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## Alacena. An Open Learning Design Repository for University Teaching Alacena: repositorio de diseños del aprendizaje abierto para la enseñanza universitaria

*Being a teacher means being involved in the design of learning activities. The teaching profession has become a «profession of knowledge», not because knowledge was or is the legitimate component of the profession, but because the teacher is the designer of learning environments and has the ability to design the spaces where knowledge is being produced. But these learning environments have long been regulated to the privacy of the classroom environment with student complicity. One positive aspect of the launch of the European Higher Education Area has been to bring greater transparency to the process of designing teaching and student learning. Our objective in this study was to identify, represent and document a wide variety of learning designs made by experienced and innovative teachers. We hope this repository will be available and accessible to every teacher through the Internet. The participants in this study were 58 teachers mainly from universities in Andalusia and the five branches of knowledge. From interviews we proceeded to represent all the learning sequences, available in the repository of sequences that we named «Alacena». This repository is accessible on our research group's website (<http://prometeo.us.es/idea>). The conclusions of our study were that there are innovative learning designs aimed at promoting a greater understanding of what students learn through their involvement in processes of inquiry and/or collaboration, and they are representative of good teaching practices in universities.*

*Ser docente significa estar implicado en el diseño de actividades de aprendizaje. La profesión docente se ha transformado en una «profesión del conocimiento» no ya porque el conocimiento haya sido o sea el componente legitimador de la profesión, sino porque el docente es el diseñador de ambientes de aprendizaje y tiene la capacidad de rentabilizar los espacios donde se produce el conocimiento. Ahora bien, estos ambientes de aprendizaje durante mucho tiempo han quedado regulados en el ámbito de privacidad del aula y a la complicidad con el alumnado. Uno de los aspectos positivos que ha tenido la puesta en marcha del Espacio Europeo de Educación Superior ha sido aportar una mayor transparencia a los procesos de diseño del aprendizaje de los alumnos. Nuestro objetivo en este estudio consistió en identificar, representar y documentar una amplia variedad de diseños de aprendizaje realizados por docentes con amplia experiencia innovadora y que pudieran estar disponibles y accesibles a través de Internet. El profesorado que ha participado en este estudio lo han conformado un total de cincuenta y ocho docentes principalmente de las diferentes universidades andaluzas y de las cinco ramas de conocimiento. A partir de entrevistas procedimos a representar el total de secuencias de aprendizaje que están disponibles en el repositorio de secuencias que hemos denominado Alacena. Este repositorio está accesible en la página web de nuestro grupo de investigación <http://prometeo.us.es/idea>. Como conclusiones del estudio podemos constatar que existen diseños del aprendizaje innovadores y universitarios que pretenden promover en el alumnado una alta comprensión de lo aprendido a través de su implicación en procesos de indagación y/o colaboración y que son representación de buenas prácticas de enseñanza en la universidad.*

*Learning design, repository, learning activities, sequences of learning, patterns, higher education.*

*Diseño del aprendizaje, repositorio, actividades de aprendizaje, secuencias de aprendizaje, patrones, enseñanza universitaria.*

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## **1. Introduction**

One of the most evident consequences of the gradual introduction of the European Space of Higher Education is the change in the processes of planning and design of the teaching carried out by university teachers. The emphasis on ensuring the quality of teaching and learning for students is requiring university teachers to anticipate the learning processes in which the students will be involved. The systems to guarantee the quality of new university degrees, as well as the procedures for their verification and future accreditation, demand high levels of transparency from university teachers with regard to the teaching and learning processes that the students will be part of.

In order to encourage autonomous learning, we need to design and promote formative actions that involve the students in active learning (Huber, 2008). From this point of view, the students are the ones who construct their own knowledge through learning activities (Benito Capa & Cruz Chust, 2007) which, in order to maximize the quality of learning results, according to Meyers & Nulty (2009), should be authentic, real and relevant; constructive, sequential and related to each other; require the students to use and participate in progressively more sophisticated cognitive processes; be aligned with the desired learning results, and generate interest and motivation to learn. Herrington, Reeves, Oliver & Woo (2004), influenced by the constructivist theory of education and advances in technology, call these authentic activities.

Being a university teacher means being involved in designing learning tasks. But if learning is now understood not as consumption but as production of knowledge and, consequently, teaching does not transmit knowledge but leads and facilitates it, university teachers should no longer take the role of a leading actor, and should become the set designer instead (Murillo, 2006). This makes us reaffirm, as Bain (2007) points out, that university teachers should think of teaching as the promotion of learning, and should create a critical learning environment that is natural, and where people learn by tackling important, attractive or intriguing problems - authentic tasks that provide them with a challenge when it comes to dealing with new ideas, re-considering their assumptions and examining their mental models of reality. Along the same lines, Hannafin, Oliver and Land (1999) suggest that suitable learning environments are characterised by the encouragement of student participation in complex cognitive learning activities that include problem solving, critical thinking, collaboration and/or self-adjustment.

Consequently, the didactic planning of a topic or subject should not be limited to distributing the contents throughout a schedule using the European credit system as a calculation system for teaching activity. Instead, the central element of this planning should be to present sequentially the whole set of activities and tasks to be done in order to guide the experiences that the students will have to cover throughout the teaching-learning process (De Miguel, 2006: 17).

Our role as teachers will involve long hours of designing and preparing learning activities and situations or scenarios that allow active and cooperative learning, where the development or execution of the complex actions that constitute each competency take place, rather than preparing and imparting the disciplinary contents of our specialty (De la Cruz Tomé, 2003; Kiss & Castro, 2005). It should be remembered that adopting a teaching approach that guides students in their learning also means taking on the role of a facilitator who should respond to the needs of the group and of particular students (Borthwick, Bennett, Lefoe, & Huber, 2007).

In summary, the teaching profession has become a «profession of knowledge», not because knowledge has been or is the validating component of the profession, but because the university teacher is the designer of learning environments and is capable of making the spaces where learning takes place profitable (Marcelo, 2001, Marcelo & Vaillant, 2010). However, for a long time these learning environments have been controlled by the privacy of the classroom and the students' involvement (Guerra, González & García, 2010). One of the positive effects of the introduction of the European Space of Higher Education has in fact been to make the design processes of the students' teaching and learning more transparent, as it asks that we, though perhaps too far in advance, inform them of how we are going to ensure that our students acquire competencies by developing what have been called «teaching guides» (Marcelo & Yot, 2010).

### **1.1. Designing students' learning**

Design is a critical task that is a characteristic of the role of a teacher. As Schön (1990) affirms, professionals design situations in which they apply their tacit knowledge, as well as improvising. Learning design is the human activity in which people outline and plan learning activities, units of learning that a subject must carry out in order to learn (Koper & Tattersall, 2005). As a synonym of instructional design, it involves, according to Horton (2006), selecting, organising and specifying the learning experiences necessary to teach something to someone.

As Cameron (2007) clarifies, the term learning design refers to a general and comprehensive method of description of the teaching-learning process. «Learning design» is a representation of the teaching-learning practice set out in some form of notation through which it can be shared between teachers, replicated by a new teacher or used as a basis in creating new learning activities (Conole, 2008). These forms of representation are defined by Conole (2008) as mediation devices, thus emphasising their role as mediator in terms of how they are used as part of the design of new learning activities and/or to help other university teachers make informed decisions with regard to learning design (Conole, 2007). This leads Masterman, Jameson, & Walker (2009) to question whether the designs should be prescriptive, that is to say, used to communicate to teachers a list of steps to follow, or descriptive in the sense of offering teachers information about what others have done, from which they may be able to discover their own variants.

The idea of using learning designs as a means of sharing good teaching-learning practices is gaining interest. Beetham & Sharpe (2007) provide a valuable description of the current development of this line of investigation by revising the aspects relating to learning design, its exchange and reuse. However, as Falconer & Littlejohn (2006) suggest, a learning design can only be shared if the representation provides all the information that teachers need in order to understand it, often giving details of component elements of each learning activity, such as the learning tasks and the necessary resources and support (Conole, 2008; Oliver, Herrington, Herrington, & Reeves, 2007). In addition, according to Koper (2005), it should provide the means for illustrating the underlying design inherent in each learning practice, which is more widely applicable than the practice itself.

## **2. Creation of a repository for learning sequences for university teaching**

After establishing and highlighting the importance of student learning design in the new context of the European Space of Higher Education, we will describe the investigation we have developed, which has enabled us to design a repository for Learning Sequences. Our objective in this investigation was to identify, represent and document a wide variety of learning sequences planned by university teachers with extensive innovative experience and make them available and accessible through the internet.

### **2.1. Looking for innovative learning designs**

Fifty-eight teachers have participated in this study, from the various universities in Spain as well as from the University of Chile, specifically from the Faculty of Medicine. The largest numbers of teachers are from the University of Seville (23) and the University of Huelva (12).

Graph 1 Distribution of learning sequences by university.

Of the total of participating university teachers, twenty-four correspond to the branch of Health Sciences, mainly Medicine and Nursing qualifications. In second place are the Architecture and Engineering university teachers with a total of fifteen university teachers participating in the study. There is a smaller presence of university teachers corresponding to Social Sciences (Teaching, Psychology, History...), and to Sciences (Biology, Maths, Chemistry...).

As we have mentioned, the selection of the university teachers was deliberate, since we were interested in having access to university teachers with a strong university career as well as a proven capacity for innovation. In order to choose participants we used various methods, including selecting university teachers participating in teaching innovation projects in Spanish universities, and university teachers who had received prizes for their activity in innovation.

### **2.2. How did we obtain the information?**

The data collection has been carried out through semi-structured individual interviews with each university teacher who was part of our study sample. Once we had identified a university teacher with an outstanding career in teaching innovation, we arranged an interview with them. The purpose of the interview was for the participants to describe a learning sequence that they habitually plan and implement for the development of the subject that they teach, focusing in the activities carried out by the students, the role played by the students and the university teacher, and the resources that are used to support the students' learning. In the course of the interview we aimed to discover and identify at least the following elements of the learning design:

First Context: competencies to be taught with the sequence, expected learning results, prerequisites for carrying out the sequence, study content covered, time needed to complete it and level of difficulty.

Second the Activities performed by the students and university teachers: tasks that are involved (assimilatory, managing information, adaptive, communicative, productive, experiential, evaluative), type of interaction required (individual or in groups), roles adopted (student as an individual, student as part of a group, advisor,

mentor, facilitator, moderator...), necessary resources (demonstrations, texts, audio-visual resources, web pages, email...) and evaluation system (diagnostic, formative, summative).

As interviewers we used an interview guide, with direction on questions to ask, and all the interviews were recorded in audio and had an average duration of approximately 90 minutes, depending on the complexity of each sequence.

Once each of the learning sequences had been reformulated, in separate reports, they were sent to the teachers for them to review and validate the report that had been produced. All the contributions that the university teachers made about the representations of their sequences and their own learning designs were then incorporated.

Following this, all the learning designs were edited in HTML format to be published on the internet and produced with the LAMS tool. The next stage was the creation of the repository on the investigation group's web page.

Although it is not the purpose of this article, it should be made clear that the study proceeded with a complex process of data analysis. After the reports had been returned and validated, a first analysis was carried out to describe the various learning activities and classify the tasks involved. In order to do this we set out a system of categories.

Subsequently, in order to specify the relationships between the learning activities described, and thus to find out what patterns of learning activities were frequent in the totality of the sequences, a second data codification was carried out. The results showed us that patterns of learning activity exist based on the minimal combination or structuring of activities.

### 3. The result: The Storage Space for Learning Sequences

All fifty-eight learning sequences are available in the sequence depository that we have called Alacena. This repository is available on our investigation group's web page, as indicated above, <http://prometeo.us.es/idea>



Figure 1. Screenshot of the web page and the Alacena repository.

Since its creation, Alacena has been an open resource available to university teaching staff with the sole purpose of allowing them to find the representation of a variety of highly innovative learning sequences that can help them to effectively design their own courses. Furthermore, it has been conceived as a resource to be permanently constructed and added to, as it receives contributions from those university teachers who choose to share their own experiences. Nevertheless, we are aware that there is not a tradition of making formal plans in education, and in general the design is a very local and even individual aspect (Koper, 2005; Oliver, 2007). For this reason, there follows a detailed description of the notation system, the learning design we have developed, and the authorised uploading tool.



Figure 2. Uploading tool in the Alacena repository.

In order to develop the representations of the learning sequences, a standardised design language is required, i.e. a notation that describes the learning design in an interpretable way (Koper & Bennett, 2008). By notation, the system of conventional signs that is adopted to express concepts is understood. A number of attempts are now emerging to comprehensively document learning designs, with the effect that there are currently many types of representation that can serve a wide range of different purposes. As examples of these initiatives, Agostinho (2008) highlights: E2ML, IMS Learning Design, Learning Design Visual Sequence, LDLite, Learning Activity Management System and the design patterns. Richards & Knight (2005), McAndrew, Goodyear & Dalziel (2006), Cameron (2007), and Falconer & al. (2007), have also offered their review of the existing representations.

Our learning design provides all the information that teachers need in order to understand and reproduce any of the learning sequences, giving details of the component elements of each learning activity, such as the learning tasks and the necessary resources and support (Conole, 2008; Oliver, Herrington, Herrington & Reeves, 2007), represented as:

- 1) An account of general and identification information that can help to contextualise the sequence, such as the qualification, the subject and the student-teacher ratio. In those cases in which the university teacher implementing the sequence and reporting it to us has decided not to remain anonymous, their personal details have been provided and the contextual information has been extended to give the department, faculty and university.
- 2) A graphic that summarises the most important moments of the sequence - the different tasks that the students carry out in it. It is a simple representation in the form of an graphic, where just the tasks to be carried out by the students are illustrated, appearing in the order in which they are carried out, with arrows showing which task precedes and follows each other task.

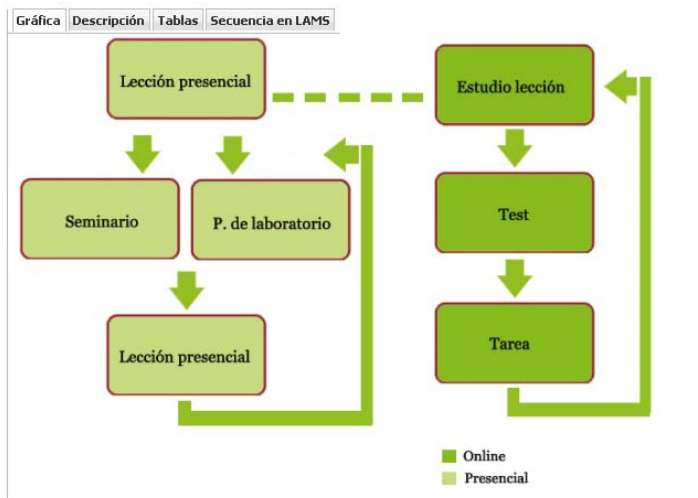


Figure 3. Graphic representation of a learning sequence

3) An in-depth description of the sequence, detailing its phases. The text allows us to find out which activities (assimilatory, managing information, communicative, productive, application, experiential) make up the learning sequence, and helps us to understand the tasks that the students carry out. The learning activities and tasks are what form the main thread through the information collected. For each one of them, attention is drawn to the resources that are needed and used, the role played by the university teachers and students, the type of interaction and how students are grouped, etc. However, the information is kept brief in order to avoid making it tiring to read.

4) A table focusing on three important aspects for understanding each sequence, namely: resources that are used, concrete tasks performed by the university teachers and students, in which they use the previously mentioned resources, and roles assumed by the teachers as well as the students in the carrying out of each of the tasks. The table therefore extends the information contained in the graphic and synthesises the detailed information in the description. The three representations (graphic, table and description) contribute to the overall understanding of the sequence.

RECURSOS	TAREAS	ROLES *
Transparencias Pizarra Plataforma	Lecciones presenciales	A: Individual D: Presentador Interacción uno- mucho (docente- alumnado) e interacción grupal.
Laboratorio y microscopio Muestras Protocolo de prácticas Plataforma	Prácticas de laboratorio	A: Individual D: Orientador Interacción individual.
Aula de informática Relación de temáticas y referencias	<i>Seminario:</i> Explicación y asignación	A: Individual D: Presentador Interacción uno- mucho (docente- alumnado) e interacción uno- uno (docente- alumnado).
PowerPoint Documentos Plataforma	Exposición	A: Presentador o evaluador D: Evaluador Interacción uno- mucho (alumno- grupo clase).
Plataforma Lecturas HTML PowerPoint	Estudio de lección	A: Individual
Plataforma y examen	Test	A: Individual
Plataforma	Tarea	A: Individual

\* La interacción: siempre podrá ser, además, uno- uno (alumno-profesor, tutoría individualizada) e interacción grupal (interacción en el foro).

Figure 4. Summary table of a learning sequence.

5) A LAMS sequence, the image that represents the development of the sequence in the LAMS tool, taken in its own environment. It will soon be possible to download designs developed in and exported from LAMS to be reused. It is sufficient to mention that «Learning Activity Management System» (LAMS), is an open source piece of software, which allows a university teacher to design as well as put into practice online learning activities, and which represents a sequence of activities illustrated visually in the form of a diagram that is easy to interpret (Agostinho, 2008).



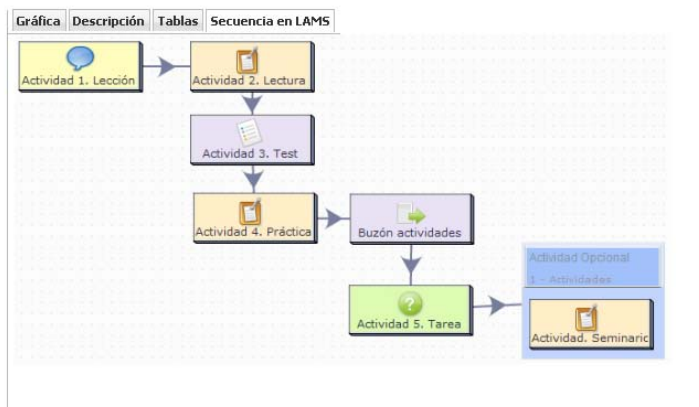


Figure 5. LAMS graphic representation of a learning sequence.

The various learning designs are organised, so that they can be located easily, by the different field of knowledge, by teaching method and by learning format:

- By Field of Knowledge. Taking into consideration the five areas of knowledge, the designs have been categorised as relating to: Social Sciences, Mathematical and Natural Sciences, Arts and Humanities, Health Sciences and Technology, Engineering and Architecture.
- By teaching method. Although the majority of learning sequences incorporate a variety of activities for the students to complete, we have observed that one type of activity tends to predominate in each sequence. Consequently, we have differentiated between: sequences based on practical work, sequences based on problems, sequences based on projects, sequences based on case studies, sequences based on group work, generic sequences.
- By learning format. We have differentiated between three sequence formats: face to face, online, and blended.

#### 4. Conclusion

As a result of the process of analysis carried out in the study, and having created the Alacena repository, we were able to verify the existence of innovative university learning designs that attempt to promote high levels of understanding among students of what they have learned. This is done through students' involvement in investigative and/or collaborative processes, which represent good university teaching practices.

We also know that as teachers we have to facilitate learning of the competencies included in our teaching programmes and guides, and that learning activities are the necessary vehicle to achieve this. This means that our role as teachers will involve long hours of designing authentic learning activities.

The Alacena repository that we have created could become a useful tool to help with the planning of learning sequences, as it presents publicly what other university teachers do and provides knowledge of a variety of types of activities that we can design, the resources and support that we may need, the roles to be played, etc. so that they can then be carried out.

Since it is a tool that brings us closer to the reality of the classroom, and that allows us to discover different teaching-learning processes, it is consequently a tool that promotes professional teaching development processes.

The data derived from our research show that university teachers use a wide variety of activities and learning tasks. The different tasks included within learning activities are aimed at achieving certain objectives of student learning. However, based on this variety of tasks, they find that the assimilative activities are most frequently found, and the tasks associated with it. We understand that it is from the students aware of the content or theme of the program, either by reading or by the listener, which he usually practiced by low-level cognitive tasks such as the application or information management.

At a time when university teaching is changing due to the enormous effort being made by teaching staff, it seemed to us that there was a need to publish examples of good practices carried out by university teachers. However, the fundamental aim of the project is for teachers to see Alacena as a useful and valuable resource that they can use in the process of planning and designing their students' learning.

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