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## Student's Epistemological Beliefs and the Perception about University Professor. A study with Science Students

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### Abstract

In this work we analyse the university professors ratings and their epistemological beliefs. We sampled 133 students from the Universidad Complutense de Madrid (Spain) who are studying Health Sciences. For the study we used the following questionnaires: Characteristics of University Teaching Quality from the students point of view (De-Juanas) and Schommer Epistemological Questionnaire (Schommer). The results show that gender has no influence on the perception of students about teachers or epistemological beliefs. We found relationships between students' beliefs about knowledge and its valoration on a number of teaching work dimensions

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### Introduction

In the European Higher Education Area (EHEA) reform process, the work of the faculty is located within a challenging context, coming on stream new teaching roles related to the development of new manage learning tools, assessing skills, using new technologies, to attend diversity, etc. Numerous research has been carried out on the study of these roles that have focused their interest on the dimensions that determine a good teacher, teacher assessment and teaching skills (Berliner, 2005; Bain, 2005; among others). The results of these studies have identified training needs and, of course, have been useful as a model for reconsidering the new institutional positions in the reforms that have emerged in the academy.

In a recent study, Beltran and Perez (2005:112) develop a university professor model that integrated and synthesized the different university teaching skills in four functions: academic competence, pedagogical competence, personality of the teacher and personal efficiency. This model has served as a reference to this work.

The interest in the study of learning from the perspective of students has been increasing. The influence of epistemological beliefs on academic learning has been recognized. In that way, the universities begin to take into account various personal background aspects related to learning that were previously overlooked.

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Research on epistemological beliefs, conducted mostly in the United States has relied on quantitative and quasi-experimental methodologies, in turn, these have facilitated the data collection by researchers (Cano & Cardelle-Elawar, 2004). Consequently, these works made from metacognitive approaches, have based their findings on an analysis of questionnaires grounded in the work of Perry (1970) and Schommer (1990). Schommer's studies allowed to find relationships between epistemological beliefs and various variables related with learning. Often, scientific literature can be found that reports about research results that corroborate the findings of these works (Chan, 2003; Cano and Cardelle-Elawar, 2004, Rodríguez & Cano, 2007). However, research does not collect evidence on the university students epistemological beliefs and his relationship with their teachers valuation.

This study assumes the value of students' beliefs about learning and takes into account the perception of teachers by students. In this sense, our overall aim is describe and analyse these aspects. Furthermore, we make the following hypothesis: 1) the ratings of Health Sciences student about university teaching quality features and their epistemological beliefs differ by gender, 2) Health Sciences students' opinions about university professors are related to their epistemological beliefs.

## 2. Method

We used a descriptive and ex post-facto design. The dependent variables studied were: 1) Quality teaching faculty features manifests from the point of view of the students (De-Juanas, 2009): personal identity and planning; learning mediation; disposition toward students; use of new technologies; Orientation; selfevaluation; experiential learning, academic proficiency; and critical thinking; 2) Epistemological beliefs (Schommer, 1993): Fixed Ability, Simple Knowledge, Quick Knowledge, and Certain Knowledge, 3) The independent variable is gender.

### 2.1. Sample and Questionnaires

To carry out the research a non-probability sample was made. We collected 133 students sample (96 women, 72%, 37 males, 28%) according to criteria of availability. These students belong to Health Sciences studies at the Complutense University of Madrid (Spain) (Dentistry, Pharmacy, Optometry).

We used the University Teaching Quality Features from Students point of view Questionnaire (CDUCA) (De-Juanas, 2009). This questionnaire collects student ratings on the faculty through 57 items in a Likert scale. The items are positively worded and each score in the scale expresses frequencies in relation to how many professors, students have and have had throughout their academic experience. High scores reflect that, in the opinion of the students, many teachers agree with the questionnaire statements. The instrument reliability was 0.966 measured by Cronbach's alpha coefficient. The questionnaire dimensions are operationalised as follows: 1) Personal identity and planning, this factor is related with university professor personality traits that promote training process, as well as interpersonal and communication skills; 2) Learning mediation, items of this dimension are related to teachers ability to engage and motivate students; 3) Favourable towards students, refers to the ability to understand the students position and provide personalised attention; 4) New Technologies Used, assesses the use and promotion of new technologies in the teaching-learning process; 5) Guidance, values orientation, assistance and support to students; 6) Self-evaluation and self-learning control, respect the ability of academics to promote the assessment and control of learning by the students themselves; 7) Experiential Learning, it is the teachers' ability to relate learning highlighting experiences; 8) Academic Professional Proficiency in the area, characterised by management that show teachers about their subject; 9) Critical thinking refers to the help provided by the teacher to the students to think, to know information sources, take a personal position before learning, etc.

We also used the Schommer Epistemological Questionnaire (SEQ) (1990) that measures the individuals' beliefs about knowledge and learning. This instrument is part of a naive perspective of the subject. It was constructed using a Likert scale whose items are formulated in positive and negative sense. The answer scale is from one to five. Each score means the agreement or disagreement degree with the statements posed to participants in each item. Low scores on one factor correspond with little naive beliefs, while high scores indicate that beliefs are more naive. The instrument has 63 items grouped into twelve subscales. Furthermore, these scales saturate into four factors or dimensions: Fixed Ability, Quick Learning, Simple Knowledge and Certain Knowledge. We examined the internal

consistency of the SEQ questionnaire using Cronbach's alpha. The results showed a value of .67. This value can be considered acceptable, if we take as a reliability instrument reference reflected by Schommer (1993:360) in a test-retest showed a value of .7.

## 2.2. Procedure and Data analysis

The data was collected during the first semester of 2008. Just in the last year prior to the implementation of the new curriculum in line with the ESHE. The questionnaire application was developed in the classroom inside the academic schedule, and was conducted by the authors of this work.

To carry out the statistical analysis we used SPSS for Windows, version 19. We calculated descriptive statistics of the sample characteristics and the different variables involved in the study, we also conducted parametric T tests to compare the results of women and men, and Levene statistic to test group homocedasticity. Finally we studied the relationship between both instruments factors using Pearson correlation analysis.

## 3. Results

### 3.1. Factors Description

First, the SEQ instrument shows the following descriptives results:

Table 1. Mean and Standard deviation for each SEQ factors

	Mean	SD.
Fixed Ability	2.52	.29
Simple Knowledge	2.80	.34
Certain Knowledge	3.00	.30
Quick Learning	2.53	.36

For its part, the descriptive data from the CDUCA questionnaire shows a profile that characterises teachers perceived by students in the sample (see Table 2).

Table 2. Mean and Standard deviation for each CDUCA factors

	Media	Desv.tip.
Personal identity and planning (PERSO)	4.21	.89
Learning mediation (MEDIA)	3.26	.84
Favorable toward students (DISPO)	3.73	1.03
New Technologies Using (TIC)	3.82	.92
Guidance (ORIENTA)	3.43	1.01
Self-evaluation and self-learning control (AUTOEV)	2.92	1.17
Experiential Learning (AEXPER)	3.23	1.13
Academic Professional Proficiency in the area (DOMINIO)	4.39	1.09
Critical thinking (PENCRIT)	3.03	1.11

In order to check gender differences in mean scores a Student t-test was applied (see Tables 3 and 4).

Table 3. Descriptives and T Test for SEQ factors by gender. \*The difference is significative at .05.

	Gender	N	Mean	SD	Levene	Sig.	T Test	Sig.
Fixed Ability	men	37	2.57	.32	.47	.49	1.14	.26
	women	96	2.51	.28				
Simple Knowledge	men	37	2.83	.37	.34	.56	.52	.52
	women	96	2.79	.33				
Certain Knowledge	men	37	2.96	.33	.01	.93	-.88	.38
	women	96	3.01	.29				
Quick Learning	men	37	2.61	.38	.02	.87	1.59	.11
	women	96	2.50	.35				

Table 4. Descriptives and T Test for CDUCA factors by gender. \*The difference is significative at .05.

	Gender	N	Mean	SD	Levene	Sig.	T Test	Sig.
Personal identity and planning (PERSO)	men	37	4.20	.98	.67	.41	-.08	.93
	women	96	4.22	.86				
Learning mediation (MEDIA)	men	37	3.35	.98	1.08	.30	.81	.42
	women	96	3.22	.78				
Favorable toward students (DISPO)	men	37	3.60	1.08	.13	.72	-.90	.37
	women	96	3.78	1.02				
New Technologies Using (TIC)	men	37	3.86	1.04	.51	.48	.26	.79
	women	96	3.81	.88				
Guidance (ORIENTA)	men	37	3.43	1.13	2.09	.15	-.01	.99
	women	96	3.43	.97				
Self-evaluation and self-learning control (AUTOEV)	men	37	3.00	1.16	2.83	.09	.46	.65
	women	96	2.90	1.18				
Experiential Learning (AEXPER)	men	37	3.31	1.39	3.02	.08	.51	.61
	women	96	3.20	1.02				
Academic Professional Proficiency in the area (DOMINIO)	men	37	4.43	1.12	.18	.67	.26	.79
	women	96	4.38	1.09				
Critical thinking(PENCRIT)	men	37	3.06	1.24	.23	.63	.23	.82
	women	96	3.01	1.06				

Table 5. Pearson correlaions between CDUCA and CE factors. \*correlation is significative at.05;\*\* correlation is significative at.01

		Fixed Ability	Simple Knowledge	Certain Knowledge	Quick Learning
Personal identity and planning (PERSO)	Pearson	-.04	-.02	<b>.18</b>	-0,08
	Sig.	.67	.79	.04*	.36
Learning mediation (MEDIA)	Pearson	.05	.01	.09	-.11
	Sig.	.55	.94	.31	.21
Favorable toward students (DISPO)	Pearson	-.12	.07	<b>.26</b>	-.13
	Sig.	.16	.42	.00**	.12
New Technologies Using (TIC)	Pearson	.01	-.10	.08	-.06
	Sig.	.90	.25	.35	.50
Guidance (ORIENTA)	Pearson	-.03	-.04	.15	-.05
	Sig.	.77	.63	.08	.56
Self-evaluation and self-learning control (AUTOEV)	Pearson	-.02	.07	.05	-.11
	Sig.	.86	.40	.60	.23
Experiential Learning (AEXPER)	Pearson	.13	-.01	-.04	<b>-.20</b>
	Sig.	.15	.90	.67	.02*
Academic Professional Proficiency in the area (DOMINIO)	Pearson	-.01	.08	<b>.23</b>	-.06
	Sig.	.87	.34	.01*	.50
Critical thinking(PENCRIT)	Pearson	-.09	.01	.06	-.16
	Sig.	.30	.91	.47	.06

After analysing the different dimensions in the two questionnaires the results show that valuations of women and men are similar. We did not find statistically significant differences between the mean scores.

### 3.2. Relationship between CDUCA variables and epistemological beliefs of student

This section deals with the study of the linear relationship between two quantitative variables: CDUCA questionnaire dimensions and epistemological beliefs questionnaire factors. To quantify the linear relationship between these variables we calculated the correlation coefficients. Given the type of variables involved, we selected the Pearson correlation coefficient. We found statistically significant correlations between "certain knowledge", factor in EC questionnaire, with 3 of the nine CDUCA factors: "Personal identity and planning", "favourable disposition towards students" and "professional and academic domain in area". The correlation is positive in all

cases, this pattern indicates that students who score high on these three factors also score high in "certain knowledge" and therefore are more naive beliefs about the certainty of knowledge.

Finally, "Quick Learn" factor in CE shows a significant negative correlation with the factor "experiential learning" in CDUCA. This fact can be interpreted as that students who score high on this factor believe that a greater number of teachers meets CDUCA statements, they have more sophisticated epistemological beliefs about the speed of knowledge acquisition. No significant correlations were found between the other dimensions.

#### 4. Conclusions and discussion

The meaning of learning fact is dialectical, it means the teacher learns from his students and is modified by this interaction, and becomes, in an ideal way, in an exchange process. It is a mutual giving relationship, students provide to teachers who must be in a constant state of improvement and knowledge about their profession. This fact, linking with the understanding of how they epistemological beliefs operate in the students learning gives to our study an unusual interest to the educational university community. Although the purposes of our study differ from assessment purposes.

Contributions from students about CDUCA show a profile of Health Sciences teachers that can serve, for the professionals and academic institutions in this area, to define the goals to which they can direct the training and professional development of university teachers. The profile found evidence that, despite changes due to new learning paradigm, it seems that teaching methods have not changed as much. In another, Health Sciences students of the degrees surveyed estimate that more than half of teachers who have or have previously taught them in their university education manifests a professional and academic domain in your area; possess personal qualities and interpersonal skills, facilitate communication instruction, and make a use of new technologies in their classrooms.

Furthermore, in relation to the metacognitive research, interested in studying epistemological beliefs. In general, it assumes its implicit nature, hard to access and verbalise. However, given the nature of this work, we decided to use direct and explicit measures based on the SEQ. The results show that all epistemological beliefs of the students tend to be naive. In particular, those relating to certain knowledge and mere knowledge.

The gender difference on student ratings of teachers and epistemological beliefs, can be concluded that teachers are not rated differently by men and women.

In order for the relationship between the study of teachers from the students' point of view and their epistemological beliefs. The results found allow to clarify the understanding of teaching and learning experience of undergraduate students in Health Sciences careers. The results show that both constructs are not independent of each other, correlations between factors were found. Despite the findings, the developed study has generalisation limitations because the sample used and the sampling procedures applied. Also, in future works we will consider combining both quantitative and qualitative methods to analyse the reality of teaching from the students point of view and the epistemological beliefs analysis.

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