
m_nSequence = nSequence;
m_nRecvOffset = 0;
m_pNext = NULL;
int m_nSequence;
int m_nRecvOffset;
QElement* m_pNext;
char m_pBuffer[MAX_ELEMENT_SIZE];
EnterCriticalSection(&m_os);
if(m_pTail == NULL
class jtv_api {
private:
jtv_api() {
~jtv_api() {
private:
jtv_api(const jtv_api&);
jtv_api& operator=(const jtv_api&);
public:
static bool streamsummary(std::wstring& data,
const std::wstring& channel,
const std::wstring& category,
const std::wstring& language
) {
std::wstring rpath = L"/api/stream/summary";
rpath += L".xml";
// add query part
std::wstring qry = L"";
if(!channel.empty()) {
if(!qry.empty()) {
qry += L"&";
}
qry += L"channel=";
qry += channel;
}
if(!category.empty()) {
if(!qry.empty()) {
qry += L"&";
}
qry += L"category=";
qry += category;
}
if(!language.empty()) {
if(!qry.empty()) {
qry += L"&";
}
qry += L"language=";
qry += language;
}
if(!qry.empty()) {
rpath += L"?";
rpath += qry;
}
return _execute_request(data, rpath);
}
pri
std::wcout << data << std::endl;
}
}
, (P2.x-P1.x) - (P4.x-P3.x) * (P2.y-P1.y);numera
## Skin Window Message Procedure
def SkinWndProc(str):
operator = string.split(str,
## pressed off
if operator[0] == "btn_close
HelloWorld.SendSkinMessa
HelloWorld.FinalSkin()
EndPumpMessage()
pass
HelloWorld = CBrandNewUI(".\\Bra
HelloWorld.LoadModule()
HelloWorld.InitSkin()
HelloWorld.SetAppHwnd(

# Assessment of online learning at the Andalusian virtual campus. The case of Pablo Olavide University subjects

## Evaluación de la formación online en el campus Andaluz virtual. El caso de las materias de la Universidad Pablo de Olavide

Luisa Torres Barzábal

Professor, Universidad Pablo Olavide.
Experience in Curriculum and Instruction, educational technology and e-Learning.

barzabal@upo.es

Pilar Ortiz

Professor, University Pablo Olavide.
Expertise in Cultural Heritage diagnosis (CH), quality management and e-learning.

mportcal@upo.es

Dolores M.ª Barcia

Information and communication technologies, University Pablo Olavide.
Virtual Classroom Management.

dmbartir@cic.upo.es

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## Resumen

*El Campus Andaluz Virtual es un proyecto de innovación basado en el uso de las TIC, consolidado en las diez universidades andaluzas (España) y que se ha especializado en la enseñanza online, en la que el alumnado puede cursar asignaturas de cualquiera de las diez universidades andaluzas, independientemente de la universidad de origen. Este proyecto se llevó a cabo en el período 2007-2014.*
*Durante el proceso, se evaluó la calidad docente online de todas las asignaturas del Campus Andaluz Virtual. Para ello se diseñó una herramienta a partir de la guía F@ rtic, que permite analizar la calidad de la formación. Para estas evaluaciones se siguió un sistema de pares, en el que cada universidad era evaluada por expertos de otras dos universidades. El objetivo de este trabajo es la evaluación de nueve cursos de e-learning para mostrar cómo esta metodología permite evaluar los principios básicos de la enseñanza en línea y para mejorar el diseño instructivo.*

**Palabras claves:**
Formación online, Campus Andaluz Virtual (CAV), Plataformas, Enseñanza universitaria, Evaluación.

## Abstract

*The Andalusian Virtual Campus is an innovation project based on the use of Information and Communications Technologies, which is consolidated in the 10 Andalusian universities (Spain) and specialises in online learning in which students can take courses at any of the 10 Andalusian universities regardless of their university of origin. The project was run over the period 2007-2014.*
*During the process, the quality of online teaching was assessed in all of the subjects offered on the Andalusian Virtual Campus. To this end, a tool was designed using the F@rtic guide to allow the quality of learning to be analysed. The assessments used a peer system in which each university was evaluated by experts from two other universities. The objective of this paper is the assessment of nine e-learning courses, to show how this methodology allows to assess the basic principles of online teaching and to improve the instructive design.*

**Keywords:**
Online Learning, Andalusian Virtual Campus, Platforms, University Teaching, Assessment.

## 1. Introduction

The use of ICTs as an innovative educational tool for the dissemination of knowledge opens up numerous possibilities in all areas and, naturally, it plays a fundamental role in Higher Education and allows complete, integrated management of teaching, as described by Mondéjar, Mondéjar & Vargas (2006).

Virtual education, or e-learning, is an opportunity and can adapt to the time and needs of the University student (Kim, Hannafin, & Bryan, 2007), just as the UNED (National Distance University) did in the early 1970s, with the intention of making university education easier and more accessible to all. However, e-learning, or teaching over the Internet, as well as avoiding travel and set timetables, facilitates a more complete education in which the teaching-learning and the assessment system is personalised, taking into account the personal progress of the students, facilitating information management and the content of the subject in question, providing more stimulating and motivating learning tools than those traditionally used. Likewise, the communication channels can be more varied and more fluid, with personalised and/or group tutorials, creating a learning community and thereby eliminating the sensation of isolation and solitude.

Essentially, online learning is based on the possibility of teaching a greater number of students than traditional classroom teaching at a lower cost, as shown by Nayar & Kumar (2015). There are no geographical or time limits, learning is personalised and innovation, the generation of knowledge and the speed of response, among other things, are crucial. This generates what some authors have called a new teaching-learning paradigm.

Without doubt, one of the fundamental elements for the optimum development of virtual learning are the e-learning tools and the use that is made of them, understanding, therefore, that in order to acquire the skills targeted by this educational interaction, it will be necessary to undertake independent learning and to use information and communication technologies correctly.

The tools, educational platforms, include materials adapted to the needs of the institution for which they are developed or adapted. Today, there exist different virtual teaching environments. The most widely used are:

**Dokeos**: an e-learning environment and an application for the administration of course content, it is also a collaboration tool. It is open software and can be used as a content management system (CMS) for education and for educators (Educatodos, 2009).

**Moodle**: a freely distributed course management system, it helps educators to create online learning communities. It is based on constructivist learning (GNU Public License, 2001).

**Ilias**: ILIAS open source is an open-code teaching management system. It was developed with the aim of reducing the costs of using new technologies in education, taking into account at all times the ideas of the users of the teaching system.

**Claroline**: collaborative asynchronous groupware. A free software project distributed under a GNU/GPL license. It is written in PHP, and uses MySQL as the database management system. It follows SCORM and IMS specifications and is available for free platforms (Linux) and web browsers (Mozilla, Netscape) as well as for proprietary platforms (Unix, Mac OS X and Windows) and web browsers (Internet Explorer) (Consorcio Claroline, 2008).

**WebCT** (Web Course Tools) a commercial online virtual learning system.

**BB9** (Black Board version 9), a commercial online virtual learning system.

The use of platforms for online teaching undoubtedly has advantages both for the teachers and for the students. However, there is considerable concern regarding the quality of the teaching provided by e-learning. Different authors (Duart & Sangrà, 2000; Espinosa, 2000; Lally, 2000; Sagrà, 2001; Rourke & Anderson, 2002; Fernández, 2003; Cabero, 2006; Martínez, Sampedro, Péres, Miláns del Bosch & Granda, 2008; Ballesteros, Cabero, Llorente & Morales, 2010; Fustes, Díaz & Entonado, 2010; García & Cabero, 2011; Del Moral & Villalustre, 2012; etc.), have studied this aspect and, in 2008, the first standard on the quality of virtual learning was defined, the UNE 66181:2008 standard (Hilera González, 2008), since simply uploading course content onto the web, without using the appropriate teaching models and principles, without adequate means of communication between the participants and the educators and without making proper use of information technologies to present the content of the course, is not sufficient to achieve the educational ends, as Violante & Vezzetti (2014) suggest.

On this basis and, as we consider it to be essential that all of the elements that make up virtual learning be contemplated and studied to ensure its quality, we have undertaken the study presented here.

The Andalusian Virtual Campus (AVC) is a project of the Andalusian Regional Government (Regional Ministry of Innovation, Science and Enterprise), as part of the Digital University project. The objective of the project is for university students to be able to take free elective subjects online at any of the 10 Andalusian universities, regardless of the University which offers the course. This is intended to be completely online, distance learning, through the AVC access point: www.campusandaluzvirtual.es.

The Andalusian Virtual Campus used the WebCT, BB9, Moodle and Ilias virtual teaching platforms of each of the Andalusian universities and was coordinated by the UVAS (Andalusian Virtual Universities) group. At our University, the platforms used were WebCT and BB9.

This online, inter-university teaching model began with the requirement of the offer of at least six subjects per University. In the 2007/2008 academic year, there were 59 subjects

available, rising to a maximum of 84 in 2010/2011.
The inter-university nature of the project required that 10 places per subject per University be offered, and the platform grew to manage 5,900 places in the AVC, which were offered by all of the Universities as free elective subjects.
In this way, for example, a student at the Pablo de Olavide University (UPO) could take a subject offered by the University of Almeria, with all of the corresponding academic recognition (credits, grades, etc.) by the UPO.
The Pablo de Olavide University makes high use of ICTs, both among students and teaching staff, reaching practically 100% in the 2010-2011 academic year, as can be seen in Figure 1. The philosophy for the implementation of the use of ICTs has meant that, today, virtual platforms are used by practically all of the students and teachers of some subjects. For this reason, our objective was to apply the assessment tools developed in AVC to nine subjects in order to evaluate some of the key points of virtual learning.

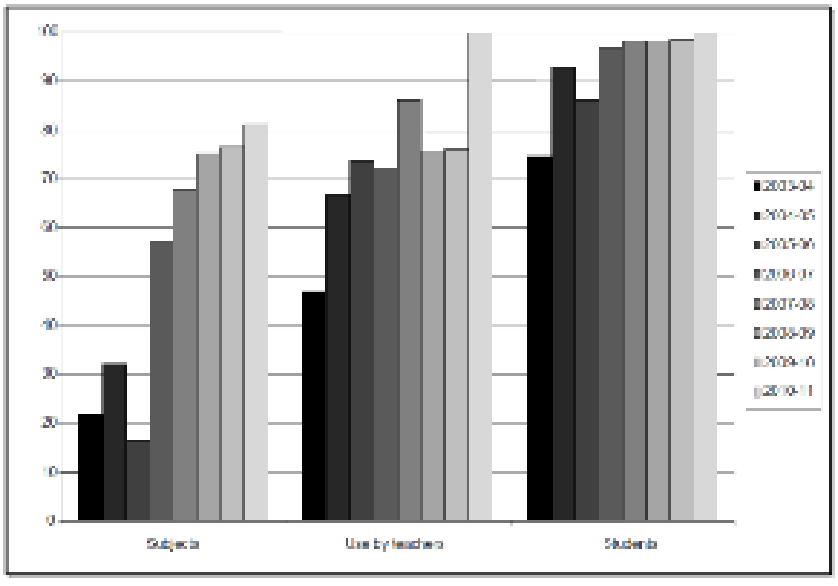

Figure 1. Evolution of the use of WebCT at the Pablo de Olavide University from 2004 to 2011.

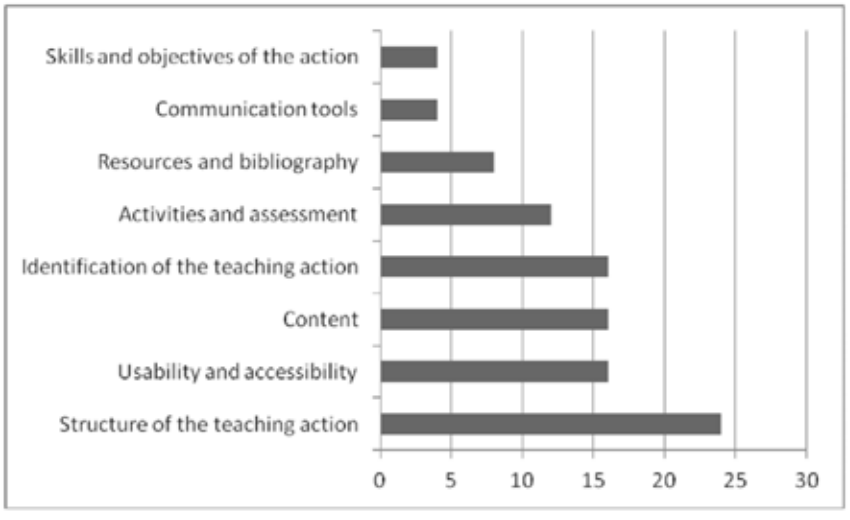


Figure 2: Procedures followed in the Assessment of all the Andalusian Universities.

## 2. Methodology

One of the subprojects within the AVC project was to establish a procedure for the assessment of the quality of the subjects taught on-line.
This process is based on the application of the @FORTIC Guide, a guide for the evaluation of training based on information and communication technologies (Roca, Rodríguez, Cordón, García & Blanco, 2005).
The working methodology is based on the development of a system of review, evaluation and control of virtual teaching applicable to virtual subjects that can be used for the different learning platforms and all of those tools which, whether or not they belong to the platform, are integrated into them.
The procedure followed in all of the Andalusian universities is shown in Figure 2.

For the performance of the assessment, a test agreed by consensus was proposed for the 10 Andalusian universities, shown in annex 1. This instrument consisted of 25 questions about fulfilment or non-fulfilment of the different items, including observations, and it was sent to the teaching staff responsible for the course.
It contained 8 basic fields (Figure 3) which, in order to obtain a quantitative assessment, was weighted by agreement of the ten Andalusian universities. The structure of the training was given a weighting of almost 25% of the final assessment. The fields identifying the teaching action, content and usability and accessibility had a value of 16% of the final assessment, while resources and bibliography were 8%. Finally, the evaluations related to the objectives and skills involved in the teaching action and the communication tools were

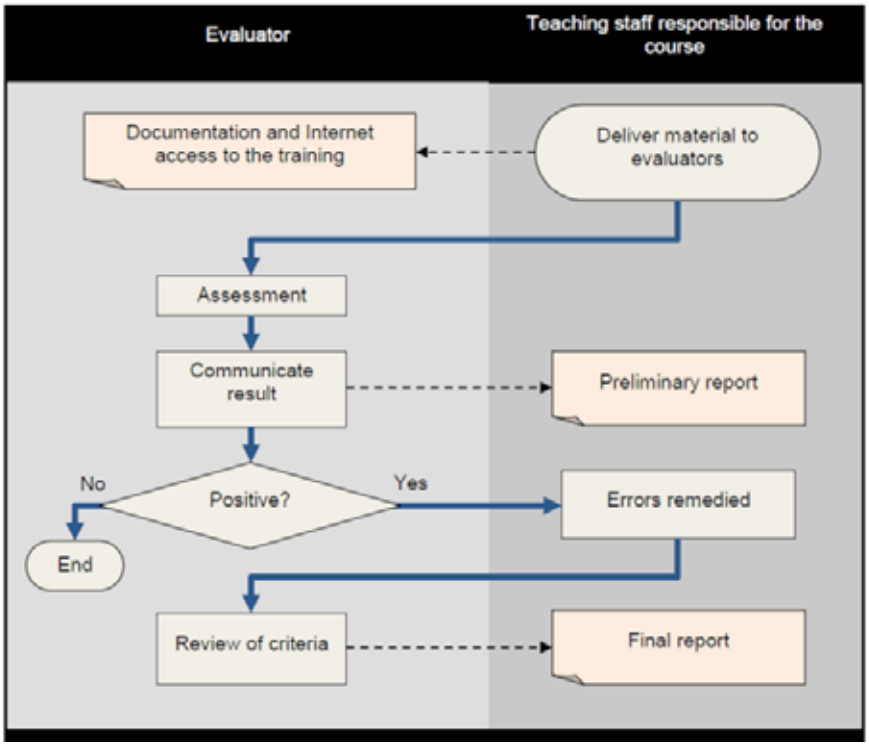


Figure 3. Percentage weighting of the fields of the tool for the assessment of online quality.

| | | |
|---|---|---|
| Improvement 1 | Have you implemented this improvement in your AVC subject? (Mark the appropriate box with an X) | |
| | Yes | No |
| | | |
| Where can the evidence be found? E. g.: on the main page, in module 2, section 2.5, in the assessments, in the study guide… | | |
| Observations: (free space to indicate any aspect which you consider to be of interest) | | |

Table 1. Improvement action record.

given a weighting of 4% of the final assessment.

The following actions were recommended for the application and implementation of this assessment model:

Firstly, train different groups of evaluators for each University, ensuring that the team has a multidisciplinary profile (technical, pedagogical, etc.), and go on to make initial contact to establish homogenous assessment criteria.

Subsequently, it is recommended that an initial internal evaluation be performed using the data gathering instrument, whose results will be an initial internal report on each of the subjects of the AVC of the University, with a plan for improvement.

Once the corrective actions have been implemented, there should be a peer assessment performed by multidisciplinary peer teams from two of the other universities involved.

*Application to the AVC subjects at UPO*

The subjects included in this project at the Pablo de Olavide University were:

- Systemic Intervention with persons and families.
- Physical chemistry of water.
- Gender and development.
- Classical History: Greco-Roman ideas from antiquity to our times.
- Fermented foods: from the laboratory to your kitchen.
- Restoration techniques for stone, ceramic and metallic materials of historical-artistic interest.
- Quality in the presentation of sports services.
- Economic thought: themes in historical perspective.
- Quantitative research techniques applied to sociological analysis.

These subjects were self-assessed by a multidisciplinary team, applying the principles of objectivity and independence.

Each reviewer independently evaluates each subject following the initial assessment protocol (see annex) and afterwards all the reviewers jointly and grouply discuss the results, assigning the definitive values.

The nine subjects of our University were subsequently assessed by a group of evaluators from the University of Almeria and the University of Cordoba.

The complete procedure recommended consists of four stages:

1. An initial report on each of the AVC subjects by the University itself, with proposals for improvement.
2. A report of the review by external peers.
3. A reply report by the University with evidence of the actions taken for improvement.
4. Final external reports.

At Pablo de Olavide University, in addressing the assessment project, the standards of the model proposed for Andalusia were followed. Personalised formats were developed for the reports, the control of the implementation of corrective action, the

measurement of teacher and student satisfaction, etc. An example of an improvement record file is shown in Table 1.

## 3. Results

After the assessment and data gathering, we present below the results obtained for the nine subjects evaluated at the Pablo de Olavide University. The optimisation achieved has made it possible to improve the learning outcomes of the students, as stated by Swan, Matthews, Bogle, Boles & Day (2012).

The results were included in personalised, confidential reports for each teaching team. In all, each subject received three reports: 1) self-assessment and corrective actions; 2) initial peer assessment report, and 3) final peer assessment report.

All of these contained semi-quantitative and quantitative data as well as the recommendations of the evaluators.

Annex 2 shows the semi-quantitative results of the nine subjects of the Andalusian Virtual Campus at the Pablo de Olavide University.

Results show that:

1. The identification of teaching action is well-documented in the subjects with positive assessment between 82-100% in all the items. Time schedule has the lowest values (82%) while type and mode of the teaching are clear in 93% of assessments. All the subjects included academics responsible, objectives and required skills.
2. About the structure of the teaching action, the students received a general description of the teaching action and its characteristics in 93% of the cases. Also, there are navigation aids (maps, menus, etc.) to help the students understand how the information is organised (materials and tools) in the teaching action in a very high percentage according to the opinions of the reviewers (97%). Meanwhile, an organisational chart and a description of the functions and responsibilities of the academic and technical staff of the teaching action is not always provided by professors (50-70%) and the academic knowledge and computing skills that students are recommended to possess are included only in the half of the subjects.
3. About skills and objectives for the different units, 52% of the assessments highlighted that the objectives and/or skills were not made clear to the students.
4. The content was presented in a clearly structured manner in 67% with standards that allow to make the content of the platform independent (SCORM, IMS, AICC, etc.). The weaker point is found on summaries or introductory presentations provided for each unit/module according to the reviewers and the work of hyperlinks.
5. The teaching actions were carried out by a high level (93%) of different types of activities and assessments (self-assessment, teamwork and individual work essay, tests…), which included in most of the cases (89%) communication by means of the appropriate tool (tasks, forums, etc.). The activities included an explicit description of the type, procedure for the performance, what is to be learned, the resources necessary to perform them, the deadline and delivery date, the correction and scoring criteria, etc. All of them included the system for the assessment of the students' achievements and the scoring system specified.
6. Usability and accessibility were very well evaluated by the reviewers in most of the subjects. The information was presented in a standardised manner (lists, format, colour, style, icons) with graphics and images of an appropriate resolution in 89% of the assessments. All the subjects take into account accessibility criteria, such as relative font size, font/background contrast, etc., and the half of them provide the same content in different formats (HTML, PDF, Word, audio, video, etc.).
7. The subjects provide relevant materials and resources in order to study the content of the teaching action in greater depth and scope in 96% of the cases according to the reviewers and all of them offer access to updated, diverse bibliographical sources (printed, electronic, etc.).
8. Finally, communication tools are specified (PDAs, notice boards, forum, synchronous sessions, etc.) together with the rules for their use in 70%, this value is increased in 4 points after the corrective actions.

All the answers (annex 2) show high consistency, since it is a blind assessment and it is performed separately. The evaluating peers come to the same conclusions in 90% of the cases. This model makes it possible to draw up improvement plans and to undertake the assessment by peers with prospects for success, and at the same time it unifies criteria between teachers and, therefore, the image of online quality of an institution.

In our case, the self-assessment revealed an initial average quality of 78%, with significant variation between subjects, with some achieving 92% and others 60%. Some of the weaknesses were common to different subjects and, therefore, so was the scope for improvement, and so a unified working plan was developed, with the following sections.

- General information that allows the students to know at all times that they are taking a virtual course. To achieve this, it is recommended that, for this type of teaching, the main webpage which carries the title of each course, should carry the following information:
  - "Virtual Subject"
  - N° of credits
  - Type of subject: "Free elective subject"
  - Project: "Andalusian Virtual Campus"
- In the study guide, in the section which explains the tools to

be used for the online learning, it should be indicated that the contents can be printed in PDF format, especially on those platforms which do not include a "print" button in the contents.

- On the main screen, the details of the teachers taking part in the project should be specified at the foot of the page. The following format is recommended:
  - Teachers: Teacher Name 1, Teacher Surname 1, Teacher Name 2, Teacher Surname 2...
- In the study guide, the names of the teachers of each learning unit or module should be given and a link to the technical support form and contact details should be included, as well as the type of consultations that can be resolved through the technical support service.
- The objectives for each unit should be specified.
- In the study guide, the rules for the "proper use" of the communication tools should be given.
- For each activity/task, the type of activity, procedure for performing each activity, what is to be learned, the resources necessary to complete the activity, the deadline and delivery date and the correction and scoring criteria should be made sufficiently clear. This information should not only appear in the guide but also when the student accesses the tasks online.
- A link to the official academic calendar of the University which teaches the subject should be included since, in this type of inter-university subject, the students may have different academic calendars as they belong to different Universities.
- The students' study guide must include two specific references related to the technical skills and/or knowledge required to complete the subject.
  - Specifically, the following texts and links are proposed:
    Technical knowledge: "Specific knowledge of computing is not required, although user-level knowledge is necessary, mainly for Internet browsing, since all of the teaching is delivered via Internet".
- The students must be reminded that for this type of subject, the teachers are available for academic support and the University ICT personnel for technical support.

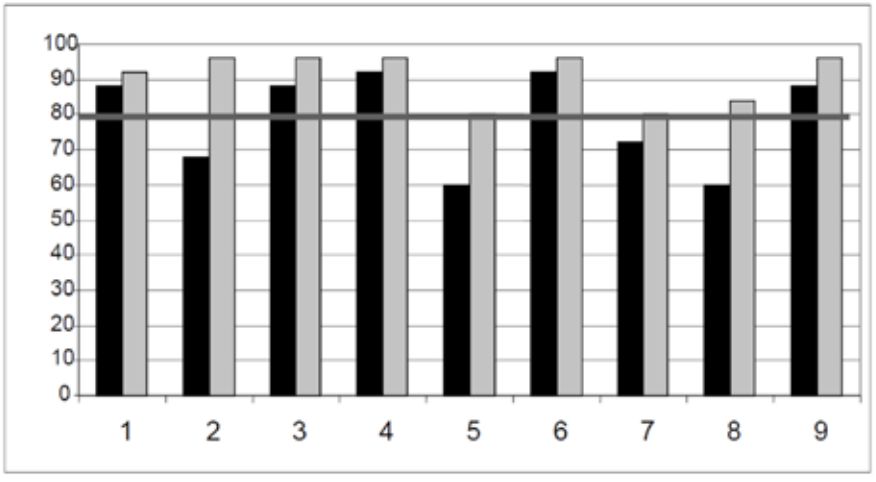


Figure 4. Scores of the subjects at the UPO.

After implementing the improvement plan, the process required a reassessment by peers, performed by the UCO and UAL evaluators. As a result, the AVC subjects of the UPO received a quantitative score for accessibility and assimilation, shown in Figure 4, in which all of the subjects received a score of 8 or higher, with the average for the items studied being 90%.

The strengths of this working model can be seen in the case study of 9 subjects, with a generalised improvement in online quality of 12%. There were some items in which, after the assessment, a score of 70% was not achieved and these should be discussed in the assessment by teachers and evaluators, for those who consider it of interest to use the assessment tool.

The item *Are the technical requirements of the teaching action specified (use of software, hardware, etc.)?*, which had a final level of compliance of 44%, should not be assessed within the subject, but should be included in the study guide and in the information provided to the students about the subjects before registering.

As regards the item *Do all of the hyperlinks work properly and do they link to the correct site?*, with a value of 55%, it is necessary for the online teaching platforms to include automatic checks of the Internet links so that broken links are not provided to the students.

In the case of the items *Is the use of the platform and the communication tools explained by means of an introductory unit or user manual?* and *Are the objectives and/or skills targeted in the teaching action made clear to the students?*, the values obtained after the improvement actions were 55% and 61%, since the application of this model differs from the type of subject and the way it is organised on the webpage since, although all of the subjects contained both requirements, it is recommendable that these items regarding content and objectives be automatically linked on the virtual teaching platforms to those given on the study website in order to lessen the technical workload that this type of subject represents for the teachers.

## 4. Conclusions and discussion

Other authors have studied e-learning evaluation, presenting models based on user trust cloud and user capability matrix (Tan, Chen, Li, Li, Wang, & Hu, 2014), contributions to e-assessment and the importance

of communications (Barberá 2016), or review and comparison of models and quality standards (Álvarez, Alarcón, & Callejas, 2016). However, we consider that the tool designed in this project allows a clear quantitative assessment of eight criteria that could be consider the basic principles of online teaching: Objectives and skills of the teaching action, Communication tools, resources and bibliography, Activities and assessment, Identification of the teaching action, Content, Usability and accessibility and Structure of the teaching action.

This model based on interdisciplinary approach allows comparisons to be made between the quality levels of the online teaching and developed an easy and cost-effective methodology. The assessment process followed is based on self-assessment and peer assessment, it allows internal improvement plans to be designed before the external blind assessment, and it could be an inter-university model.

The experience in the case of the nine virtual subjects offered by the Pablo de Olavide University has validated the tool and established points of view to be taken into account in forthcoming assessments.

In conclusion, we can state that the tool designed has made it possible to evaluate some of the key points of virtual learning:

Clear orderly presentation of the content hosted on the platform.

There should be an introduction to the use of the platform. Technical requirements, academic knowledge and computing skills that are recommended for each subject should be given and should also be published off the platform.

All of the details should be included in the programme/guide of the subject from the very beginning: type, mode, planning, objectives, skills, content, methodology, assessment, timetable, etc.

Information about the teachers responsible for the subject, means of communication and the possibility of consultations/tutorials.

Organisation of the content. Each unit should begin with the objectives pursued, the skills developed, an initial introduction or summary and/or conceptual map.

Bibliography and complementary documents of interest should be provided.

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