Reumatol Clin. 2015;11(4):196–203

Reumatología Clínica

www.reumatologiaclinica.org

Special Article

The Teaching of Rheumatology at the University. The Journey From Teacher Based to Student-centered Learning☆

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ARTICLE INFO

Article history:
Received 30 October 2014
Accepted 15 December 2014
Available online 15 April 2015

Keywords:
Teaching
Grade
European space for higher education
Rheumatology
University

ABSTRACT

In recent years, university education has undergone profound changes as a result of the creation of the European Space for Higher Education. It has gone from a teacher-centred model, based on the transmission of knowledge through lectures, to being student-centred, based on the acquisition of skills and attaching great importance to independent learning. This transformation involves the need to reorganise academic activity and employ new teaching tools, such as active learning methodologies, more in line with current requirements. In this article, the backbones of the European Space for Higher Education are presented, and diverse experiences of teaching innovation described under Reumacademia and from three Spanish universities.

La enseñanza de la reumatología en la universidad. La travesía desde el aprendizaje basado en el profesor al centrado en el alumno

Palabras clave:
Docencia
Grado
Espacio Europeo de Educación Superior
Reumatología
Universidad

RESUMEN

En los últimos años la enseñanza universitaria ha experimentado un profundo cambio como consecuencia de la creación del Espacio Europeo de Educación Superior. Se ha pasado de un modelo centrado en el profesor, basado en la transmisión de conocimientos a través de las clases magistrales, a otro centrado en el alumno, basado en la adquisición de competencias y que otorga gran importancia al aprendizaje autónomo. Esta transformación comporta la necesidad de reorganizar la actividad académica y de emplear nuevas herramientas docentes, como las metodologías activas de aprendizaje, más acorde con las exigencias actuales. En este artículo se exponen los ejes vertebradores del Espacio Europeo de Educación Superior y se describen diversas experiencias de innovación docente en el marco de Reumacademia y de tres universidades españolas.

New Teaching Model

The advent of the European Higher Education Area (EHEA) has led to a change in the traditional teaching model, which is based almost exclusively in the transmission of knowledge from the teacher to the student (passive learning). It is not easy to adapt to the new paradigm, in which the student becomes the protagonist of his education (active learning). To overcome the challenge, it seems necessary to both understand the key elements on which the transformation is based and explore the potential of new learning methods.

European Higher Education Area

In 1999, the education ministers of 29 European countries signed the Declaration of Boulogne,[1] the foundation document of

☆ Please cite this article as: Naranjo A, de Toro J, Nolla JM. La enseñanza de la reumatología en la universidad. La travesía desde el aprendizaje basado en el profesor al centrado en el alumno. Reumatol Clin. 2015;11:196–203.

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Table 1
Differences Between Traditional University Teaching and European Higher Education Area (EHEA) Teaching.

	Traditional university teaching	Teaching at the EHEA
Model	Teacher-centred	Student-centred
Academic load	Credits based on the activity (hours) of the teacher	Credits based on the activity (hours) of the student
Type of learning	Dependent	Autonomous
Role of the teacher	Dominant	Companion
Role of the student	Passive	Active
Teaching technique	Presentation (magisterial) class	Active methodologies
Formative objective	Transmission of knowledge	Acquisition of competences
Teaching method	Face-to-face activity	Great importance to information technologies and communication

a convergence process aimed at creating the EHEA. The Boulogne process, which ended in 2010, intended to foster the European dimension of higher education through the establishment of a common system of qualifications, the promotion of student mobility and the encouragement of cooperation between centres. The changes implemented regarding traditional teaching are evident (Table 1).

International Credit System

One of the main foundations of the EHEA, which currently comprises 45 countries, is the use of an international credit system, called European Credit Transfer System (ECTS).[2,3] Credits were created as a result of the exchange programme ERASMUS, in order to recognise the courses taken by the students. The EHEA chose the ECTS as a benchmark that would ensure the quality and the homogeneity of qualifications across all universities. ECTS credits consider all the learning process activities of the student and, therefore, not only hours of classes are taken into account, but also hours of study and the time dedicated to practices and assignment preparation. This new calculation formula implied an important change in the traditional measuring method, in which credit was more likely used to take into account the dedication of the teacher rather than to assess how difficult it was for a student to pass a subject. An ECTS credit has a minimum limit of 25 h of work from the student and a maximum limit of 30 h. In practice, all the Spanish universities have decided that an ECTS credit is worth 25 h. Most of the EHEA degrees have an academic load of 240 ECTS credits, though the degree in Medicine has 360 (60 per year).

A New Pedagogical Model

The ECTS leads to a new pedagogical model, given that it is mostly based on the autonomous learning of the student. This implies a challenge for both the teacher, who must prepare out-of-class activities, and the student, who is inevitably responsible for the organisation of his work. To some extent, the responsibility of the educational process passes from the teacher to the student, though this circumstance does not imply less dedication from the teacher. In fact, the teacher has to adopt the role of a guide and a counsellor, giving accurate instructions about where and how the student should obtain knowledge. Thus, the level of involvement and dedication of the teacher is necessarily greater. Besides, the teacher must conduct a personalised follow-up of the student to detect whether there is any difficulty in his learning process and, if so, determine the way of overcoming it.

Curriculum Oriented to Professional Work

One of the key demands of the Boulogne process is the need to adjust the training to the requirements of the labour market. In other words, it is advocated that the academic curriculum is oriented to professional work. That is why in 2002 the Tuning Project (Tuning Educational Structures in Europa Project)[4] was put in motion, in which degrees are considered in terms of competences which are a dynamic combination of attributes related to knowledge, skills, attitudes and responsibilities that the students have to be able to prove at the end of the educational process. Competence and knowledge are not synonyms; competence includes knowledge but its development takes more time.

There are 2 kinds of competences[5,6]: generic or cross competences, which are common to all degrees, and specific competences, which are related to each specific field of studies.

There are 3 kinds of generic competences: (a) instrumental competences, which include methodological and technological abilities; (b) interpersonal competences, which refer to the ability of personal relationships, either individual (e.g., self-criticism) or social (e.g., teamwork), and (c) systemic competences, which allow the person to observe how the parts of the whole group work together (e.g., planning skills).

On the other hand, specific competences are divided into 3 classes: (a) academic (*to know*); (b) field-related, which include the practical skills of each field (*to do*), and (c) professional, which are the skills related to each specific profession (*to know how to do*).

Teaching Modalities

Autonomous learning and competence training entail the need to reorganise teaching activities. In essence, 3 teaching modalities can be considered: directed, supervised and autonomous.

Directed activities are carried out mainly in the classroom; they are led, to a greater or lesser extent, by the teacher and they have a pre-established schedule. They involve master (presentation) classes, which have experienced a clear decrease in lecture hours, and seminars, which have been granted greater importance in terms of academic load. It is during seminars that active learning methodologies are usually included (problem-based learning, case-study method, cooperative learning).[7–9]

Supervised activities, which usually take place outside of the classroom, require somewhat regular follow-up with the teacher. This includes, among others, tutorships, assignment control, clinical practices and checking of the learning folder, a portfolio containing different documents, finished or in progress, which evidence the work and evolution of the student in that subject and to which the EHEA grants special value.[10,11]

Autonomous activities are those in which the student organises his time freely and they involve tasks such as bibliographic searches, assignment preparation, studying and incorporating content to the portfolio.

Information Technologies and Communication

For the EHEA, information technologies and communication are essential in the educational process.[12] It is believed that the university must encourage the so-called “electronic learning” (e-learning), i.e., distance (virtual) learning, through new electronic

means, especially the Internet. As a result, the university operating core of the educational process relies on the virtual campus, generally supported by the Module Object-Oriented Dynamic Learning Environment tool (Moodle). Among other possibilities, the virtual campus allows for the communication and interaction between teachers and students, the storage of teaching resources (videos, slides, articles) that may be consulted at any time, the creation of blogs or the supervision and assessment of learning results.

Teacher Innovation Accounts Regarding Rheumatology Teaching in Spain

While the EHEA guidelines were incorporated to study plans, several initiatives regarding teacher innovation were developed in schools of Medicine. It is worth mentioning that the Boulogne plan was progressively incorporated, at a year-per-course rate. In many centres, students finishing their courses in 2014–2015 will be the first to get a degree based on the EHEA. In the rheumatology subject, given that it is taught towards the end of the course of studies, innovating activities are generally in a very early stage and there is barely any evidence as to the results obtained from their application.

Below, you will find the personal accounts of the authors of this paper, which are provided as practical examples of the new teaching modalities. Moreover, they show teacher innovative activities within the Reumacademia framework.

Reumacademia

The Spanish Society for Rheumatology, aware of how challenging adaptation to the EHEA is for teachers, has launched the Reumacademia project, whose main goal is to support rheumatologists who are interested in developing an academic career. The project is currently coordinated by Víctor M. Martínez Taboada and Joan M. Nolla, and it is sponsored by the Roche Institute.

The purposes of Reumacademia include providing ongoing training on the art of teaching and promoting material creation for the teaching of rheumatology to medical students. In this sense, courses aimed at increasing the training on active methodologies, given by experts in teaching training, have been developed in the last 2 years. Attending rheumatologists have been given the possibility of completing the theoretical knowledge they acquired by conducting a supervised practical assignment. Their contributions made it possible to prepare a set of teaching materials[13] which is expected to be a useful complement of the rheumatology subject. In this way, there is a resource based on active learning methodologies for each of the following diseases: rheumatoid arthritis, systemic lupus erythematosus, primary Sjögren's syndrome, systemic sclerosis, inflammatory myopathy, giant cell arteritis, psoriatic arthritis, gout, calcium pyrophosphate crystal arthropathy, postmenopausal osteoporosis and osteoporotic vertebral fracture.

Universidad de Barcelona

In the new study plan, rheumatology teaching at the School of Medicine in Universidad de Barcelona (UB) is included in the fifth year of the course of studies as a comprehensive subject called "Ortopedia y Reumatología" [Orthopaedics and Rheumatology], which has 9 ECTS credits (4.5 for Orthopaedic Surgery and Traumatology contents, and 4.5 for Rheumatology contents).

The UB School of Medicine has 2 headquarters: one in Campus Casanova (Hospital Clínic) and another in Campus de Bellvitge (Hospital Universitari de Bellvitge). In Campus de Bellvitge, where there are about 80 students per course, the subject is coordinated by a rheumatologist and has 8 teachers (4 of which are members of the Orthopaedic Surgery and Traumatology Service, and 4 are members of the Rheumatology Service). Each student dedicates a total of 225 h to the subject, 108 of which correspond to on-site classes and 117 to autonomous work. From the 108 h of on-site classes, 38 correspond to presentation classes (26 master classes and 12 seminars) and 70 to clinical practices.

Rheumatology teaching contents are included in 18 h of presentation classes (13 master classes and 6 seminars), which are given to all students in the classrooms of the campus, and 35 h of clinical practices, which are held in the Rheumatology Service, with students divided into 16 groups (rotational periods of 2 weeks). In practices, each of the group members gathers 27 h of clinical experience, especially in external practice, and attends 8 seminars that last one hour each, and are held in the clinical classroom of the service. Of those seminars, 4 are based on traditional teaching techniques and 4 use active learning methodologies. Problem-based learning[14] is applied when giving the differential diagnosis of a patient suffering from musculoskeletal pain, and the case-study method is used for comorbidity in rheumatoid arthritis ("62-year old female patient with rheumatoid arthritis and fever"),[15] the diagnosis and treatment of systemic lupus erythematosus ("36-year-old female patient with initial polyarthritis")[16] and the attitude when dealing with a patient with vertebral fracture ("63-year-old male patient with multiple fractures").[17] Each of these teaching resources[14–17] establishes the teaching objective and the learning objectives to be achieved, as well as the competences that will be developed.

The use of active learning methodologies is favoured by the proximity environment in which the seminar is held and by the small number of students (5) in each group. Students positively grade the experience, even though a satisfaction level assessment is not yet available.

During practices, students use another learning tool proposed by the EHEA, the portfolio. In the portfolio, students must record their everyday experiences during rotations. Thus, they must include the following: (a) date; (b) name of the teacher who has been their coach; (c) problem identification; (d) analysis; (e) information source; and (f) description of the incorporated competences. The portfolio is essential for the assessment of the practical part of the subject, which represents 40% of the final grade.

Besides, as a support element for the autonomous work, before the start of presentation classes on systemic autoimmune diseases, a document with 10 standardised clinical cases[18] is uploaded to the virtual campus (Moodle). The aim is two-folded: to facilitate the acquisition of knowledge (consolidate the concept of systemic disease, highlight the importance of the differential diagnosis and recognise the key elements on which diagnosis and treatment are based) and to foster the development of competences (analysis and synthesis ability, search for information and integration of previously acquired knowledge).

Universidad de La Coruña

The Rheumatology Service of Complexo Hospitalario Universitario de A Coruña receives students from the School of Medicine of the Universidad de Santiago de Compostela (USC) for the rotation course of the sixth year of the course of studies, as well as students from the third to fifth year during the summer period and from other Spanish schools in an unregulated manner. The USC School of Medicine has a fourth-year subject called "Enfermedades del Sistema Inmunológico y Reumatológicas" [Immune System and Rheumatologic Diseases], with 3 ECTS credits that correspond to 30 h of presentation classes, 6 h of interactive seminars and 45 h of personal work from the student. Moreover, it has a fifth-year subject called "Enfermedades del Aparato Locomotor" [Diseases of the Locomotor System], shared with Traumatology and Rehabilitation,

with 6 ECTS credits. The rotation classes of the sixth year are decentralised in the USC, and students may rotate through any hospital of the Galician community. Student rotations usually last from 1 to 3 weeks for each service.

The rapid development of the Internet and social networks has revolutionised the way students exchange data and look up information. More and more students use tablets and smartphones to look up medical information instantly on the Internet, and share it on Facebook or Twitter. Even though textbooks are a valuable resource when checking problems, the Internet represents a huge help to support the learning needs of students, and teachers should keep that in mind.[19]

Taking this fact into consideration, the Rheumatology Service thought it should have its own teaching material to support the different activities proposed by the teaching plan of the rheumatology subject. The idea was to prepare materials that facilitated the different educational activities and allowed for an improvement in the acquisition of skills and competences by the medical students and even by the residents. Because of this, multimedia materials are considered especially useful in the learning-teaching process and are easily distributed using the latest information technologies and social networks.

The material prepared includes presentations from several lessons and videos, of common structure, from 1 to 10 min long (Table 2). The filming was done using an electronic tablet or a video recorder, and the contents were edited with a simple programme. Also a channel was created called "reumatología chuac" [rheumatology at Complexo Hospitalario Universitario de A Coruña] on the YouTube website, to upload and store the material designed.[20]

A complete playlist of videos is available, which includes a first part of anatomical bases and exploratory anatomy, and a second part with several basic topics of the rheumatology subject (management of osteoarthritis, low back pain, osteoporotic vertebral fracture, knee arthrocentesis).

The channel was created on 14 January, 2013. Since then, it has received 54,211 visits with a total of 2749 viewing hours and an average audience retention of 3 min for each visit. The main source of searches is the YouTube website (91%). The material was watched mainly from Spain (40%) and Mexico (20%), mostly by men (58%). If we analyse the geographic location of the top 5 viewing places, we can see that in South America the material is viewed mostly by people between 18 and 24 years old (39%–49%), followed by people between 25 and 34 years old (30%–42%). In Spain, the material is viewed in a rather uniform way by people ranging from 18 to 64 years old (15%–16%), peaking between 25 and 34 years old (27%) and 45–54 years old (24%) (Fig. 1).

The channel has 373 subscribers and has received 248 messages in which it is commented that the material is appreciated and has been useful, highlighting the availability of the materials online for consultation any time and from anywhere. On the other hand, the members of the Rheumatology Service have considered the experience to be positive and very useful in facilitating student and resident learning, which encourages the incorporation of new teaching materials.

Universidad de Las Palmas de Gran Canaria

At the Universidad de Las Palmas de Gran Canaria (ULPGC), Rheumatology has been traditionally taught in 20 lectures. Initially, it was linked to blocks of medical teachings and, more recently, to Traumatology and Orthopaedic Surgery in a comprehensive subject called "Enfermedades del Aparato Locomotor" [Diseases of the Locomotor System], consisting of 13 ECTS credits. During the last 2 decades, bachelor students have had access to the full syllabus at the university website, along with examination videos and links to image collections such as the Spanish Society for Rheumatology [Sociedad Española de Reumatología, SER] image bank.[21–24] The classes have been increasingly complemented with the inclusion of clinical cases.[24] Thus, for example, to explain the management of low back pain, 5 clinical cases with examination and X-rays (spontaneous vertebral fracture, lumbar osteoarthritis, night pain with radiological signs of hyperostosis, rentier patient with multiple subjective complaints and one case of idiopathic low back pain) are presented. The students are asked to reflect on each clinical case about warning signs and correlation between subjective complaints from the patient and objective examination and image findings. Afterwards, the teacher debates each case with the students and gives a lecture about the management of low back pain and a final summary.

During the 2012–2013 course, there is a significant change in the teaching of Rheumatology in 2 ways; on the one hand, the medical specialty starts being taught in the fourth year instead of the fifth and, on the other hand, medical graduate students join instead of the undergraduates.

Taking advantage of the change to grade, a great teaching effort was made to organise group assignments following the case-study method and problem-based learning. The lesson from that experience was, in summary, that: (a) the acceptance from the students was very positive; (b) in order for the group assignment to be effective, the students must complete it mostly after class hours; (c) the class hours must be used to debate what was learned as a group, clarify doubts and perform the closing by the professor, and (4) the time must be closely watched when there are presentations and debate from the students, in the sense that there has to be a script with the main topics to be discussed within a structured debate.

During the 2013–2014 course, greater intensity has been placed on the teaching of Rheumatology based on cases and problems, with help from the Reumacademia programme of the SER. This way, about half of the lectures are master classes and the other half are made up of clinical cases, seminars and group presentations. In a few words, it could be said that the ULPGC's goal for Rheumatology is to prepare students for an objective and structured clinical assessment or to prove their competence in the medical disorders of the locomotor system at the level of a general practitioner. The updated syllabus on the university website has been maintained from previous years with the addition of examination videos and a collection of images from the SER image bank. The amount of information transmitted by this type of teaching is obviously less than the one provided by master classes, but the advantage is that the ideas are more firmly retained.

Teaching success regarding the teacher, both in traditional classes and in those where new student-centred teaching methodologies are used, is based on the same key elements: work, effort and passionate transmission of knowledge. Apart from the effort resulting from the preparation of the new teaching material, another limitation of the student-centred system is that the teacher is exposed to an open discussion, which may lead to awkward questions from the students. In this sense, the teacher should depart from the idea of a traditional teacher who knows everything because he is the only source of knowledge and, instead, he should act natural when asked questions to which he does not know the answer.

In order to favour the preparation of clinical cases that have been distributed along the syllabus, the following class dynamics is preferred:

1. Three general information classes on rheumatology: clinical history and examination, complementary tests, "panoramic" view of the main groups of rheumatic diseases and their distinguishing characteristics. This class model is implemented pursuant to the suggestions made by students in a survey. Its purpose

Table 2
Teaching Material Available Through the Youtube Channel Called "Reumatología chuac".

	Title	Duration (min)
1	Anatomical bases for the study of rheumatic diseases	10:18
2	General diagnostic principles: anamnesis	6:12
3	General diagnostic principles: laboratory	3:29
4	General diagnostic principles: radiology	13:24
5	Examination in rheumatology: an overview	1:20
6	Examination of the temporomandibular joint	0:37
7	Examination of the spine: anatomical bases	5:06
8	Examination of the spine: palpation	1:09
9	Examination of the cervical spine	1:18
10	Examination of the dorsal spine	0:54
11	Examination of the lumbar spine	3:10
12	Examination of the shoulder: anatomical bases	2:39
13	Examination of the shoulder	9:40
14	Examination of the elbow: anatomical bases	0:45
15	Examination of the elbow	1:30
16	Examination of the hand: anatomical bases	2:23
17	Examination of the hand	3:38
18	Examination of sacroiliac joints: anatomical bases	1:31
19	Examination of sacroiliac joints	2:33
20	Examination of the hip: anatomical bases	1:40
21	Examination of the hip	3:45
22	Examination of the knee: anatomical bases	2:13
23	Examination of the knee	4:53
24	Examination of the ankle and foot: anatomical bases	2:29
25	Examination of the ankle and foot	2:50
26	Examination of the way of walking	0:25
27	Osteoarthritis	11:48
28	Vertebral osteoporotic fracture: how to deal with it	14:22
29	Fibromyalgia	17:58
30	Arthrocentesis	4:40
31	Low back pain	12:45
32	Radiological grading of knee osteoarthritis: Kellgren–Lawrence scale	3:06
33	Autoimmune diseases for patients	1:57
34	Appropriate technique for the subcutaneous injection of medication	2:19

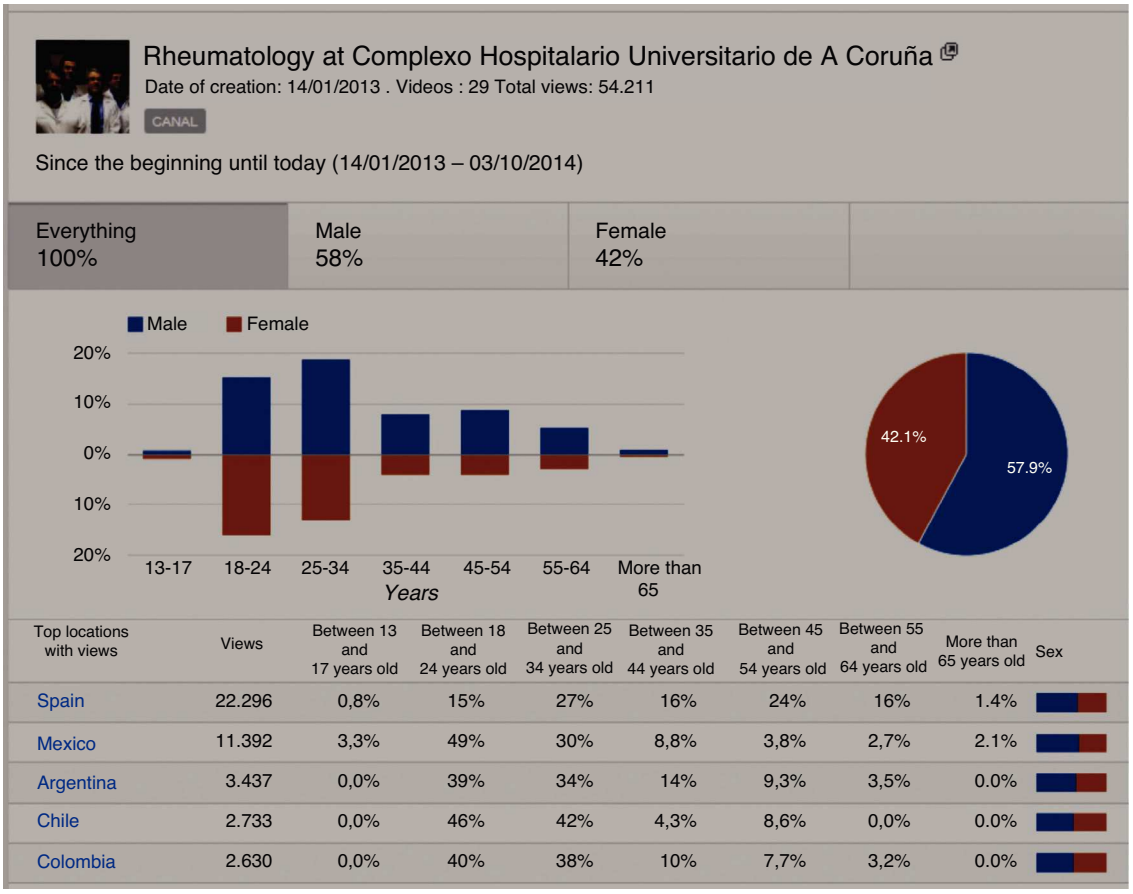

Fig. 1. Analysis of demographic characteristics from top 5 countries that most use online material.

Table 3
Clinical Cases and Group Assignments at ULPGC.

Title	Active learning methodology	Main objective (knowledge and competences of the student)	Time schedule
Seropositive polyarthritis and thrombocytopenia	PBL	To learn about diagnostic options and the key elements of differential diagnosis	After rheumatoid arthritis and lupus classes
70-year-old female patient with lumbar pain, headache and high ESR	CSM	Data indicating suspicion of vasculitis	Day of the class on vasculitis
Hand cyanosis	CSM	Attitude when dealing with Raynaud's phenomenon	Day of the class on scleroderma
Arthritis and diarrhoea	PBL	Diagnostic options	Day of the class on spondyloarthritis
Acute monoarthritis of the knee in adults	CSM	Attitude when dealing with acute monoarthritis	Day of the class on microcrystalline arthritis
Monoarthritis of the knee in children	CSM	Attitude when dealing with monoarthritis in children	Day of the class on juvenile monoarthritis
Set of X-rays without clinical data	CSM	Reasoned radiological reading	Later on during the year
Advanced gonarthrosis	CSM	Treatment of osteoarthritis of the knee	Day of the class on osteoarthritis
Physical examination of the locomotor system	CL	Physical examination. How to handle tendinitis	Day of the class on soft tissue rheumatism
Generalised pain, refractory to treatment	PBL	Attitude when dealing with fibromyalgia	Day of the class on fibromyalgia
Osteoporosis (cases)	CSM	Global assessment of fracture risk	Day of the class on osteoporosis

PBL: problem-based learning; CL: cooperative learning; CSM: case-study method; ULPGC: Universidad de Las Palmas de Gran Canaria; ESR: Erythrocyte sedimentation rate.

is to give a general idea of the specialty before students start preparing cases and group assignments.
2. Master classes involve a large number of clinical cases. For instance, to explain the lupus disease, several patients are presented, so as to show its variability of presentation and the reason for classification criteria.

The teaching system based on clinical cases and problems inevitably requires a clear definition of what students need to master by the end of the course. When choosing essential information over non-essential one, lectures transmit considerably less information than master classes. For a general physician, it is fundamental to know how to guide a patient with articular pain, detect warning signs, determine which patient needs to be referred to the emergency ward, interpret basic complementary tests and understand how essential treatment is.

For the practical application of the case-study method and for the teamwork of students, it is essential that all cases be interesting and, at the same time, challenging. Students must be informed of the paper to be prepared, at least, a week in advance, and it must be included in the dynamics of master classes. Therefore, a case of acute monoarthritis of the knee in adults is planned to be presented during the class of microcrystalline arthritis. Table 3 shows the rest of the clinical cases and group assignments of the 2013–2014 academic course of the ULPGC. Teachers may help students through on-site tutorships and mainly through the virtual campus available on the Internet. All groups (4–6 students per group) have to prepare the solution in writing. Students may be asked to deliver the suspected diagnosis, or the tests to be ordered or warning signs, without exceeding 3–4 specific questions. On the day of the presentation, the teacher initially gives a slide presentation of the case summary. Then, he randomly asks a group to comment on the results of the paper. This may sometimes be done with slides. Later on, all groups comment on the case as part of the discussion, and the case is finally closed with a summary comment from the teacher. This class process should take no longer than 20 min, so it is necessary to check the time and to make all the comments that are essential for the case. The teacher must have a list of key issues to be discussed and summarised by the end of the class. He should raise questions on all the issues that were not analysed by the students. It is advisable to raise Socratic questions, such as the following:

- Why do you say that?
- What does this mean exactly?
- How is this related to what we have been discussing?
- What is the nature of. . .?
- What do we already know about this?
- Could you give me an example?
- What you mean to say is. . .or. . .?

One of the most successful cases involves working with 15 simple X-rays which represent the main rheumatic diseases. At the beginning of the classes, students are given the pictures without clinical information, together with explanatory information on radiological reading. The presentation takes place almost by the end of the rheumatology course, after explaining the main diseases. Students have to interpret the X-rays in a structured manner: main findings, suspected diagnosis and other diagnoses. On the day of the class presentation, the teacher asks each group to explain the X-ray appearing on screen. It is briefly discussed and, finally, the teacher closes each case. The assessment consists of the evaluation of the written paper and class participation.

For problem-based learning, the teacher presents a lengthy clinical case that has sufficient information, complementary studies and follow-up, so no other tests are needed. One of the cases involves a female patient with chronic generalised pain reluctant to receive medical treatment, with detailed comments on her evolution, who, in the last visit, requests to be referred to the Pain Unit and to be given a specific report for permanent work incapacity. The tasks of the case are: diagnosis, treatment and justification for the work incapacity.

The conduct of applied cooperative work during the course is achieved through the examination of the locomotor system. To do so, each of the 5 students of the group needs to examine each of the 5 joints (shoulder, elbow, hand, knee and foot), so that each student masters one joint. Students prepare the task using written material, videos available in the virtual campus and the support of the teacher. During the second stage, each student explains the assigned joint to the other 4 students of the group, as do all of the other students with their assigned joints. Finally, during the class, there is a brief examination of each joint with randomly chosen students, where one acts as the patient and the other as the examiner. The class on soft tissue rheumatism has been chosen because the physical examination is essential for the diagnosis of tendinitis and bursitis.

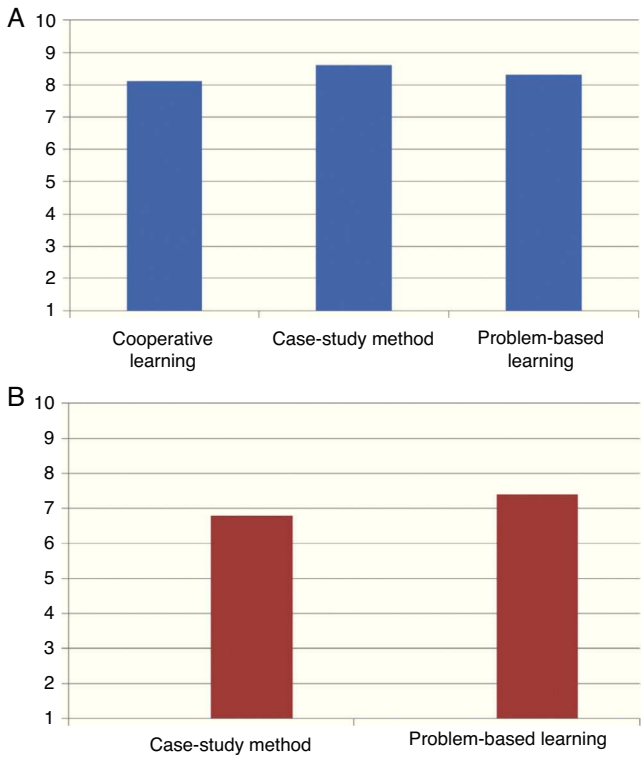

Fig. 2. Survey results of the student assessment of the ULPGC 2013–2014. (A) Teamwork contribution to student,[1–10] with 10 being the maximum contribution. (B) Difficulty in the preparation of the group assignment,[1–10] with 10 being not difficult at all.

Students complete a class assessment survey a week after the end of the course (Fig. 2). From a sample of 46 anonymous answers through the virtual campus, the overall score was positive; on the contribution of teamwork on a scale from 1 to 10, with 10 being the maximum contribution to the student, the average score ± standard deviation referred to concrete cases ranged from 8.1 to 8.6 ± 1.2; on the difficulty of preparation, with 10 being not difficult at all, the average score ranged from 6.8 to 7.4 ± 1.6.

The assessment of the cases and the problems is performed by counting the participation as a group plus class attendance, which has a weight of up to 15%–20% of the final grade for Rheumatology. The content of the theoretical exam test is consistent with the type of teaching methods; thus, there are plenty of clinical cases, clinical photographs and X-rays, the latter shown on slides during the examination. Questions with images associated account for 25% of the total.

Final Remarks

The medical teachers, used to a traditional model in which they shared their knowledge with the students using master classes, need to adapt to a new model in which the student is the central element of the learning process.

The challenges posed by the EHEA, as set forth in this review, are difficult to overcome, especially when the Boulogne Plan has been implemented without providing the university with the necessary human and economic resources to ensure a smooth transition from the previous situation.

Teachers must improve their training on the art of teaching, master active learning methodologies and organise their teaching activities taking into account that the student must acquire competences and not just knowledge. In these cases, the work conducted by teaching training centres, present in all Spanish universities but not sufficiently staffed in most cases, becomes particularly significant.

The EHEA provides an implicit renewal opportunity, of which rheumatologists should take advantage in order to become innovative in medical teaching and, thus, promote the specialty among graduate students. In this sense, developing innovation projects, which are common to all Spanish universities, and designing reliable and precise indicators, which make it possible to measure the obtained results, are tasks which should be carried out throughout the coming years.

Ethical Responsibilities

Protection of persons and animals. Authors state that no experiments were performed on human beings or animals as part of this investigation.

Data confidentiality. Authors state that this article does not contain patient data.

Right to privacy and informed consent. Authors state that this article does not contain patient data.

Conflict of Interests

The authors declare that there are no conflicts of interest.

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