

# Role of the organization of subjects and the educational resources used in their teaching in the Anatomy education-learning process

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## SUMMARY

Within the three-year nursing degree course in Spain, the way in which anatomy teaching is organised shows distinct differences between different universities. At the University of Jaén, first-year students have human anatomy (HA) as a separate subject, whereas at the University of Almería, anatomy is included within a larger module called the structure and function of the human body (SFHB).

The aim of this study was to analyze the reaction of students to the organization of their anatomy courses, the resources used in their teaching, their contents, and the tutoring and evaluation system. For this purpose, a 35-item questionnaire was designed to address aspects related to these objectives and administered at the end of the 2005-6 academic year to 82 students of taking human anatomy at the University of Jaén and 52 students taking structure and function of human body at the University of Almería.

Results obtained showed differences in the evaluation of the educational organization of these subjects at the two universities. The approval rating of Jaen students for the relationship between their theoretical and practical education/training was 25% lower than that of Almería students. This difference appears to be related to the different distributions of credits between the two subjects in the courses surveyed. Students appeared more highly to value the resources that were most frequently used during the course, suggesting that students may value most highly those resources employed most frequently within a course. There were some similarities between the students at the different universities in the importance they assigned to the different thematic units of the respective subjects. Finally, both groups revealed a preference for face-to-face tutorial sessions and for evaluation by written examinations.

**Table 1.** Distribution of credits in HA and SFHB subjects.

	SUBJECT	CREDITS			
		THEORETICAL	PRACTICAL	TOTAL	RATIO
Jaén	H. A.	6	1	7	6:1
Almería	S.F.H.B. (Anatomy module)	5	4,25	9,25	1,17:1

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INTRODUCTION

The design and implementation of an educational program is a complex task in which all diverse components must be correctly linked together, maintaining a theoretical-practical coherence that cannot be improved (Villar, 2004). In addition, the educational programme must be based on an open dynamic approach and be continuously updated by feedback from students (Deborah et al., 2002).

Universities are currently making great efforts to improve educational programmes and to introduce new technologies into their development. These efforts are of major importance in the teaching of anatomy, which requires the acquisition of a large amount of knowledge but is generally afforded insufficient time for this purpose by course designers (Inzunza and Bravo, 2006).

In the three-year nursing degree course, the way in which anatomy teaching is organised shows distinct differences between different universities. Thus, at the University of Jaen (Andalusia, Spain), first-year students have human anatomy (HA) taught as a separate subject, with six credits assigned for theoretical component of the course and one credit for the practical component and is further organized into 11 themes that contain a total of 52

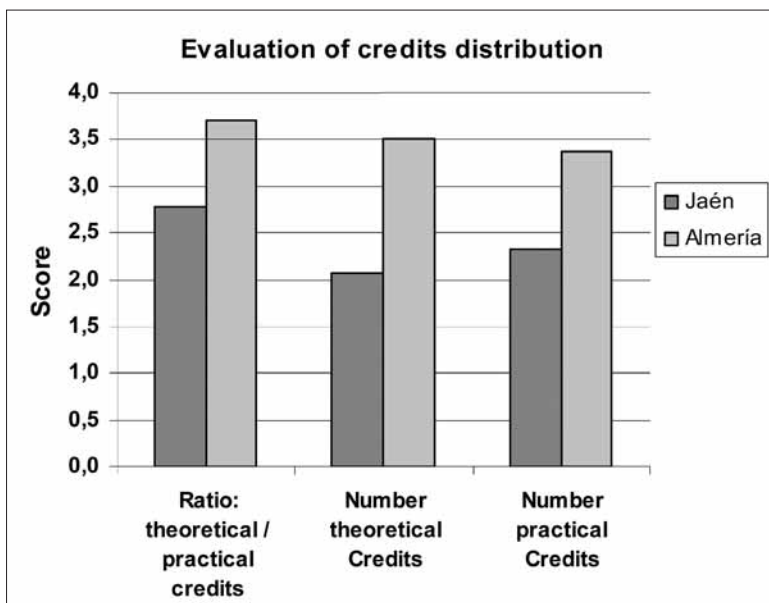
didactic units plus 1 practical session per theme (Perea, 2006). In contrast, anatomy is taught at the University of Almería (Andalusia, Spain) as part of a larger, complex course called structure and function of the human body (SFHB), and which includes 1 biochemistry module, 1 histology module alongside the 1 anatomy module. SFHB is assigned a total of 10 credits for the theoretical components and 5 for practical components. In the SFHB course anatomy teaching is organised into 8 thematic units and accounts for around half of the theoretical learning and almost all of the practical classes (Herrera F, 2006).

The aims of this study were to analyze the reaction of the students to the organization of their anatomy courses in the different universities, the resources used in their teaching, their contents, and the tutoring and evaluation system, and to evaluate the influence of these factors on the perception of teaching by the students.

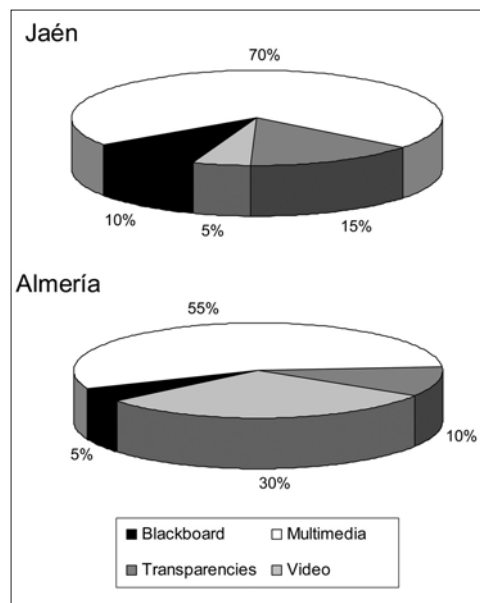
MATERIALS AND METHODS

A 35-item questionnaire was designed to explore the different aspects related to the study objectives and was then administered to HA and SFHB students at the end of the 2005-2006 academic year. A total number of 134 students were enrolled in the study, 82 HA students at the University of Jaén and 52 SFHB students at the University of Almería.

**Figure 1.** Student evaluation of credit distribution. The histograms represent the score for the appropriateness of the total number of credits and ratio between theoretical and practical credits, for the subjects of HA (Jaén) and SFHB (Almería).



**Figure 2.** Percentage of use of educational resources in the teaching of HA (Jaén) and SFHB (Almería).



The SPSS software package (v13) was used for the statistical analyses, including descriptive statistics and ANOVA.

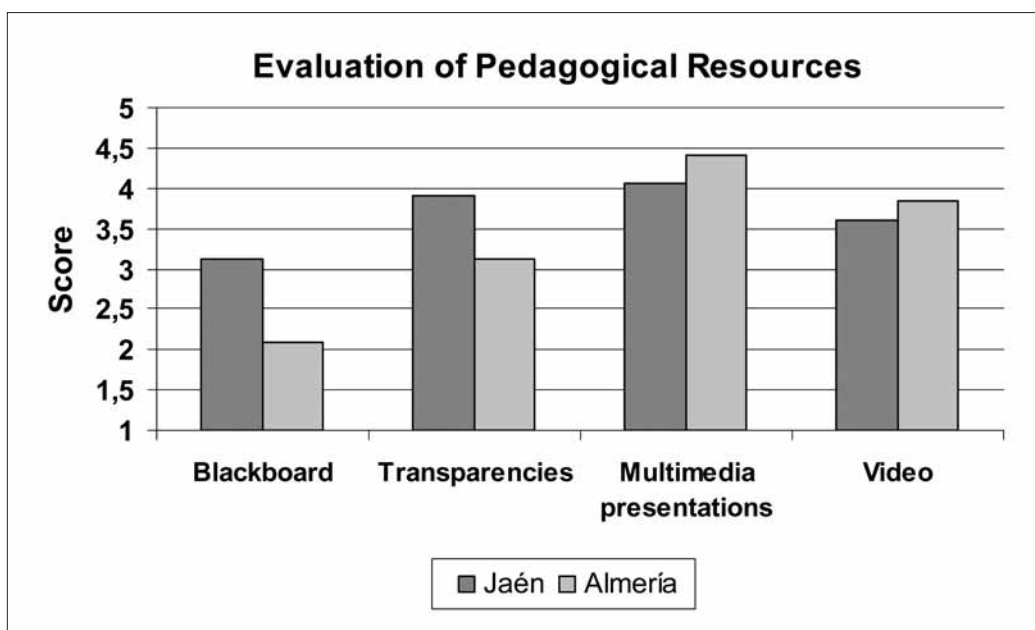
## RESULTS

The inclusion of education in anatomy within their respective degrees was highly rated by the students at both universities. However, differences were found with respect to their responses to the educational organisation of the subjects. Thus, the approval rating of Jaén stu-

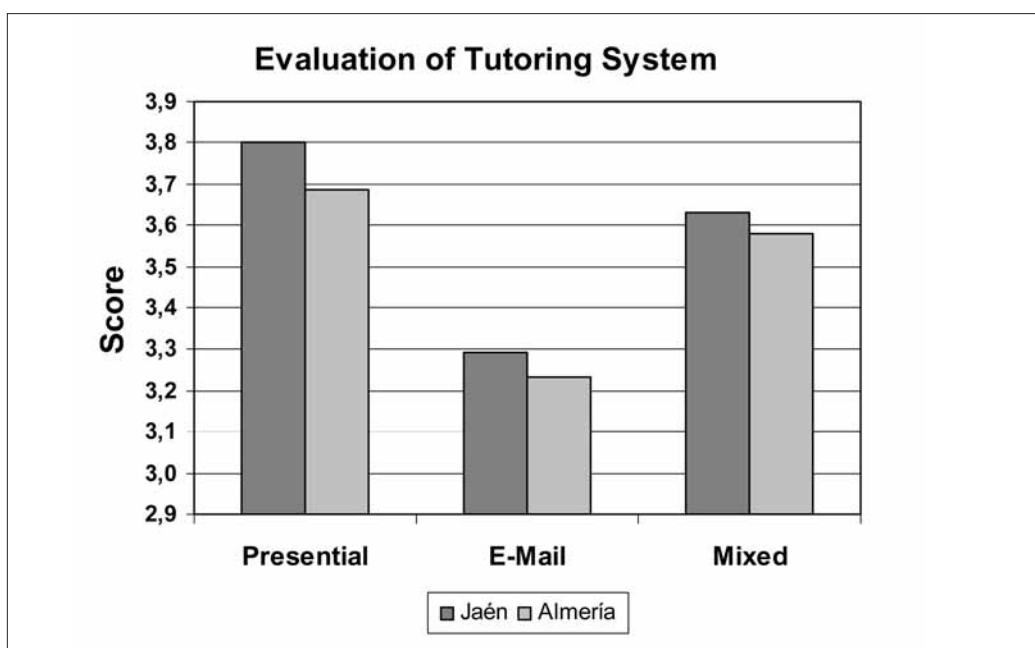
dents for the relationship between their theoretical and practical education/training was 25% lower than that of Almería students.

The resources used for HA teaching were distributed as follows (by % of hours): 10% use of blackboard, 15% transparencies, 70% multimedia presentations and 5% video, with a distribution in the SFHB course of 5%, 10%, 55% and 30%, respectively. Interestingly, the rating by students of the use of blackboard, transparencies and video appeared to reflect the percentage of hours for which the resource was used. Thus, blackboard and transparencies

**Figure 3.** Student evaluation of pedagogical resources. The histograms represents the preference of HA (Jaén) and SFHB (Almería) students for the resources used in the development of the subjects.



**Figure 4.** Evaluation of tutoring system. The vertical axis presents the score for face-to-face, e-mail or mixed tutoring by students of HA (Jaén) and SFHB (Almería).



were more highly valued by HA than by SFHB students, and video was more highly rated by SFHB than by HA students.

There were similarities in the importance assigned by students at both universities to the different thematic units of the subjects. Thus, there was generally a higher rating of topics related to circulation and the digestive system as opposed to the nervous system and more general aspects of the subject.

With respect to the tutorial system, both student groups expressed a preference for face-to-face teaching session than for consultations made via the electronic mail system.

Finally, both groups of students showed a clear preference for evaluation by written tests and short open-answer questions rather than by oral examination. Evaluation based on anatomical plates, practical class notebooks and individual tasks occupied an intermediate place.

## DISCUSSION

These two groups of students differed in their evaluation of the relationship between their theoretical and practical education. This difference appears to be related to the different distribution of credits between the two courses, with a theory:practice ratio of around 1:1 in SFHB and 6:1 in HA, explaining the greater demand for the practical teaching by HA students. Moreover, the requirement by HA students for theoretical and practical credits exceeded by 41.2% and 30.5% the stated requirements of SFHB students. This finding suggests that a deficit of practical classes may be associated with an overall perception by the students that the subject is inadequately taught, leading to a demand for more teaching hours in anatomy.

Students most highly rated the resources that were most frequently used to teach the subject, suggesting that students may value most highly those resources employed most frequently within a course. Nevertheless, the groups showed a similar evaluation of multimedia presentations, which was the most highly rated resource, assigned 88% of the maximum score by HA students and 84% by SFHB students.

The similarities between student groups in their evaluation of the importance of different thematic units may be explained by the fact that the previous knowledge acquired by both groups of students in their pre-university stud-

ies was similar and, may have been greater in the units they considered more important. Thus, significant learning, i.e., the relationship between the learning of the new knowledge with respect to previous knowledge, allows students to fit concepts within their existing cognitive structure, thus increasing their knowledge and promoting a favourable attitude to learning that increases their self-esteem, while stimulating personal enrichment and motivation to learn (Ballester, 2002).

Students expressed a preference for face-to-face tutorial sessions. In this context, it may be necessary for teachers to promote the use of computer resources to support student education (Granger, 2006), although electronic material may not be the sole source of information for student (Rizzolo et al., 2002). This has become of special importance since implementation of the Bologna scheme and the establishment of European credits, which stimulate the self-training and self-learning of the students, in which tele-assistance tools offer a clear advantage (Pagani, 2003). Moreover, recent educational research into the use of new information and communication technologies, especially the Internet, showed that their daily use allows students to implement pedagogical principles and make themselves the main actors in the construction of their own knowledge (Waldegg, 2002).

Finally, the preference for evaluation by written examination may reflect the feelings of insecurity and concern associated with oral examinations, which might not therefore reveal the true level of knowledge acquired by the student. Students may feel they can achieve greater degree of concentration in written exams, with the ability to review their responses before the exam ends (Moreno, 1995). Nevertheless, recent studies demonstrated that oral examinations can be as effective as or more effective than written examinations in evaluating students' understanding of medical content (Rushton, 2003).

In conclusion, these results showed a close relationship between the educational programming of anatomical subjects and student demands. Practical training appeared to be of great assistance in the assimilation of anatomical knowledge. The teaching resources most frequently used during the course were those most highly rated by students and, finally, the importance assigned to thematic units appears to reflect the influence of significant learning on student preferences.

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