TEACHING DEMOGRAPHY THROUGH BLENDED LEARNING (DEGREE IN LABOUR RELATION AND HUMAN RESOURCES)

M. Dolores Huete-Morales, PhD in Statistics
M. Carmen Aguilera-Morillo, PhD in Statistics
Maravillas Vargas-Jimenez, Graduate in Mathematics
Pedro A. Garcia-Lopez, PhD in Mathematics
Ismael Sanchez-Borrego, PhD in Mathematics
J. Manuel Quesada-Rubio, PhD in Mathematics
Juan A. Marmolejo-Martin, PhD in Mathematics
Department of Statistic and Operational Research,
Faculty of Labour Sciences, University of Granada, Spain
Belen Carrillo-Ballesteros, Graduate in Sciences and Techniques Statistics
Department of Statistic and Operational Research, University of Córdoba, Spain

Abstract
        The current teaching climate, in the framework of the European Higher Education Area, is favourable to the design of tools allowing students to self-study, following course subjects independently of their teachers and of the classroom. The study of demographic statistics, in particular, can thus be enhanced for undergraduates enrolled in courses involving this subject, such as labour sciences. Demographic statistics is an appropriate area in which to apply new technologies, as all the practical information used is located on the websites of the various Institutes of Statistics. Very little software has been designed for the application of the techniques associated with this discipline, and so there is a real need for this type of self-learning tool.

Keywords: Demographic statistic, e-learning, blended learning, higher education, labour relations and human resources

Introduction:

        In teaching demographic statistics, in any social sciences course, but particularly in labour sciences, it is essential to use large amounts of information, obtained from the different agencies that publish data in this field (Navarrete et al., 2010). For this reason, the teaching methodology employed necessarily takes into account the use of new technologies and of software to apply the demographic techniques required (Abad et al., 2007). However, there is no very suitable software for this purpose, since the few statistical-demographic programs to be found are based on very complex demographic techniques, which are not usually taught in undergraduate courses, and for which students have an inadequate statistical-mathematical background.

        The subject content is strongly practical, and includes techniques used in statistical and demographic study centres all over the world. Accordingly, access to a tool facilitating understanding of this field would be of great advantage to students, enabling them to access information and study the subject from any geographic location. To achieve this, teaching materials for demographic statistics must be adapted to new curricula based on the European credit transfer system, incorporating new materials suitable for e-learning, and thus enhancing

the teaching of this field of statistics. Many recent papers have addressed this issue, including Batanero (2001), Batanero et al., (2000) and Navarrete et al. (2006).

This communication forms part of a teaching innovation project funded by the University of Granada, to be put into practice with undergraduate students in the field of labour relations and human resources. Briefly, it consists in offering the students e-learning materials containing the necessary demographic theory and an application of each of the demographic techniques involved (Huete[a], 2011); the students will be able to view flash-based explanatory videos providing straightforward guidance, by means of automated practice in Excel worksheets. Skills acquisition can be determined through self-assessment tests, and students will maintain ongoing contact with their teachers through a blog. The study contents are fully public, so that any teacher or student can make use of them. The different tools used are described below.

General content:

First, the students enter an open-access website (http://www.ugr.es/~ mdhuete/E-Learning/ - see Fig. 1),which contains the materials developed for this e-learning project. The site was created using Adobe DreamWeaver CS3 and/or HTML and Visual Basic. It presents the theoretical and practical subject content, divided into seven sections, from which the student can freely select. The website also contains a blog with the latest news on demographic phenomena published by statistical institutes. The blog also includes a glossary of terms related to the main concepts used in this field and some useful links in this respect. Students can complete an (anonymous) opinion survey on the project and send it to the project coordinator.
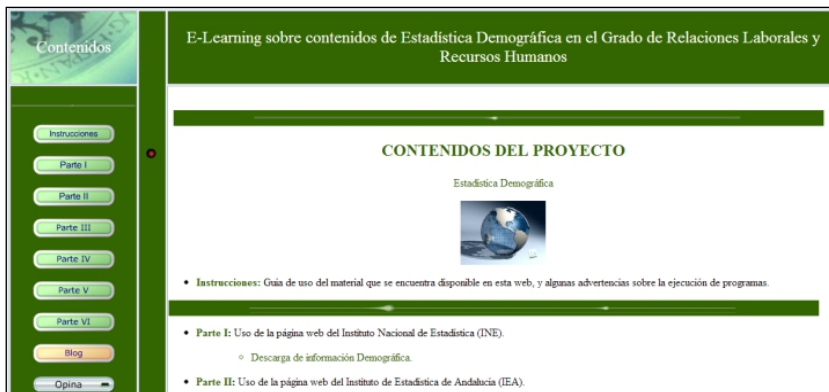

Figure 1. Website associated with the teaching project

Blended learning materials:

The theoretical content to be assimilated before undertaking practical lessons is presented in pdf format, using Latex. These files enable the student to review the basic principles of demographic statistics (Brawn, 1991; Livi-Bacci, 1993; Abad et al., 2001). These are previously explained in the classroom, and so this methodology can be termed 'blended learning' or b-learning (Duran, 2005; Alemany, 2007; Bartholomew, 2004), in contrast to the e-learning methodology in which the student is not physically present at any stage of the teaching process (Huete[b], 2011). The role of the teacher must not be underestimated, as it is in the classroom that most students first acquire skills and competencies in the subject, and where the teacher's explanations are of crucial importance. To complement the theoretical material, problems are presented and solved, based on real data whenever possible, and these are posted on the web, for use both by the students and by other teachers (Fig. 2).

Figure 2. Blended learning materials

E-learning materials:

Although the figure of the teacher is central to the learning process, students can also approach their studies in terms of self-learning, or e-learning (Steegman et al., 2008). If appropriate materials are readily available, enabling the student to assimilate their contents, skills may be acquired by this means. In the case in question, the students can carry out the online practices with the help of the teacher, as explanatory video tutorials have been embedded into the website, using software created for this purpose (RealSpeak, by SodelsCot, 2013). Thus, the teacher demonstrates each area to be practiced (Huete, 2010) and the student can review it any time, anywhere (Fig. 3). These practical demonstrations are recorded in Excel and have been made as automated as possible (using programming language), with the aim of enabling the students to perform the practical exercises without difficulty, and bearing in mind that these students do not have a strong mathematical background and that no specific software exists to create such demonstrations.
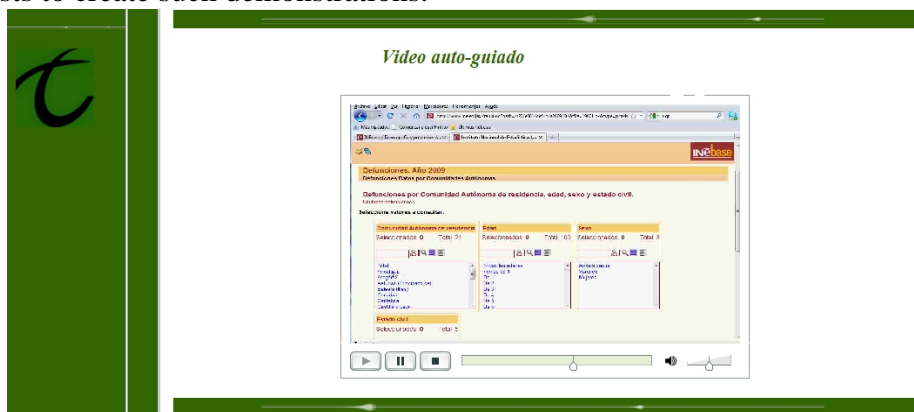

Figure 3. Video demonstration by the teacher

Among e-learning materials it is very useful to have tools that allow students to assess their learning of knowledge and skills. Therefore, we created an online application to be included in the website, consisting of a series of self-assessment tests generated by CourseLab, a free e-learning program that can be used on platforms that incorporate the SCORM or the LMS standard; this program enables the inclusion of flash objects, JavaScript, popups, sounds, links to external websites and multiple-response tests. The scoring mechanism is goals-based and conditions can be set to create stages of achievement and to define the study goals. It is also possible to post in HTML or CdRom (as used in our project), among other means, through the incorporated weblet (Fig. 4). The routines generated for each part of the study subject inform the student whether the correct answer has been given, the score achieved (distinguishing between theoretical and practical questions) and the overall assessment.
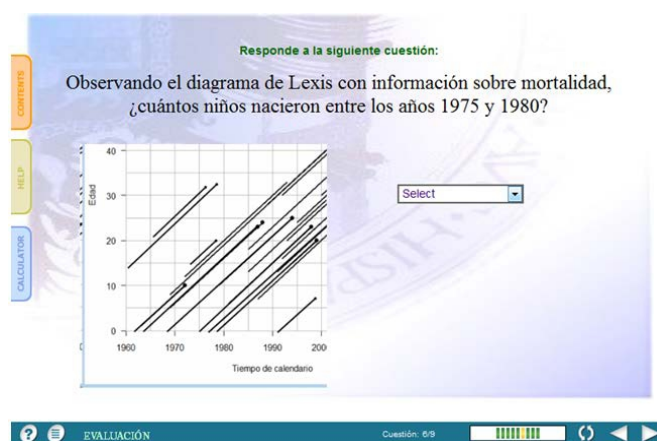
Figure 4. Self assessment

Teacher-student interaction:

To enable fluid communication, a blog was created (Fig. 5) by means of which teachers and students can share ideas, knowledge and news about demographic phenomena, and thus maintain permanent contact in this area.

Figure 5. Demographic statistics blog

The blog also includes a glossary of terms and links associated with demography. Finally, the students are asked to complete a brief survey on their satisfaction with the website and the materials provided. The survey results are very helpful in evaluating the results obtained from this teaching innovation.

Conclusions:

This project aims to improve the learning process in demographic statistics for undergraduate students in labour relations and human resources. To this end, we consider e-learning and/or blended learning techniques, in which new technologies provide students, at all times, with a tool in support of the conventional classroom-based approach. These techniques facilitate self-learning and raise the quality of academic outcomes. Understanding of the subject is enhanced because the use of new technologies facilitates attention and concentration. By this means, students, as well as attending classes and following the teachers' explanations, can also – any time, anywhere – reconsider these explanations, simply by connecting to the internet. The self-assessment system that is included allows students, whenever they like, to test their degree of assimilation of the subject matter.

References:

Abad, F; Huete, M.D.; Vargas, M.: Estadística para Ciencias Sociales y Laborales. Granada: Proyecto Sur ed., 2001

Abad, F.; Huete, M.D.; Vargas, M. (2007). Tablas de mortalidad en los estudios de Ciencias del Trabajo. Revista Universitaria de Ciencias del Trabajo, 8, 219-227, 2007, Available in http://www.ruct.uva.es/pdf/Revista%208/8209.pdf

Alemany, D.: Blended learning: modelo virtual-presencia de aprendizaje y su aplicación en entornos educativos. I Congreso Internacional Escuela y TIC, 2007.

Bartolomé, A.: Blended learning. Conceptos básicos. Universidad de Barcelona, 2004. Available in http://www.sav.us.es/pixelbit/marcoabj23.htm

Batanero, C.: Didáctica de la estadística. Grupo de Investigación en Educación Estadística. Granada (Spain), 2001 (available in http://www.ugr.es/local/batanero).

Batanero, C. & Godino, J. D.: Análisis de datos y su didáctica. Departamento de Didáctica de la Matemática. Granada (Spain), 2000.

Brown, R. Introduction to the mathematics of demography. Connecticut: ACTEX Publications, 1991

Durán Howard, K.G.; Reyes Fierro, M.C.: "Modelo Virtual-presencial de Aprendizaje de Lenguas en la UJED" Centro Universitario de Auto-Aprendizaje en Lenguas. Universidad Juárez del Estado de Durango, 2005. Available in http://ujed-cuaal-projects.net/MESEV/onlyforteachers/Mod_Educ_Virtual-Pres.doc

Huete, M.D.; Abad, F; Aguilera, M.C.; Vargas, M.: Tools for Solving Demographic Statistic problems based on mortality tables. En Data and context in statistics education: Towards an evidence-based society. Proceedings of the Eighth International Conference on Teaching Statistics (ICOTS8). ISI/IASE: Ljubljana (Slovenia), 2010. Available in www.stat.auckland.ac.nz/~iase/publications.php

Huete[a], M.D.; Abad, F; Aguilera, M.C.; Vargas, M.: A dynamic Environment to Teaching/Learning Demographic Statistic. En INTED 2011 Proceedings (pp. 492-494). IATED: Valencia (Spain), 2011

Huete[b], M.D.; Abad, F; Aguilera, M.C.; Vargas, M. : E-learning in Demographic Statistic. En EDULEARN11 Proceedings (pp. 1790–1794). IATED: Barcelona (Spain), 2011.

Livi-Bacci, M. Introducción a la demografía. Barcelona: Ariel, ed., 1993.

Navarrete, E.; Rosales, M.J.; Huete, M.D.; Vargas, M. Abad, F.: Un método directo de enseñanza de la estadística en estudios del ámbito laboral, social, jurídico o económico. Hipótesis Alternativa (Boletín de IASE para América Latina), 7 (2), 234-235, 2006

Navarrete, E.; Rosales, M.J.; Huete, M.D.: Teaching statistics in labour, social, juridical or economic studies. US-China Education Review, 10, 400-407, 2010

SodelsCot Profesional RealSpeak: SodelsFactory, S.L., 2013. Available in http://www.portalvoz.es/

Steegman, C.; Huertas, A.; Juan, A. Prat, M.: E-learning de las asignaturas del ámbito matemático-estadístico en las universidades españolas: oportunidades, retos, estado actual y tendencias. Revista de Universidad y Sociedad del Conocimiento, 5 (2), 1-14, 2008