from Heredia´s central campus of the National University. Complete surveys are the subsequent result back to the depuration of valid records, after a single verification in the resulting database.

A survey was applied to students and teachers using online tools; Deanary authorities, as well as principals and coordinators of the virtual platform were interviewed; moreover, an institutional documentary review was made, following a matrix led by: a) policies, strategies and innovation practices, regulations related to subjects and programmes design, pedagogical principles; b) professional teaching development; c) curricular guidelines, and d) educational quality.

The questionnarie content included closed and open questions, and it was divided into three parts: 1) general information, 2) styles and level of computer and internet use, and 3) blended-learning education. In order to give the questionnairies validity, three tests concerning readability and question understanding were applied as well as, automatised sequence in the recording of answers. In addition, a review of experts was conducted to show the questions could answer the research objectives. Interviews were held face to face, with a structured guide about questions related to the different possibilities to implement the teaching blended methodology which included: institutional policies, technical assistance and infrastructure, professional development, didactic and pedagogical support and social development.

3. Results

The resulting data in this study come from surveys and structure interview applied to the selected population: teachers (31%), students (38%), headmaster (88%), Deans of faculties (50%) and virtual platform coordinators (100%). In addition to exhaustive printed documentary review and in institutional repositories.

3.1. Intentions and principles

The National University (UNA) it is a Costa Rican state institution of higher education created by Republic Act in 1973, based on autonomy principles and freedom of teaching with the purpose of promoting culture at a national level, throughout its central campus in Heredia and three regional headquarters.

The institutional structure of the UNA consists on three models: 1) The Government model or assemblies, 2) the management or advice model, and 3) The administrative model formed by the rector, deans of Faculty, centre and regional headquarters, and academic unit or school directors.

The Faculty of Social Sciences has the mission training professionals, developing research and disseminating knowledge from a social sciences perspective. It consists on eight schools, a secondary school and two centres. It offers eleven degrees, ten master's degrees and a Ph.D.

For the degree's entry, students take admission process consisting of an Academic Attitude Test and the average of the diversified cycle grades. These data have a stratification model: type of school, location, methodologies to study of in high school and schedule; thus, the competition for the vacancies takes place between candidates who have had similar conditions in secondary school. Degrees and qualifications in UNA nomenclature is defined by an agreement among all the higher education universities in the country and are named as: undergraduate - graduate and faculty-grade - University Baccalaureate and degree - graduate - professional Specialty, professional master and academic expertise, and doctorate.

3.2. Features of primary agents

The student population, 63% are women and 3% men. The ranges of ages are: 23% are less than 20 years, 51% between 20 and 25 years old, 13% between 25 and 30, 6% between 30 and 35 and 6% are older than 35 years. Marital status, 85% are single, 7% are married, 3% free union, 4% divorced and 1% did not answer. 84% have not got children, 13% have got them, 3% did not answer. Place of origin, 70% are from the metropolitan area, while 28% are from remote areas to the central campus of Heredia. 61% does not work, 39% do work.

Faculty, 57% are men and 42% are women. The age average, 26% between 25 and 35 years old, 26% between 35 and 45, 32% between 45 and 55, 16% is over 55 years. Working condition, 35% has an appointment on property, 61% are temporary workers, 3% has got both appointments. The workday, 64% Works full time (40 weekly hours), 1% three-quarters of full-time (30 weekly hours), 16% half working day (20 hours) and 19% half quarter time (10 weekly hours). Professional category, 5% Professor, 28% lecturer 2, 24% Teacher 1 and 42% Professor Instructor graduate. The Exclusive dedication system, 11% belongs to, 78% does not belong to, 11% did not answer. Seniority, 4% is older than one-year-old, el 9% is 1 and 3 years old, 23% between 3 and 6 years old, 15% between 6 and 9 years old, 47% more than 8 years old and 1% did not answer.

3.3. Infrastructure, equipment and other technological resources and their use

The SSF has got its headquarters at Omar Dengo campus, in the central district of Heredia, where the authorities of the Dean Office are assembled, eight academic units and other support services such as library, computer and languages laboratories, fixed and mobile, classrooms, meeting and video conferencing, auditoriums and other resources. Teachers show that they have the following materials at their disposal: Portable pc and beam video, material resources (stationery, imprints etc.), rooms for meetings with other teachers, audiovisual equipment (television, cameras or o video, recorders, sound equipment, etc.), appropriate classrooms, computer science laboratory (with

desktop computers), office or cubicle for student´s attention, video conferencing room, mobile computers laboratory (with laptops), digital whiteboards.

In terms of resigned resources by the UNA, as well as other free access, the frequency of use in teaching: Databases subscribed online (Eric, Academic Search Complete, etc.), Digital Collection (institutional regulations, etc.), E-books, Electronic, Dictionaries, Electronic magazines (from UNA and/or subscribed), Institutional repository, and Free Access Resources (Open Access), such as academic google, etc.

Teachers and students mainly have their own computer equipment and internet connection. Personal computer (PC) is used 53% by teachers, and 24% by students; portable computers are used by 38% of teachers and 69% of all students. 2% students appear not to have internet access from home, they use libraries and student laboratories, public libraries and Internet cafe. Concerning teachers, 69%, devote working more than 10 week hours in front of the computer and/or in doing university task; students, 59 per cent devote more than six hours per week.

Teachers and students use web 2.0 diversity tools. Among them, the most used are: audio and video, calendar storage and document management, blogs, wikis, communication, collaboration and publication, creation of educational activities, directories, search engines, learning virtual environments, library and databases, conceptual maps, presentations, social networks and support research tools.

The most common programs or applications used by teacher and students in everyday tasks are: text processor, presentations and spreadsheet; In addition, they use to a lesser extent, other specific applications. At least 50% of them have received training, others are self-taught.

Teacher and students consider the computer / internet in learning and in daily life, relevant and essential; they reveal the following advantages of use they provide: information access, information registration, usefulness of virtual learning environment, communication, ubiquity, entertainment, work, study, personal tasks (services payment, etc.), updating, training, etc. Concerning the information, they search on the Web, both students and teachers use the following Protocol: analyse the web-page quality, use recommended pages and look up sites like academic Google and subscribed data based - in relation to the specific disciplinary area databases -; There are a few who use similar tasks and adapt them. In addition, 94% takes into account that it respects the author rights of the consulted materials.

The technological resources online for communication used by students and teachers are: Email; Mobile phone (Messaging in-line type WhatsApp, etc.); Mobile phone (text SMS messages or phone calls), and Mobile phone (internet access and virtual classroom).

As for the style of use of web tools, with teachers and students, more that (50%) is exemplified with some features: For the working material development, they look for images on the Internet, and use strategically organises information in folders on their computer; They have worked in collaboration with colleagues or co-workers; they use the Internet to coordinate appointments or personal and professional encounters with other people, and use the Cloud to save your documents. The UNA used as a virtual learning environment the platform Moodle. The degree of knowledge that teachers of that platform have on this platform and virtual technological tools is: medium (47%); high (16%) and very high (27%). Moreover, 84% teachers and 68% students have used the Institutional Virtual Classroom and/or some technological and virtual tools (google drive, blogs…) in face-to-face or with technological, bimodal or virtual courses.

3.4. Blended learning and blended education.

Learning and teaching techniques which teachers use more frequently, in order of preference: a) study of expository, b) experience (relationship between examples and debate), c) conceptual maps, d) guided reading and summaries, e) problem-solving, f) discovery and inquiry (research work), g) interrogatives, h) laboratory (organisational skills organizational creative, manipulative, applying knowledge to particular cases), and i) role-playing showing (confirm explanations and arguments in theoretical form).

Furthermore, Directive assessment is the way how teachers prefer to assess learning outcomes, they note that - almost always - it is applied; the self-assessment and the co-assessment is used to a lesser extent from its point of view, students prefer combination of the three forms (directive assessment, self-assessment and assessment between peers), 57%; while 29% prefer directive assessment, the rest shows other combinations.

More than 50% of the teaching staff, during its teaching, has experienced: to be updated at a university discipline Taught at the University, to receive training to improve University teaching, to research and to participate in the design of training programmes courses. In terms of student skills, autonomy is a remarkable capacity in blended learning and

virtual education. From the students, 65% show that they are considered to be autonomous in their studies. However, some of them relates it to the unneeded teachers' guide or scaffolding during the training process; others relate it to maturity, responsibility, critical thinking, therefore, they write it down:

> "*I am not autonomous; it is always necessary to know a professional's point of view in the field. [A23.147]*.
> *"Yes, I am autonomous. I search systematically to acquire the information I need to know and make its own critical reading.*" [A23.163].

3.5. Trends in virtual programs and blended learning in the field of the SSF

The tendency in virtual and hybrid programs in university education has been signed up by authorities of the Faculty and academic units, who note down:

> *"It is a process which involves not only the use of technology, they are deeper changes of a pedagogical and administrative side."* [E01V].
> "*The technological mechanisms of new knowledge require you to use these tools within the courses."* [E01D].

The opinion of teachers, in terms of the of higher education trends in undergraduate and college degree, raise prospects about the technological impact and experience of the new generations; the transformation of the world education with lines to the polarisation of the quality (some excellent and other lousy); adaptation to present and the technological and commercial facilities which contribute to the study; the increase in teleworking; the technology passion and problems creation to justify the incorporation of technology, it is therefore a path that will transit and it is necessary to internalise the importance and benefits of its proper use; etc.

In addition, with regard to specific courses in the field of social sciences, opinion is summed up in five dimensions: 1) learnings: the student takes control of his own process (autonomy), Self-regulated learning (Self-learning), and students perform online tasks in virtual courses (collaborative learning); 2) pedagogic mediation: on using video lessons, researches, study cases, greater use of digital resources, Web tools use (simulation, game etc.), use of concept maps, change in pedagogy (from face to face to virtual), decline of physical work, the virtual substitution, team work can be virtually developed, teacher's timetable increases because in addition to the class planning and review tasks in class, you must have time for the virtual, and changes in activities´ planning; 3) educational models: biolearning, obligatory bimodal courses, bimodality (combine face to face-virtual, without voiding the attendance), ubiquitous and M-learning (mobile learning), the attendance is essential for learning, PLE (Personal Learning), MOOC (Massive Open Online Courses –Massive courses on line-); 4) use of TICs: introduce ICT in learning processes, greater virtuality, virtual space for feedback classroom, use of social networks in learning process, ICT complement and enhance teaching, class available to student (retake lessons), videos, readings, etc., there is an opening for its use, but at the same time, there is resistance to experience (through ignorance or lack of access), and 5) communication: new interactions between agents (student-teaching, teacher-teacher third parties, authors, organisations, extra-university institutions), and reconcile or coordinate interaction times between facilitators and participants.

Teachers surveyed, 68% stated they would like to carry out blended-learning courses; 16% responded with a conditioned Yes; 15% indicates no, or are uncertain; 1% prefer attending classes face to face. Among the stated reasons, they noted:

> "*It can be a useful tool for teachers who we also develop research, because, if we have schedule clashes, we can teach online."* [E63.1225].
> *"I would like to use it, being aware that it carries a greater commitment of the teacher, it is an opportunity to achieve greater coverage to students who work and study at the same time."* [E63.1236].

The implementation of blended learning blended subjects involves a series of organisational changes, in accordance with the teachers´ opinion, is outlined in two areas: Technical and administrative support and Teaching and academic organisation.

3.6. Benefits and social projection

The benefits of blended education which believe teachers are different, some of the views are taken into account: flexibility for planning time and personal rhythm in virtual activities; other learning environments with learning

multiple choice which can favour the cognitive development; enrolment increase and access to quality public University. Save of resources for the institution, a time percentage without requiring material resources from university will be delivered, thus, improving the use of the infrastructure, students learn how to use new technologies that will help them in their future employment. It would help their development as professional. In that line, from the authorities of the Faculty, academic units and the students´ opinion about the benefits of blended learning education following ideas were summarized: flexibility of hours, time for the family, saving time in transfers and money transportation, engage properly in the network, better communication and discussion among students through chats and forums, interactive classes encourage creativity and innovation, updating teachers and one could learn more, it could work with teachers from other countries, modernise the scope of courses, it would have more resources to be developed, tutoring without moving house, more courses could be taken and have access to more information.

4. Discussion and conclusions

The educational process has meaning in the social transformation from student central link in the process (Shaidullin, Safiullin, Gafurov, & Safilullin, 2014). Therefore, curriculum design, in any of the decisive or operative levels, must come from a critical analysis of reality and of the principal factors involved. It is not justified that the technology imposes blended or virtual education. Technology is here, it is the product of the scientific and technological development. It is not about going against the flow without greater critical sense, but to use them to achieve development and well-being conditions. Costa Rican youth need the knowledge and training to overcome poverty conditions and marginalised overcrowding. That is why you should study new forms of access to University, for those young people who do not have the possibility to approach a campus that demands permanent presence.

This educational diagnosis has been identified, analysed and assessed on fundamental aspects of the human, material and teaching resources which underlie the case under study and that the results demonstrate methodological perspectives in blended learning education, which, from the respect of the each discipline specificities and noting theories of learning, teaching principles, share resources, promote interdisciplinary work in an autonomous environment of expression, it is possible to enhance a quality education for the student population. From the point of view of authorities, academics and students, there is willingness and vision of the need to incorporate ICT in the educational process, thus also in their statements deducted elements which comprise technical and transversal skills suitable to undertake blended experiences blended learning are implied.

Change from face to face education to the blended learning has its foundation on the methodological change of the combination of two integrated learning environments (face to face-virtual) instead. Therefore, from this study in the context of the SSF principles and intentions are identified:

a) policies, strategies and regulation, some of them are cited: Freedom of Expression, Experiences of educative innovation; pedagogical model; ICT academy; Procedures for the automatised opening of courses in virtual. classroom; guidelines for curriculum flexibility on the UNA; Administrative and pedagogical and other regulations.

b) the basic curriculum and teaching processes are established in study plans, the pedagogical model and specific guidelines, which specify the teaching role (teaching load is distributed within hours' contact, attention to students, lessons preparation and assessment, systematisation and didactic production, meetings and committees and updating and training; the student role (autonomous and collaborative work); administrative management: dynamics and facilitator.

c)The material and technological resources such as databases subscribed by the UNA catalogue of books, journals, multimedia files, databases and other items online; physical classroom (laboratory, workshop, etc.), meeting rooms and other facilities; Institutional Virtual Classroom platform; computation team or other technological resources such as mobile phone, web resources 2.0 for free access.

Besides sharing the experiences in some academic units that are already dabbling into academic innovation proposals and promotion ICT and innovation in methodological aspects are an opportunity not only for education for regular students, but coastal, indigenous, young people at social risk, mothers and working parents, small and medium enterprises (Pymes) managers, etc. in short, University projection for social transformation, thus avoiding: "That University helps the machine and not the people. Once this decision is taken, the rest is easy. [DA63.1358]

From this exploratory research experience, various concerns arise, some are dotted as future research lines: How much is the price of a blended learning subject? Which are the training needs that required teachers, students,

headmasters and administrative managers to start an innovation and pedagogical culture, introducing ICT within educational processes and that could answer current requirements without losing UNA humanistic principles?

References

Baños, J. (2007). *Educational Platform MOODLE. Virtual classroom creation. Reference Manual for Teachers (Version 1.8).* http://www.fvet.uba.ar/postgrado/Moodle18_Manual_Prof_1.pdf.

Bartolomé, A., & Sandals, L. (1998). Save the University. About Technology and Higher Education. *Higher Education. At Th. Ottman e I. Tomek (Ed.). Educational Multimedia and Hypermedia annual, 1998. AACE: Charlottesville (VA), pp. 111-117.*, http://www.lmi.ub.es/personal/bartolome/articuloshtml/em98/bartolome/index.html.

Camacho, M., Lara, T., & (Coord.). (2011). *M-learning, in Spain, Portugal and Latin America. Monograph SCOPEO no.3.* http://scopeo.usal.es/wp-content/uploads/2013/04/scopeom003.pdf.

El-Hmoudova, D., & Tejklova, M. (2016). Computer based key language competence development. *Procedia - Social and Behavioral Sciences 217 (2016) 57 – 64* , http://www.sciencedirect.com/science/article/pii/S1877042816000501.

Escudero, J., Área M., Bolívar, A., González, Ma., Guarro, A., Moreno, J. & Santana, P. (1999). Design, development and innovation of the curriculum. Madrid, España: Editorial Síntesis, S.A.

Fuentes, M. (7 de 12 de 2010). *Users training in school libraries. Obtained from the Big6 model for the information problems solution:* http://usuariosformacion.blogspot.com.es/2010/12/el-modelo-big6-para-la-solucion-de.html.

Krasnova, T. & Demeshko (2015). Tutor-mediated support in blended learning. *Procedia - Social and Behavioral Sciences*, 166(0), 404-408. doi:http://dx.doi.org.roble.unizar.es:9090/10.1016/j.sbspro.2014.12.544.

Legislative Assembly of Costa Rica (1973). Law of the National University Creation. Law 5182. San Jose, Costa Rica.

López, P. L. (2011). *Collaborative learning for the management of knowledge in educational networks in web 2.0. Department of teaching, School Organisation and Doctoral Thesis.* Madrid: Tesis doctora. UNED. Spain. http://eprints.sim.ucm.es/21561/1/LopezSanchez01libre.pdf.

López, M.-V., Pérez, M.-C., & Rodríguez, L. (2013). Application of learning in accounting. A comparative analysis between different grades. *Journal of education*, January-April. pp. 461-482. http://www.mecd.gob.es/dctm/revista-de-educacion/articulosre360/re36021.pdf?documentId=0901e72b814a77f5.

National Committee of Rectors. (2004). Convention on grades nomenclature and higher education qualifications of the state university. http://www.cu.ucr.ac.cr/normativ/nomenclatura_grados_titulos.pdf: University Council. Information unit. Obtained from http://www.cu.ucr.ac.cr/normativ/nomenclatura_grados_titulos.pdf.

National University of Costa Rica (2007). *Policies for the integration of the information and communication technologies at the National University academic processes.* CONSACA-170-2007. UNA GACETA 11-2009.

National University of Costa Rica (2012a). *Procedures for automatised opening of the Virtual Classroom courses. National University , academic Vice-Chancellor.*: VA-2247-2012. UNA-GACETA 22-2012.

National University of Costa Rica (2012b). *Guidelines for curriculum flexibility in National University.* SCU-2077-2012.

National University of Costa Rica (2014a). *Agreement of University Council SCU-1615 - 2014. Heredia, Costa Rica: General reform of Organic Statute. National University*.

National University of Costa Rica (2014b). *Automatised Opening Procedures of the Virtual Classroom courses. Teaqching Director*: Circular VA-DD-04-2014.

National University of Costa Rica (2015). *http://www.una.ac.cr/index.php/m-telefonos-una/ciencias-sociales.*

National University of Costa Rica. (2016a). Register National University. Obtained from www.una.ac.cr: http://www.registro.una.ac.cr/index.php?option=com_content&view=article&id=242&Itemid=796.

National University of Costa Rica (2016b). *www.una.ac.cr*. Obtained from http://www.una.ac.cr/index.php/m-carreras/facultad-de-ciencias-sociales-carreras.

National University of Costa Rica (2016d). *SIDUNA Documentary information system of the National University . Obtained from* http://www.siduna.una.ac.cr/index.php/recursos-electronicos/base-de-datos-en-linea.

Pérez, G. (2004). Qualitative research. Challenges and questions. Madrid: La Muralla S. A.

Porter, W., Graham, C., Spring, K., & Welch, K. (2014). Blended learning in higher education: Institucional adoption and implementatiion. *Computer & Education.* Vol. 75, June 2014, pp. 185-195. http://www.sciencedirect.com/science/article/pii/S0360131514000451.

Shaidullin, R., Safiullin, L., Gafurov, I., & Safilullin, N. (2014). Blended Learning: Leading Modern Educational Technologies. *Procedia-Social and Behavioral Sciences*, 131 (2014) 105-110. http://www.sciencedirect.com/science/article/pii/S1877042814029978.

Siew-Ling, L., & Anak, M. (2015). Blended Learning in Teaching Secondary Schools` English: Preparation for Tertiry Science Education in Malaysia. *Procedia - Social and Behavioral Sciences 167 (2015) 293 – 300*, http://www.sciencedirect.com/science/article/pii/S1877042814068244.

Soler, R. (2015). The curricular design in the innovation processes. Theory, Research and Practice in STEM Education. Linus: Nueva York.

Valdivia, J. (2009). *Practical online community: knowledge and learning. Department of Didactics, School Organisation and Special Didactics*. Madrid: Doctoral Thesis. UNED. España. http://e-spacio.uned.es/fez/eserv/tesisuned:Educacion-Jvaldivia/Documento.pdf.

Vieira, D. (2011). *Learning styles and teaching media in virtual contexts. Department of didactics. Special Didactics and School Organisation. Madrid*: Doctoral thesis. UNED. Spain. http://e-spacio.uned.es/fez/eserv/tesisuned:Educacion-Dmelare/Documento.pdf.