Student Perceptions of Classroom Environment and Instructors' Reflections

LUIS M. VILLAR[1] & OLGA M. ALEGRE[2]

[1] Departamento de Didáctica y Organización Educativa. Facultad de Ciencias de la Educación. Universidad de Sevilla. 41018-Sevilla. Spain.

[2] Departamento Didáctica e Investigación Educativa. Facultad de Ciencias de la Educación. Universidad de La Laguna. 38201-Tenerife. Spain.

ABSTRACT. This study reports the development of an instrument to assess classroom environment in universities. Using a sample of 665 students from 11 departments of the University of Seville (Spain), an instrument called the Evaluation of University Teaching Activities Questionnaire (E.U.T.A.Q.) was field-tested. The E.U.T.A.Q. consists of 25 items assigned to ten scales: Clarification, Student Autonomy, Instructor Scaffolding, Student Prior Knowledge, Connections, Interrogation / Discussion, Explorations Based on New Technologies, Collaboration and Negotiation, Motivation, and Evaluation. Data showed that the E.U.T.A.Q. has sound structural characteristics, thus suggesting that it should prove to be an important research tool for classroom teaching and curriculum innovations aimed at improving learning environment perceptions. Also, instructors' reflections lead to engagement and proactivity in pedagogical knowledge, thus building an analytical approach which is fundamental to the development of university professional practice.

INTRODUCTION

Higher education in Spain is undergoing deep curriculum changes regarding the structure and focus of teaching at higher education universities. This study assesses 12 classroom-teaching innovations in 11 departments of the University of Seville (Spain). The assessment of learning environments follows a clearly established research tradition (Fraser, 1998). Thus, we maintain the following research assumptions:

- First, perceptual assessment is associated with students' demographic characteristics and background factors (Worthington, 2002; Barfield, 2003).
- Second, perceptual assessment outlines students' interpersonal relationships as a prelude to enhancing their academic focus and, hence, satisfaction with the social environment of the class (Lindblom-Ylänne, Pihlajamäki and Kotkas, 2003).
- Third, perceptual assessment may be used for feedback on instructors' innovative teaching and learning processes in the form of profiles when paired with other improvement strategies (Schelfhout, Dochy and Janssens, 2004).
- Fourth, perceptual assessment of psychosocial characteristics of classrooms is a relatively valid source of criterion variables of curriculum and teaching quality (Wierstra, 1999).
- Fifth, perceptual assessment of a University classroom-learning environment is targeted at ensuring a teaching quality process (Villar and Alegre, 2004).
- Sixth and finally, perceptual assessment of classroom climate is well supported by empirical research (Dorman, 2000).

In addition, instructors are teaching researchers who construct and interpret class actions and their own voices and beliefs (Wildman, Hable, Preston and Magliaro, 2000; Marra, 2005).

Related Literature

The general literature on students' assessments of classroom climate has been on the rise for over a decade (Aldridge & Fraser, 2000) and the field of learning environments has undergone remarkable 'diversification and internationalisation' (Fraser, 1998, p. 7). Evidence (derived largely from on-demand University teaching quality assessment) is accruing on the potential of classroom learning environment

assessments to improve University teaching and learning as well as staff development (Dallimore, Hertenstein and Platt, 2004). Classroom climate questionnaires in a discipline class result in reflective changes in learning and instruction (Wildman, Hable, Preston and Magliaro, 2000). Furthermore, researchers have used questionnaires as dependent variables in order to demonstrate student changes in learning approaches and learning preferences prior to and after a curriculum innovation experience (Chung & Chow, 2004). Some results show that students' 'sense of belonging' is an important predictor of satisfaction measures (Thomas and Galambos, 2004).

Research purposes and hypotheses

The purpose of the present study is twofold. Our first objective is to describe University students' perceptions of innovative teaching environments and to compare their classroom climate dimension scores with those of University students with different background factors. Furthermore, the aim of this investigation is to examine and understand variables that contribute to college students' perceptions of a classroom teaching innovation, as Barfield (2003) proposed in his study. We, hence, take into consideration the strands that empirical literature has developed with regard to student assessment of teaching, as Worthington (2002, p. 51) argues:

> The literature that does exist may be broadly categorised into the role of students' (1) perceptions and expectations, (2) physical characteristics, and (3) course-related characteristics.

Consequently, the succeeding hypothesis is posited as follows:

Hypothesis: Students' classroom climate dimension scores, measured by the *Assessment of University Teaching Activities Questionnaire* (A.U.T.A.Q.), are significantly different to those of University students with other demographic characteristics (e.g. gender, age, course level, department, discipline, etc.).

A second objective of this study is to develop a practice teaching epistemology grounded in systematically collected and analysed teaching *concepts* data (e.g. instructors as teaching researchers are constantly comparing pieces of classroom teaching information and proposing *sets of teaching concepts* that are plausible for understanding *patterns* of classroom teaching actions). Instructors participated in the study on a voluntary basis.

METHOD

Subjects

A sample of 665 University students, belonging to 12 innovative disciplines within 11 departments, participated. We collected demographic information. By Gender, 68% were female and 31.7% percent male. The Age of the respondents was distributed as follows: 68.4% between 21 and 30 years of age, 18.8% between 22 and 23, 6.2% between 24 and 25, and 6% either 26 years old or above. In addition, students were asked about characteristics of the course. With regard to Course level, 61.7% of the respondents were freshmen students. Students belonging to the Case 1 discipline (Table 1) were the most numerous, accounting for 39.2%. Students performed well in College grades. In regard to ability, more than 44% had a fair scholastic aptitude score.

Table 1. Departments, Discipline Innovations Cases and Sample Frequencies and Percentages

DEPARTMENT	DISCIPLINE INNOVATION CASES	SAMPLE FREQUENCY AND PERCENTAGE
Art History	*Initiation research activity and University teaching* (Case 1)	(N = 254) (38.2%)
Modern History	*New teaching strategies in the History of Sciences and*	(N = 7) (1.1%)

	Technologies (Case 2)	
Morphological Sciences	*Anatomy of the foot: technical study based on training and education research* (Case 3)	(N = 24) (3.6%)
Business Administration and Marketing	*Participation approach to enterprise administration by means of projections and case studies* (Case 4)	(N = 46) (6.9%)
Business Administration and Marketing	*Development of managerial training tools: the case study method* (Case 5)	(N = 38) (5.7%)
Teaching of Experimental and Social Sciences	*Design of curricular materials for teaching and learning Art in Primary Education* (Case 6)	(N = 25) (3.8%)
Teaching and School Organization	*Internet applications to preservice teacher education* (Case 7)	(N = 43) (6.5%)
Teaching of Mathematics	*New Technologies in the Teaching of Mathematics* (Case 8)	(N = 51) (7.7%)
Roman Law	*Seminary of exegesis of information sources. Theme: the patrimonial situation of family children in Roman Law* (Case 9)	(N = 9) (1.4%).
Psychiatry, Personality, Evaluation and Psychological Treatment	*Role-playing of conflicting situations among handicapped students, their parents and the school* (Case 10)	(N = 61) (9.2%)
Architecture Graphic Expression	*The organization of a thematic classroom of Architecture as a strategy of education innovation* (Case 11)	(N = 74) (11.1%)
Architecture	*Attribution of tasks based upon*	(N = 33) (5%)

constructions II	*students' learning styles of learning. Individualization* (Case 12)	

Data collection

Two instruments were administered to students:

- *Assessment of University Teaching Activities Questionnaire* (A.U.T.A.Q.) (Cronbach's reliability, $\alpha = .8635$), which consists of 25 items that correspond to principles of cognitive and social psychology, to include ten learning dimensions from the cognitive apprenticeship literature (see Appendix).
- *Student Demographic Questionnaire* (S.D.Q.), which is composed of 17 closed format questions in a multiple-choice format. This instrument taps selected students' demographic factors (i.e., standard demographic and academic characteristics). These factors were chosen as independent variables to meet the first objective of this study.

Procedure

The A.U.T.A.Q. and S.D.Q. were given to students halfway through the course. The instructors taught their courses using innovation materials and strategies. The twelve instructors held group meetings, semi-structured interviews and informal conversations with the researchers to focus on classroom innovation processes and assessment issues (e.g. practice coding processes, pedagogical views), in order to write down a rationale for adopting a qualitative research approach to describe their teaching innovation. We assume that an instructor's conception of what pedagogic knowledge is and where it comes from – that is, their epistemological beliefs – will have an impact on how they teach (Marra, 2005). After class selection, 39 observers wrote down 79

narrative vignettes, and interviewed 84 students. Observers were reminded to create a climate of trust with instructors and students through non-threatening and objective behaviour. All observers were trained specifically for this study using a blank sheet on which they recorded everything that happened.

They also collected other pieces and artefacts, including instructors' lesson plans, to better describe instructors' teaching practice. In addition, observers administered the A.U.T.A.Q. to students. The purpose of the interviews was to understand the meanings constructed by these students of their college years. During dialogue, ethical considerations for the students (e.g. consent, privacy, etc.) were maintained. However, each interviewer made an interview script for each student adapted to meet the teaching situation. Additionally, instructors answered questions about the purpose of their innovation from an interview script designed by the researchers. All observations and interviews were transcribed and coded by the participant instructors.

Data Analysis

To gain insight into how students describe their classroom-learning environment, the aforementioned 10 A.U.T.A.Q. scales were analyzed. For this hypothesis, a comparison of innovations, mean scores, standard deviations and ANOVA tests were computed. Teaching practice content analysis (second objective) was condensed by means of three linked subprocesses: *data reduction* (i.e. data can then be coded, classified and aggregated), *data display* (i.e. this can be in the form of a chart, matrix, map (concept map) and *conclusion drawing* (i.e. verifying the meaning that has been extracted from the data) (Huberman & Miles, 1994, p. 429).

RESULTS

Student Age and Gender

Age ranges for the student age group are partitioned into four groups. Univariate *F* tests for each A.U.T.A.Q. scale revealed significant differences between university Age range groups on four scales: Professor scaffolding (3, 649), = 3.338, $p < .019$); Interrogation / discussion (3, 649), = 7.702, p .000); Collaboration and negotiation (3, 649), = 10.115, p .000), and Motivation (3, 649), = 3.066, $p < .027$). Furthermore, *F*-statistic yielded significant results between Gender means for one scale: Motivation (2.941, $p < .032$).

Student Scholastic Aptitude Score, Course level and Disciplines

Prior student grade experiences are an important self-referent variable influencing the interrelationship between self-efficacy and learning. The *Student Scholastic Aptitude Score* is used as an independent variable in an analysis of variance (ANOVA) with all the A.U.T.A.Q. scales entered as dependent variables. Thus, the *F*-ratio is used to compare four groups of student *Scholastic Aptitude* scores. Results revealed that significant differences exist between students on the following scales: Clarification (*F* (3, 649), = 4.155, p .002); Professor scaffolding (*F* (3, 649), = 5.591, p .000); Connections (*F* (3, 649), = 3.478, p <.008); Interrogation / discussion (*F* (3, 649), = 5.136, p .000), and Explorations based on new technologies (*F* (3, 649), = 3.154, p <.014).

Additionally, a suggestive *F* test was obtained, in which the independent variable was scientific Course level, comprised of five levels, indicating a significant effect on all scales: Clarification (*F* (4, 649), = 16.373, p .000); Student autonomy (*F* (4, 649), = 11.839, p .000); Professor scaffolding (*F* (4, 649), = 7.687, p .000); Student prior knowledge (*F* (4, 649), = 6.15, p .000); Connections (*F* (4, 649), = 6.870, p .000);

Interrogation / discussion (F (4, 649), = 9.371, p .000); Explorations based on new technologies (F (4, 649), = 6.480, p .000); Collaboration and negotiation (F (4, 649), = 24.993, p .000); Motivation (F (4, 649), = 8.400, p .000), and Evaluation (F (4, 649), = 5.494, p .000).

A one-way between-subjects ANOVA, in which the independent variable was innovative Disciplines, indicated a significant effect on all scales: Clarification (F (11, 644), = 7.230, p .000); Student autonomy (F (11, 644), = 6.759, p .000); Professor scaffolding (F (11, 644), = 2.278, p .000); Student prior knowledge (F (11, 644), = 3.026, p .000); Connections (F (11, 644), = 2.763, p .000); Interrogation / discussion (F (11, 644), = 9.628, p .000); Explorations based on new technologies (F (11, 644), = 4.011, p .000); Collaboration and negotiation (F (11, 644), = 17.948, p .000); Motivation (F (11, 644), = 3.281, p .000), and Evaluation (F (11, 644), = 3.070, p .000). According to the Least Significant Difference *post hoc* probability table, the mean comparison between the discipline *Initiation research activity and University teaching* and *Development of managerial formation tools: the case study method* means were statistically significant (p .000). The means were also significant in the following disciplines: *Initiation research activity and University teaching; Design of curricular materials for teaching and learning Art in Primary Education* (p .000); *Internet applications to preservice teacher education* (p .000); *New Technologies in the Teaching of Mathematics* (p .000); *Role-playing of conflicting situations among handicapped students, their parents and the school* (p <.020); *The organization of a thematic classroom of Architecture as a strategy of education innovation* (p .000); and *Tasks attribution based upon students' learning styles of learning. Individualization* (p .000). However, this was not the case in the other Discipline comparisons.

Student Employment Hours

This study also seeks to understand the potential relationship between outside working hours and the student classroom climate. Hours worked in outside tasks are divided into three categories: teaching children, working in an office and helping out at home. Part-time work is defined as working from 6 to 34 hours per week, whereas full-time work is defined as working 35 plus hours per week.

F-statistic yielded significant results in the following dimensions: Clarification (F (3, 649), = 1.927, $p.$ <020); Student prior knowledge (F (3, 649), = 2.691, $p.$ <001); Collaboration and negotiation (F (3, 649), = 1.943, p <.019), and Motivation (F (4, 649), = 8.400, p .000).

Analysis of Qualitative Data

Instructors coded descriptions from the log sheets into one of sixteen categories. Then, codes made up of 16 built-up teaching concepts, defined by instructors, were developed to accomplish the empirical categorizations of the texts. Consequently, they elaborated a concept map or theoretical model derived primarily from the examination of transcribed materials (class observation vignettes, in-depth interviews, and so on) that mapped key categories as specific features of a University teaching committed to excellence as well as their previous knowledge and consequent effects. Codes highlighted teaching concepts that were connected to innovations. Hence, a variety of data sources and a methodological triangulation of class observations, instructors' and students' interviews and student perceptions were used in this study.

Conceptual framework of class teaching innovations

Instructors' concept model about pedagogy is summarized in Figure 1, which is broken down into the main categories that emerged from the analyzed data (Table 2).

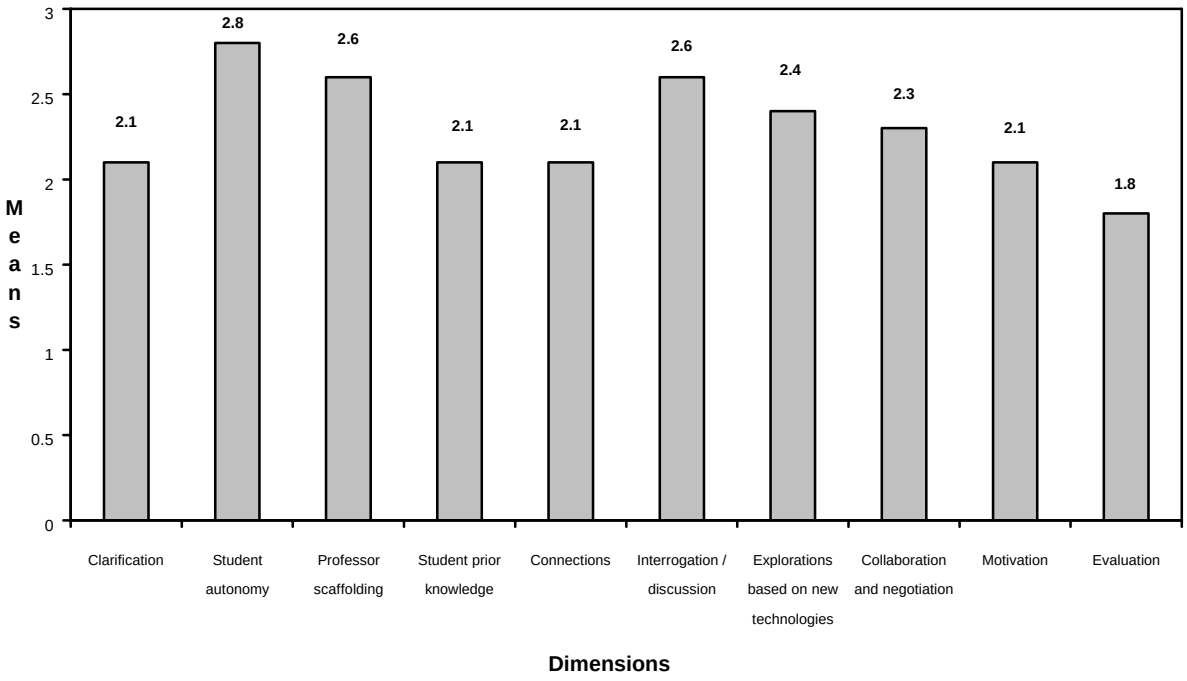

Figure 1. Means on A.U.T.A.Q. Dimensions for all University Teaching Innovations

Table 2. Means and Standard Deviations Results for A.U.T.A.Q. Dimensions

Dimensions	Mean	*SD*
Clarification	2.1	.7654
Student autonomy	2.8	.7522
Professor scaffolding	2.6	.6743
Student prior knowledge	2.1	.7609
Connections	2.1	.7789
Interrogation / discussion	2.6	.9859
Explorations based on new technologies	2.4	.9378
Collaboration and negotiation	2.3	1.0321
Motivation	2.1	.8319
Evaluation	1.8	.8393

Instructor participants mentioned both applications of practical knowledge and innovative teaching as an extension of the contextual classroom level. Instructors have differentiated discrete pedagogical knowledge and interpreted instructional strategies that are constituted by class processes and contextual factors through which they assess

teaching innovations and measure learning results. In Case 8, the *Instructional Strategies* concept shows an inveterate yearning for inquiry, as demonstrated in a class teaching session:

> The instructor indicated that he was striving for recapturing what had been done previously in order to recover the acquired knowledge and to find the rationale to the problem.

The intellectual and emotional relations in working groups characterized a type of class teaching style. The frequency of categories INQ and GWO makes patent the full expression of an innovative teaching that breathes in the depth of inquiry and reflects on the students' working group understanding. With this aim, the *Teaching skills and techniques* concept affirms its presence before, during and after class teaching communication. The starting point is exactly from category objectives, aims and expectations (OAE) that are shown condensed in the expression of the question made by a student observer to another student in a Case 5 class*:*

> Question: Would you believe that this subject covers all the expectations that you had of it?
>
> Answer: Instructors said what the subject would be like at the beginning of the course, and we follow the objectives.

In general, the instructors' statements about their roles as teacher were congruent to their stated learning outcomes and their descriptions of teaching strategies used. The image of class teaching is a road made up of six categories wrapped by the presentation of ideas and concepts (PRE) by means of resources (RES). For that reason the class crumbles in activities (ACT) that attempt student participation, delaying the monologues of participant instructors. A student expressed herself in the following way in a Case 4 class:

> Question: Can you explain how have you done tasks in this subject matter?
>
> Answer: We have done the tasks by means of summarizing topics.

Discipline curriculum is full of opportunities to include values interventions, regardless of the innovation. Category values (VAL) born out of another one - group

work (TGR) –can be communicated in innovation teaching in three main ways - through content, process, and application. For example, in a Business class, the importance of valuing others is brought out during the public meeting, where students have to listen carefully to each other and ask questions appropriately:

> Question: Do you believe that group learning is better that individual learning?
>
> Answer: You look for support from your peers and you might find an open door in them (Case 5).

Generally speaking, College class teaching is symbolic, that is, a bunch of lecture notes, code samples, homework assignments, and homework solutions that instructors put together when they are teaching. Participant instructors take this issue into account and plan otherwise to form concrete-thinking students by fostering interaction between students and their physical environment. Immersion is made a reality by audiovisual media (MAV) and resources (REC) categories. Finally, the evaluation (EVA) category reels off understanding of a possible schooling that an instructor commented on to an observer in the initial contact of his class innovation:

> The evaluation will be carried out in two ways. Firstly, we will keep the quality of task realization in mind; and secondly, exposure and participation. An 80% attendance is compulsory in order to have a passing grade (Case 4).

The articulation of an innovation is a way of describing the dynamic processes of learning development, such as College curriculum flexibility and other context factors. Teaching innovations engage students in activities that create a positive classroom-learning climate, promote the value of scientific knowledge as a social construction and develop ethical behaviour.

Cohesive social relationships (REL) refers to the degree to which students are directly connected to each other. It is a measure of the attraction of the group to its members. Cordiality in social relationships is stressed with the desire to provide a friendly environment for students. A teaching utopia refers to participant instructor

efforts to create a better, or perhaps perfect class teaching innovation, that is almost limited to searching for the concept of teaching collaboration / cooperation (CCO). It is assumed that students learn best when they are actively involved in the teaching process. Students who work in collaborative groups also appear to be more satisfied with their class teaching:

> Question: What are the positive and negative aspects that you perceive from this teaching?
>
> Answer: Well, the most positive thing is that we hold relationships with different students in the group. You share ideas, and this is fantastic (Case 4).

Category motivation or interest (MIN) is the internal state or condition that activates learning behaviour and gives it direction. Changes in behaviour are better explained by principles of ecological influences, cognitive development, emotion, and explanatory style. In an innovation class teaching students learn how to manage their learning:

> In the discussion, all students participate in an organized way and regulate their own interventions (Case 5).

The data show that all instructor participants indicated some pedagogical strategy, which was open to constructivism. The category of projection or implications (PIN) of innovation teaching is about close connections, a logical relation between two propositions: teaching and learning.

Discussion

Hypothesis is accepted. Findings show that students' perceptions of class innovation teaching are different according to University context factors. A number of student characteristics are found to have an impact on student assessment of innovative teaching, as in Worthington's (2002, p. 62) study.

Much rouse for University reform has focused on changing University teaching, but this research suggests a need to change the teaching setting from a cognitive

perspective taking into consideration that the 'process requires instructors to think about their discipline in non-traditional ways' (Marra, 2005, p. 136). Moreover, all the innovations we studied exhibited the following characteristics:

- Fostering an inquiry style of teaching and creating a supportive classroom environment that enhanced the quality of participation, as in Dallimore, Hertenstein and Platt's (2004, p. 107) research.
- Valuing interdisciplinary composition of groups, as in Wildman, Hable, Preston and Magliaro's (2000, p. 259) study.
- Creating significant tasks that provide students the interest to cope with teaching-learning complexity episodes, as in Eilam and Poyas's (2006, p. 341) intervention.

Implications

All twelve instructors expressed pedagogical beliefs or employed teaching strategies which recognize that students' understandings are based on their own unique experiences. Also, that student learning is influenced by the class environment, which should be challenging but not threatening to students. Participant instructors provide multifaceted teaching to allow students to express preferences.

Limitations/Future Work

The sample of participant instructors consisted of those who were open to new innovative activities. Furthermore, a future study would certainly be strengthened by using a pre/post classroom climate design.

Acknowledgements

The authors gratefully acknowledge the help provided by instructors J. Aceval, F. Caro, C. Casanueva, J. Correa, S. Gutiérrez, C. Hervás, D. Maldonado, E. de Manuel, J.

Muñoz, E. Padilla, R. Periáñez, C. Romero and A. Vázquez in the preparation of this manuscript.

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Appendix

Assessment of University Teaching Activities Questionnaire (A.U.T.A.Q.)

Instructions

This questionnaire is about your perception of the classroom learning environment. Your opinion about each question is required. For each sentence select the value of the answer that best suits your perception. Please answer by circling the number with 1 = 'strongly disagree', 2 = 'disagree', 3 = 'neutral', 4 = 'agree' and 5 = 'strongly agree'.

Dimension A. CLARIFICATION (degree to which University students are given explanations, examples and multiple forms of understanding a problem or difficult material).	
1. Instructor clarifies difficult aspects of this innovative activity.	1 2 3 4 5
2. Instructor elaborates the most confusing information of this innovative activity by means of outlines, diagrams or illustrations of the main ideas.	1 2 3 4 5
Dimension B. STUDENT AUTONOMY (student perception that University teaching is student-centred and that she has been offered the opportunity to make decisions on her learning).	
3. This innovative activity has changed my vision on the University student's role.	1 2 3 4 5
4. This innovative activity has changed my attitude towards the subject and the way of dealing with	1 2 3 4 5

University studies.	
5. I assume responsibilities in this innovative activity.	1 2 3 4 5
6. I suggest possible educational problems and tasks with peers.	1 2 3 4 5
Dimension C. INSTRUCTOR SCAFFOLDING (degree to which instructors demonstrate the steps or structure of a problem and provide keys and help to complete the innovative activity with success).	
7. This innovative activity gives me keys to solve problems but it doesn't direct me to a specific answer.	1 2 3 4 5
8. This innovative activity offers me enough information to be successful.	1 2 3 4 5
9. The instructor gives me feedback while I solve a problem in this innovative activity.	1 2 3 4 5
Dimension D. STUDENT PRIOR KNOWLEDGE (degree to which learning activities are personally beneficial and related to University students' prior knowledge and practical skills).	
10. This innovative activity relates new information to what I have previously learnt.	1 2 3 4 5
11. I use ideas and information that I already know to understand something new.	1 2 3 4 5
12. I have developed other cognitive capacities in this innovative activity (e.g. analysis, synthesis, critical thinking).	1 2 3 4 5
Dimension E. CONNECTIONS (degree to which University students establish their own knowledge connections and generate their own learning products).	

13. This innovative activity helps me to investigate, build and relate ideas and facts.	1 2 3 4 5
14. I explore how information relates to other topics and subjects.	1 2 3 4 5
Dimension F. INTERROGATION / DISCUSSION (degree to which conjecture, questioning, and discussion in this innovative activity is fostered).	
15. This innovative activity encourages University students to ask questions and discuss answers given in a book.	1 2 3 4 5
16. I discuss correct and incorrect solutions to problems.	1 2 3 4 5
Dimension G. EXPLORATIONS BASED ON NEW TECHNOLOGIES (degree to which new technological tools and other academic resources facilitate University students' generation of ideas and knowledge construction).	
17. This innovative activity helps to develop other study capacities in University students (e.g. handling of tools, document search, library use).	1 2 3 4 5
18. I find new information about the topics and subjects using new technologies.	1 2 3 4 5
Dimension H. COLLABORATION AND NEGOTIATION (degree to which University students socially interact with other students to give meanings to and reach agreements on teaching activities and viewpoints).	
19. I share ideas, answers and visions with my instructor and peers in this innovative activity.	1 2 3 4 5
20. I learn from peers how to think about a problem	1 2 3 4 5

and to consider their points of view.	
Dimension I. MOTIVATION (degree to which University students are involved in an innovative activity).	
21. I am motivated to work in this innovative activity.	1 2 3 4 5
22. This innovative activity improves my opinion about the content of the subject (practical vision).	1 2 3 4 5
23. I get more involved in this innovative activity than if I studied it in a theoretical way (useful vision).	1 2 3 4 5
Dimension J. EVALUATION (degree to which University students evaluate an innovative activity).	
24. I believe that this innovative activity develops instructors' interest in teaching.	1 2 3 4 5
25. I believe that innovative activities like this would significantly improve the quality of University teaching.	1 2 3 4 5