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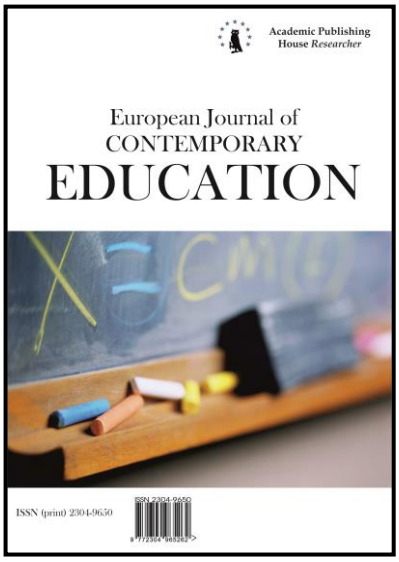

Learning Styles in University Students: Types of Strategies, Materials, Supports, Evaluation and Performance. Case Study

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Abstract

The aim of this study is to identify different learning styles in university students in the frame of university teaching carried out through innovative proposals for work and research projects, with inverted classroom dynamics (active and cooperative) and adopting a formative assessment that focuses on both the process and the students' outcomes. This proposal is complemented by the objective of determining the influence of different learning styles on the preference for the type of performance in university teaching.

A hypothetico-deductive methodological design for exploratory and correlational purposes was followed. The sample consisted of total of 640 participants in university degree courses. The data were gathered using a questionnaire that grouped 46 items into five double-response dimensions, determined by the preference or position held by the students regarding the learning strategies, methods and techniques applied; material or resources used to carry out the teaching, as well as the integration of information and communication technologies (ICT); type of supports that were received in the process; instruments to carry out the assessment; and lastly, individual or team academic performance.

The outcomes show an x-ray of four models according to the student's learning styles: individual, cooperative, dependent and autonomous. These are identified with four clusters in the sample of students selected for the study, which are associated with practical, conventional, critical and efficient student models. The conclusions explain that there are no pure models, as there are nuances that connect them in real classroom practice, but the level of student preference helps to measure the impact and confirms the improvement in teaching through university work projects.

Keywords: learning styles, university students, work projects, innovation.

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1. Introduction

Since the Bologna Declaration (1999), higher education in general and the way in which learning is taught and promoted in university classrooms in particular have received hitherto unheard of attention. The intention to create a European Higher Education Area (EHEA) has given rise to a convergence process aimed at facilitating connection and harmonisation between the signatory countries. And, in this context, among other aspects, the knowledge promoted in universities has also been addressed, as well as how it is taught and made practical.

As stated by González and Raposo (2009), this European project coincided with the review that different countries were carrying out regarding the mission of universities in the new contemporary context generated by a society characterised by knowledge and communication. Review reports revealed the need to update higher education in order to further its functionality within a social, cultural and working environment that increasingly calls for greater knowledge transfer and utility.

Different reports, research works and experiments carried out have highlighted the excessively academic style that has traditionally characterised university studies. (Dearing Report, 1997; Attali Report, 1998; Bricall Report, 2000). As a reaction, to some extent an excessive shift towards the practical has been observed, as though the fundamental purpose of higher studies were the professional employment training of future university graduates.

Between these two radical poles, an approach has emerged that seeks to reconcile the bases and foundations offered by accumulated theoretical knowledge, together with a practical bent that makes it functional and useful for personal and social development. Transfer increasingly occupies more space and interest when talking about higher education's commitment to society. The traditional criticism that describes university knowledge as something excessively rhetorical and abstract finds in skills development a channel to expand and demonstrate its practical possibilities and relate it to social improvement and productive advancement. This way, the theoretical dimension is complemented by its transfer into practice, so as to enable qualified and competent employability.

However, as proposed by González Sanmamed and Raposo (2009) and in other studies (Levine, Marcus, 2010), the more teachers commit and involve themselves in the search for creative and innovative formulas, the better the development of this transformation will be. Otherwise, we will be yet again faced with administrative and bureaucratic updates that are merely cosmetic, masking routine practices. This does not mean that political authorities and managers have no responsibility. On the contrary, it is up to them to provide the means and generate regulations that facilitate it.

In this sense, practically all the universities have implemented teacher training and research programmes. Likewise, we have numerous conferences, publications and experiences that disseminate this interest in pedagogical innovation and its social commitment. We could say that the university community has been involved in its improvement to an extent never seen before.

But having said that, and so as not to fall into naive optimism, we are also aware that many of the experiments carried out go no further than episodic attempts that do not end up generating a solid and lasting change (Porlán et al., 2018). We are still a long way from making a competency-based approach successful (López et al., 2018). The research tradition needs to delve into university education to determine realistic, well-founded and generalisable possibilities (Montalvo et al., 2018). Isolated experience generates partial stories, and we need tried and tested data that orientate on the basis of solid evidence to encourage a new pedagogy capable of transforming university teaching culture.

In line with the above, we have research and theoretical speculations that aim to overcome established traditional strategies based on memorising and following instructions in order to reproduce stable and conventional knowledge, compared to other student-based alternatives (Schweisfurth, 2015), so that with the help of the teacher they are able to generate well-informed and creative productions. We find ourselves between approaches focused on the transmission of closed and useful content to pass memory tests and exams and other proposals that seek to develop higher cognitive skills, so that learning becomes relevant and transferable to various contexts. This is what Kember and Kwan (2000) designated content-focused rather than learning-focused strategies. And, in addition, Prosser and Trigwel (1999) considered teacher-centred or student-centred (Prieto, 2008). In our national scope, we also have contributions that have researched and

presented valuable outcomes that help describe and understand these two pedagogical traditions. Researchers such as Monereo and Pozo (2003) or Monroy and Hernández Pina (2014), Pozo and Pérez Echeverría (2009) or Gargallo et al. (2015) allude to teaching models, methodologies or approaches that range from the linear exposition of information with the aim of its mechanical replication to another that involves the reconstruction and transfer of knowledge by students. This in turn points us towards a learning that would range from superficial (reproduction) to in-depth (understanding) or strategic (conceptual change).

All of these contributions depend on the role of teacher and student, as well as the relevance of the teaching or learning. These issues will have a very direct impact on the quality of training and the meaningful handling of the content and skills addressed.

However, our experience in university teaching based on the development of work and research projects (Pozuelos et al., 2012; Pozuelos, García Prieto, 2018) given their innovative nature, is firmly framed in the alternative tradition, where the learning is promoted based on relevant questions that need theoretical field content as well as its practical management, which involves a significant reconstruction of knowledge by students to generate original and well-informed output.

And this practical and reflexive dimension of university teaching leads us to other questions that broaden the perspective. Although approaches and models based on the students and their learning have already been considered and are proposed as the pillars of alternative university teaching, we now need to consider to what extent they promote autonomy and collaborative work.

Currently, different documents promoting university teaching innovation cite the need to promote autonomy and collaboration (Fombona et al., 2016; Tran, 2013) as basic references for functional and sustained lifelong learning.

It has even been stated that implementing active teaching strategies is not enough (Henríquez, Aramburo, 2019). These authors insist that it is necessary to involve the subjects who learn in the development of their experiences, and this does not depend solely on approaching knowledge from a personal and isolated perspective. Contemporary knowledge, given its ubiquitous, open and constantly evolving nature, calls for exchange and collaboration among other different agents. There is talk of shared learning constructed on the basis of the search for and use of plural information in order to generate and rework existing knowledge. More than the consumption of content, reference is made to its elaboration as an effect of the vast baggage that currently exists and is available to all.

Different research works express and support a conception of learning as a situated and active process where negotiation with others acquires substantial importance. The aim is to acquire an "adaptive ability" that allows them to use the knowledge and skills developed in the educational experience in a flexible and original way (Dumont et al., 2010). From this perspective, students are required to achieve a high degree of autonomy and self-regulation that helps them learn and expand knowledge that has not yet been achieved or deal with changing and continuous situations or problems.

Efficient learning, focused on fostering higher-order skills, relies both on stimulating the independent and self-regulating mindset and on the ability to cooperate and share to create an increasingly collaborative workforce (Navarro et al., 2015).

The axis that these other two basic dimensions define to promote relevant and "adaptive" learning would be located between "dependency" and "autonomy" and, on the other, between "individualism" and "collaboration". If we were to cross these two references, the result would be:

Table 1. Classification of learning models by student profile

Degree of decision/Degree of cooperation	Individualist	Collaborative
Dependent	Conventional Focused on reproduction.	Practical Focused on participation and practical experience.
Autonomous	Efficientist Focused on following itineraries or sequences.	Critical Focused on research

Practical. Learning is considered an effect of the participation in different areas and experiences proposed by the teacher. Content is seen as a medium that can be interpreted and discovered through the activity and is achieved spontaneously and as an effect of direct experience.

Critical. They guide their learning work on the basis of research that they carry out with other subjects, with whom they debate and refine content and knowledge that are gradually built up through an irregular process that allows them to transform their initial ideas.

This classification that has been proposed helps further our teaching work, but also, and this is the purpose of this contribution, to determine what position our students are in so as to help them advance. Moreover, it helps rework our task to promote teaching that is not only based on the student and their active learning but which is also focused on autonomy, self-regulation and collaboration, so that they can progressively manage complex knowledge that is transferable to diverse and novel situations.

Based on this approach and after reviewing different styles of university students according to their preferences for certain aspects of the teaching-learning processes (strategy, material, support, assessment and performance), the following questions that focus the research are formulated: What type of learning do the students prefer? What is the relationship between certain aspects of teaching-learning and the different student styles? What type of influence do the different learning styles have on the preference in the type of performance?

This is the panorama in which our aim is to provide a structural vision of the relationships and influences between learning styles in university students, based on their preferences for types of strategies, materials, supports, assessment and performance in university teaching.

Method

The method followed in this research is hypothetico-deductive, survey type with a longitudinal design. The work is structured on the basis of postulates that define quantitative research approaches for exploratory and correlational purposes. This is a case study as it does the rules of probabilistic selection of subjects are not followed, the subjects represent the only University of Huelva, local sample.

Participants

The sample consisted of 640 university students on various Bachelor's degrees courses (Early Childhood Education, Primary Education, Social Education and Physical Activity and Sport Sciences) from the University of Huelva, studying subjects such as Didactics and Curricular development, Attention to Diversity and Tutoring, Direction and Management of Socio-educational Centres, Pedagogy of Physical Education and Sport – in academic years 2015/2016, 2016/2017 and 2017/2018, while developing innovative alternative proposals through work and research projects. Among the participants, 90.93 % were women and 9.06 % men, in a normal distribution with respect to the high proportion of women, except in the Sciences of Physical Activity degree course, where the figures are inverted (80 % men). The average age was 23.8 years.

Objectives

The objectives set for this study can be summarised as identifying different learning styles in university students on degree courses, as well as the influence of different learning styles on the preference for the type of performance in university teaching developed through work projects.

Data gathering instrument and procedure

The students responded to the ad hoc designed “APID” questionnaire (Analysis of Proposals for Teaching Innovation) once the subject they were taking through work projects was completed. In this measuring instrument, which is organised in five dimensions (strategies, material, support, assessment and performance), a Likert-type scale (with 5 degrees from “not at all” to “totally”) was used to gauge the level of preference for the methods and techniques that had been used, by dual response. On the one hand, they rated the utility-preference, and on the other, the use made by the teacher.

This way, the questionnaire validity and descriptive and correlational analyses, etc. were determined through initial studies using the SPSS v.21 statistical software suite, whereby an acceptable reliability was obtained ($\alpha = 0.86$). These data allowed us to verify the possibilities and delimitation of learning styles, as well as validating the instrument (pending publication).

2. Discussion and results

Data analysis

To identify university student typologies, Multiple Correspondence Analysis (henceforth MCA) with the Spad v.56 program was used. This technique allowed us to explore the proximity between the variables studied, interpretively detecting associations between response modalities and, consequently, between variables. The procedures to be followed in MCA are: 1) Factorial analysis, focusing on the expression of combinations of the original variables. Each variable has a certain number of categories that allow the variable to be decomposed into as many modalities or categories expressed by the main differentiation factors.

2) Cluster analysis, allowing the hierarchical classification of the subjects based on the affinity of responses with respect to the variables studied.

In a second phase, through the modelling of structural equations, we proceeded to confirm the relationships interpreted in the MCA. The modelling program used was Amos 18.0.

Multiple correspondence analysis

Multiple correspondence analysis was carried out on a matrix of 19 variables with 87 associated response modalities. The histogram shows the five factors and the variance explained by each of them. The first three factors that explained 83.06 % of the variance were chosen for the analysis (Table 2), ensuring a minimal loss of information when considering the first two factors, as the rest seemed to provide redundant information.

Table 2. Histogram of the first five factors

NUMBER	VALUE	PERCENTAGE	ACCUMULATED PERCENTAGE	
1	0.236	57.89	57.89	**********
2	0.116	13.60	71.49	**********
3	0.106	11.57	83.06	**********
4	0.096	9.47	92.56	**********
5	0.007	7.36	100	*******

The three factors obtained in the factorial analysis of multiple correspondences are shown below.

Multiple correspondence factorial analysis

Figure 1 shows the response modalities associated with factor 1 and 2 (71.49 % of variance). Both factors are projected, as they are the ones that best discriminate the groups of students according to their degree of preference regarding the effectiveness and usefulness of the strategies (shown in black in the figure), material (shown in blue), support (shown in green), assessment (shown in brown) and performance (personal performance is shown in the figure in red, and team/collective performance in grey).

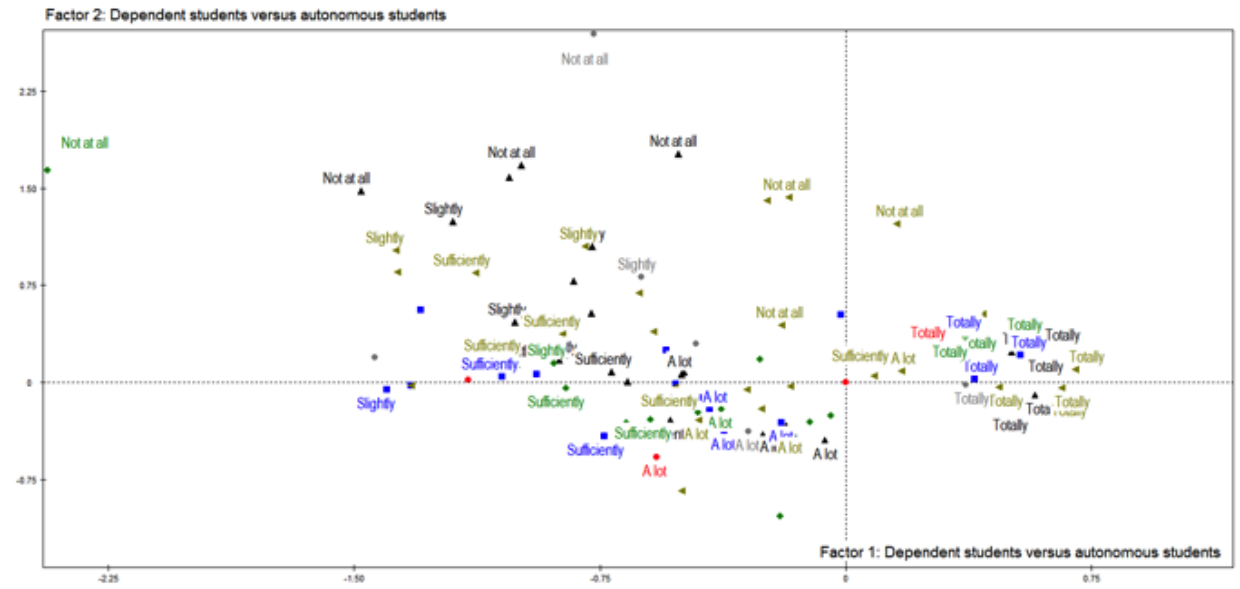

Fig. 1. Distribution of factor 1 and factor 2 response modalities

Table 3. Factor 1: Dependent students versus autonomous students

Variable label	Category label	Test-Value	Weight
Personal mind map	Sufficiently	-11,60	104,000
Rubric	Sufficiently	-10,86	127,000
Work folders	Sufficiently	-9,77	67,000
Classwork	A lot	-9,27	224,000
Personal performance	A lot	-8,92	174,000
Project guide	Sufficiently	-8,84	64,000
Teacher explanations (expositive)	Sufficiently	-8,70	86,000
Classwork	Sufficiently	-8,53	65,000
Research-documentation activities	Sufficiently	-7,78	100,000
Tutorial	Sufficiently	-7,43	125,000
Work folders	A lot	-7,12	180,000
Expositions in class	Sufficiently	-6,97	140,000
Explanations in class to groups	Sufficiently	-6,89	59,000
Explanations in class to groups	A lot	-6,80	213,000
Project guide	A lot	-6,77	170,000
Classroom notes	Sufficiently	-6,57	129,000
Research-documentation activities	Slightly	-6,49	28,000
Resources deposited in Moodle	Sufficiently	-6,36	67,000
Group work outside class	Slightly	-6,24	59,000
Personal study	Sufficiently	-6,05	107,000
Personal study	Slightly	-5,95	33,000
Rubric	Slightly	-5,90	18,000
Resources deposited in Moodle	A lot	-5,83	179,000
Group work outside class	Sufficiently	-5,50	104,000
Help via Internet	Slightly	-5,49	36,000
Personal	Sufficiently	-5,23	20,000
Classroom notes	Slightly	-5,10	28,000
Teacher explanations	A lot	-4,97	242,000

(expositive)			
MIDDLE AREA			
Exam	Totally	2,70	39,000
Help via Internet	Totally	6,91	237,000
In team or collective	Totally	9,61	331,000
Resources deposited in Moodle	Totally	10,57	379,000
Group work outside class	Totally	10,72	268,000
Personal	Totally	11,02	438,000
Expositions in class	Totally	11,43	209,000
Explanations in class to groups	Totally	11,50	354,000
Classroom notes	Totally	11,63	273,000
Tutorial	Totally	11,65	280,000
Personal study	Totally	11,89	246,000
Teacher explanations (expositive)	Totally	11,91	296,000
Project guide	Totally	12,56	392,000
Research-documentation activities	Totally	12,83	277,000
Work folders	Totally	14,10	376,000
Rubric	Totally	14,34	253,000
Personal mind map	Totally	14,94	285,000
Classwork	Totally	15,25	334,000

Factor 1: Dependent students versus autonomous students.

For evaluation purposes, this factor mainly consists of response modalities included in the positive section for very high values in mind maps, rubrics, expositions and presence of exams. In terms of support, Internet and tutorials garnered high scores. In material, there were notably high scores for Moodle resources and class notes. In strategies, there were high scores for classwork, explanations in class to groups, group work and personal study. In performance, team and/or personal got very high scores. In the negative area of the factorial axis, high scores were concentrated around different assessment strategies: folders, teacher explanations and rubrics. There were high scores for tutorials and expositions and low scores for help via Internet. Project guide and Moodle resources both showed high scores, while personal study and classwork had low scores, with personal performance scoring high. In short, this factor projects the subjects on the factorial plane around two dimensions. On the one hand, on the lower left of the factorial plane they are associated with a more dependent student body and on the lower right of the plane they are associated with more autonomous students.

Table 4. Factor 2*:* Individual students versus cooperative students

Variable label	Category label	Test-Value	Weight
Personal	A lot	-8,87	174,000
Teacher explanations (expositive)	A lot	-7,92	242,000
Rubric	A lot	-7,35	221,000
Research-documentation activities	A lot	-7,23	225,000
Group work outside class	A lot	-7,11	183,000
Personal study	A lot	-6,56	238,000
In team or collective	A lot	-6,32	193,000
Resources deposited in Moodle	A lot	-5,85	179,000
Classroom notes	A lot	-5,25	197,000
Work folders	A lot	-4,63	180,000
Help via Internet	A lot	-4,56	216,000

Tutorial	A lot	-4,47	164,000
Personal mind map	A lot	-3,64	214,000
Explanations in class to groups	A lot	-3,61	213,000
Resources deposited in Moodle	Sufficiently	-3,59	67,000
Tutorial	Sufficiently	-3,55	125,000
Personal study	Sufficiently	-3,31	107,000
Classwork	Totally	-2,56	334,000
Group work outside class	Totally	-2,17	268,000
Tutorial	Slightly	-2,17	46,000
MIDDLE AREA			
Personal study	Slightly	2,75	33,000
In team or collective	Sufficiently	2,84	79,000
Teacher explanations (expositive)	Slightly	2,86	13,000
Classwork	Not at all	3,18	4,000
Explanations in class to groups	Totally	3,22	354,000
Rubric	Not at all	3,26	7,000
Expositions in class	Slightly	3,37	23,000
Help via Internet	Totally	3,39	237,000
Exam	Totally	3,39	39,000
Personal mind map	Not at all	3,45	6,000
In team or collective	Slightly	3,49	18,000
Research-documentation activities	Not at all	4,34	6,000
Rubric	Slightly	4,38	18,000
Classroom notes	Totally	4,64	273,000
Rubric	Sufficiently	4,72	127,000
Personal mind map	Slightly	5,36	25,000
Expositions in class	Not at all	5,39	14,000
Teacher explanations (expositive)	Totally	5,55	296,000
Research-documentation activities	Slightly	6,71	28,000
Personal study	Totally	7,15	246,000
Work folders	Sufficiently	7,30	67,000
Resources deposited in Moodle	Totally	7,70	379,000
Tutorial	Totally	7,71	280,000
Group work outside class	Not at all	8,02	22,000
Exam	Not at all	8,09	220,000
Group work outside class	Slightly	8,46	59,000
Personal	Totally	8,70	438,000
In team or collective	Not at all	10,53	15,000

Factor 2: Individual students versus cooperative students.

This factor is articulated in the positive section by the presence of exams and high scores for work portfolios and class notes, support with the explanations from teachers, presence of expositive explanations and preferences for personal performance. The negative section concentrates the scores that refer to the presence of folders and mind maps, rubrics, the moderate use of class notes as material, explanations by teachers in small groups and preference for a collective performance. Consequently, this factor concentrates scores that are associated with a more individual student thinking at the top of the factorial plane, and those linked with cooperative work thinking at the bottom.

Cluster results

Once the three factors were established that synthesised the most relevant information of the interrelation of the variables analysed, the subjects were grouped according to their affinity with respect to the studied variables. The analysis identified four clusters.

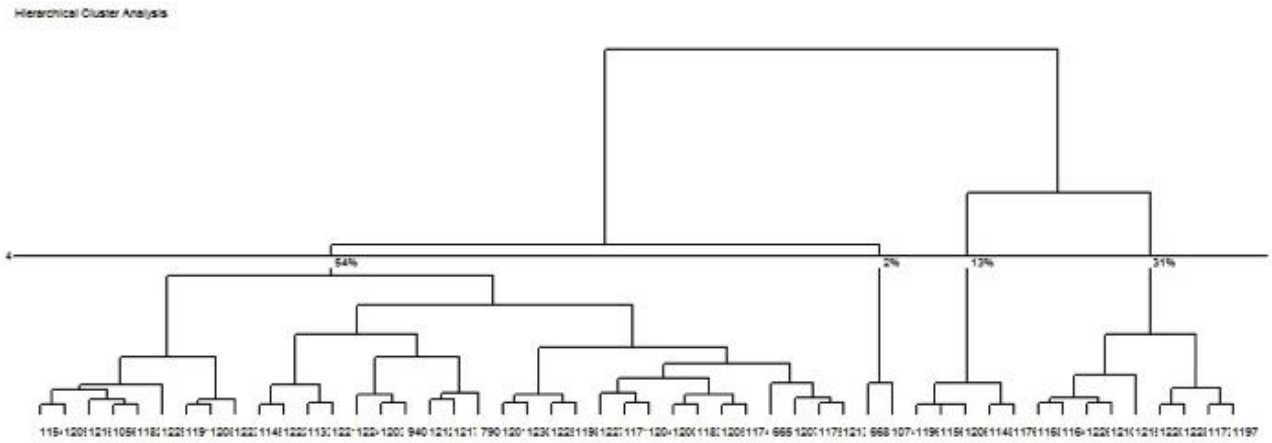

Fig. 2. Dendrogram based on response

The four groups and the percentage that each represents in the study sample can be observed through the dendrogram.

In the factorial plan (Figure 3), the two factors are represented and the clusters are projected. The use of both factors makes the discrepancy between conglomerates more visible by attending to two groups of factors of interest in the research: Individual students versus cooperative students and dependent students versus autonomous students.

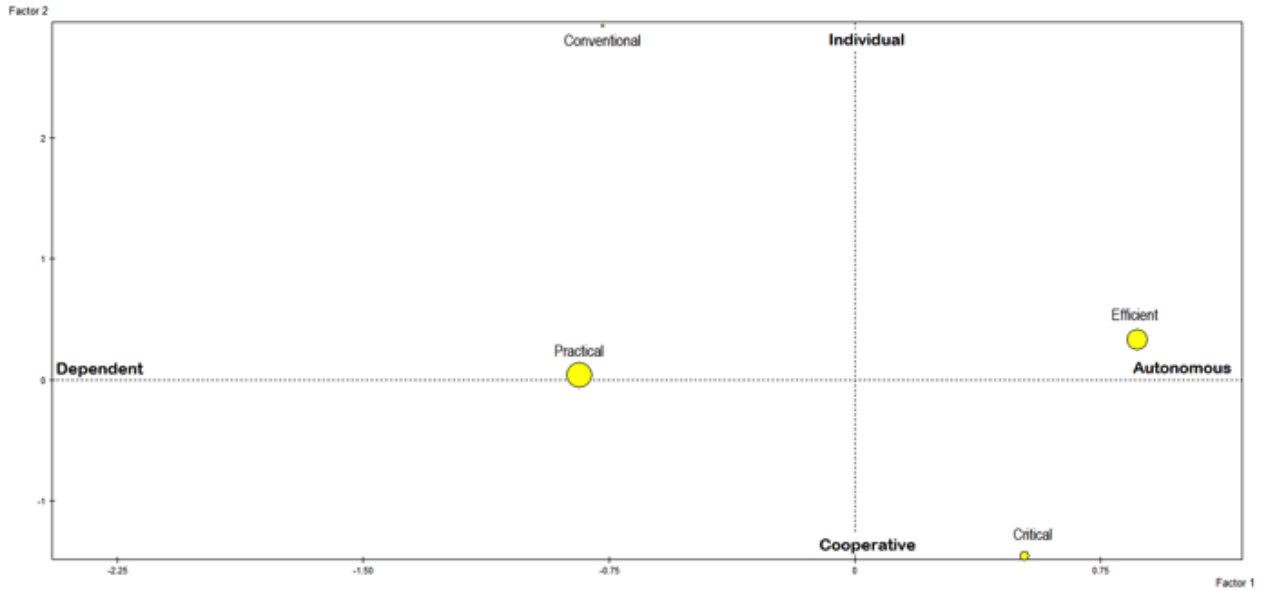

Fig. 3. Cluster factorial plans

The size of the points is proportional to the weight that corresponds to each of them (Figure 2). Thus, group 1 (Practical) consists of 295 students (46.09 %), group 2 (Conventional) of 12 students (1.88 %), group 3 (Critical) of 87 students (13.59 %) and group 4 (Efficient) of 246 (38.44 %). Each of these groups is shown in the tables in Appendix. Here, the response modalities shared by the subjects in the classified survey for each group can be viewed. What determines the importance of a response is the value of the test statistic. Important values are those whose test values are ± 2. The description of each cluster is made considering these responses and interpreting the location of the cluster within the factorial plan.

The presence of cluster 1 – Practical – in the lower left quadrant registered the highest values in this class in terms of those variables associated with dependent student thinking with some nuance that combines the cooperative and individual. In this sense, strategies such as group work and teacher explanations stood out. In terms of use of materials and support: resources deposited in Moodle, project guide and explanations in class to groups. And for assessment: work folders, rubrics and personal mind map.

Cluster 2 – Conventional – Is the most minority group, located in the upper left quadrant of the factorial plane and associated with higher scores in transmissive strategies (classroom expositions) with some presence of dependent strategies (personal work outside of class).

Cluster 3 – Critical – Is located in the lower right quadrant of the factorial plane, and is associated with those variables that reflect a more cooperative student body (group class work, research-documentation activities, work folders, class expositions, rubric and personal mind map).

Cluster 4 – Efficient – Is located in the upper right part of the factorial plane, identified with an autonomous student body with individual nuance. In this sense, its main descriptors are: class work, personal study, teacher's explanations, project guide, class notes, class explanations, tutorials, online help, work folders and personal mind map. In this cluster there is a greater presence of variables referring to individual and autonomous student work.

Model confirmation

After identifying the main descriptors that define the four clusters, the aim is to confirm the four models extracted from the analyses of previous ones. To this end, structural equation modelling was applied using the Amos v.18 program.

The models included those descriptors extracted during the multiple correspondence analysis which best defined the groups, which is why not all the variables are present.

To establish the relationships of the different variables in the models, the initial hypothesis is that the type of strategy used determines the material, supports and assessment. Likewise, the following goodness-of-fit indices were examined for each model: Chi-square statistic (X^2), recommended values between 2-5; IFI (Incremental Fit Index), recommended value ≥ .90; NFI (Normalised Fit Index), recommended value close to 1; CFI (Comparative Fit Index), recommended value ≥ .90; Residual Root Mean Square Error of Approximation RMSEA; the upper limit for considering an acceptable fit according to the Kelley criterion (1935) is .0718.

Model 1 “Practical students”

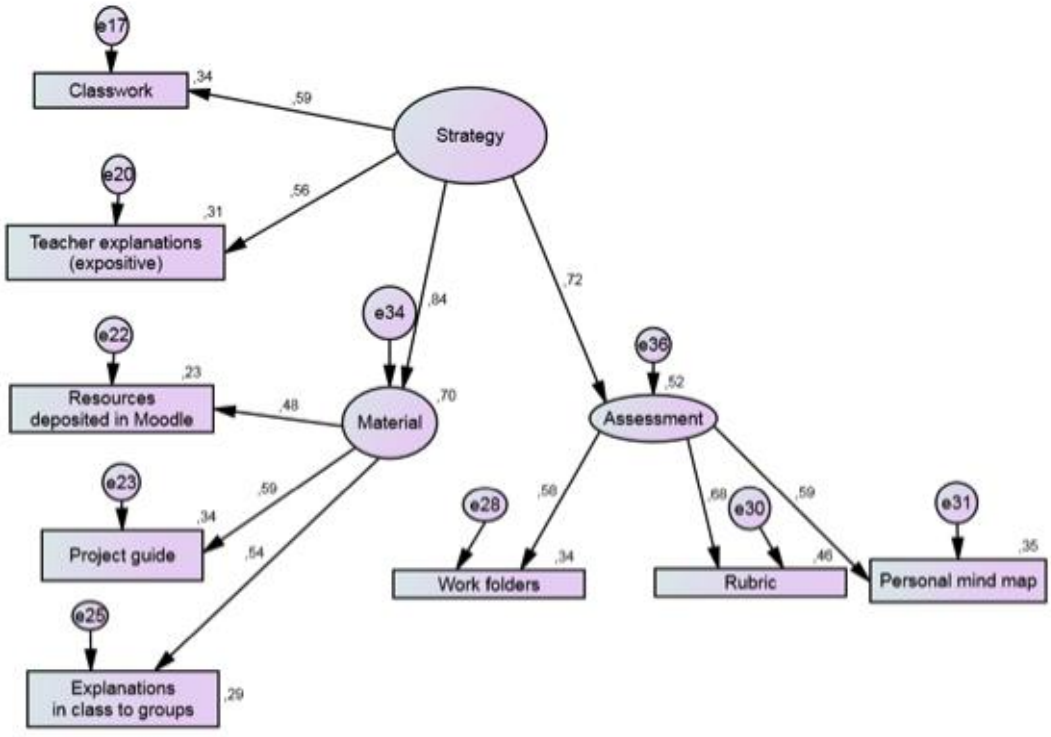

Fig. 4. Practical student model

As seen in Figure 4, this first model consists of three dimensions (Strategy, Material and Assessment). The model shows that the use of the most dependent strategies determines both the material and the kind of assessment. The high percentage of variance explained by the model in each of the variables, the strong factor loads and the goodness-of-fit indexes make it adequate: Chi-square = 67.525; Degrees of freedom = 18; CMIN/DF = 3.75; CFI = .93; RMSA = .06; IFI = .93; NFI =.91

Model 2. "Conventional students"

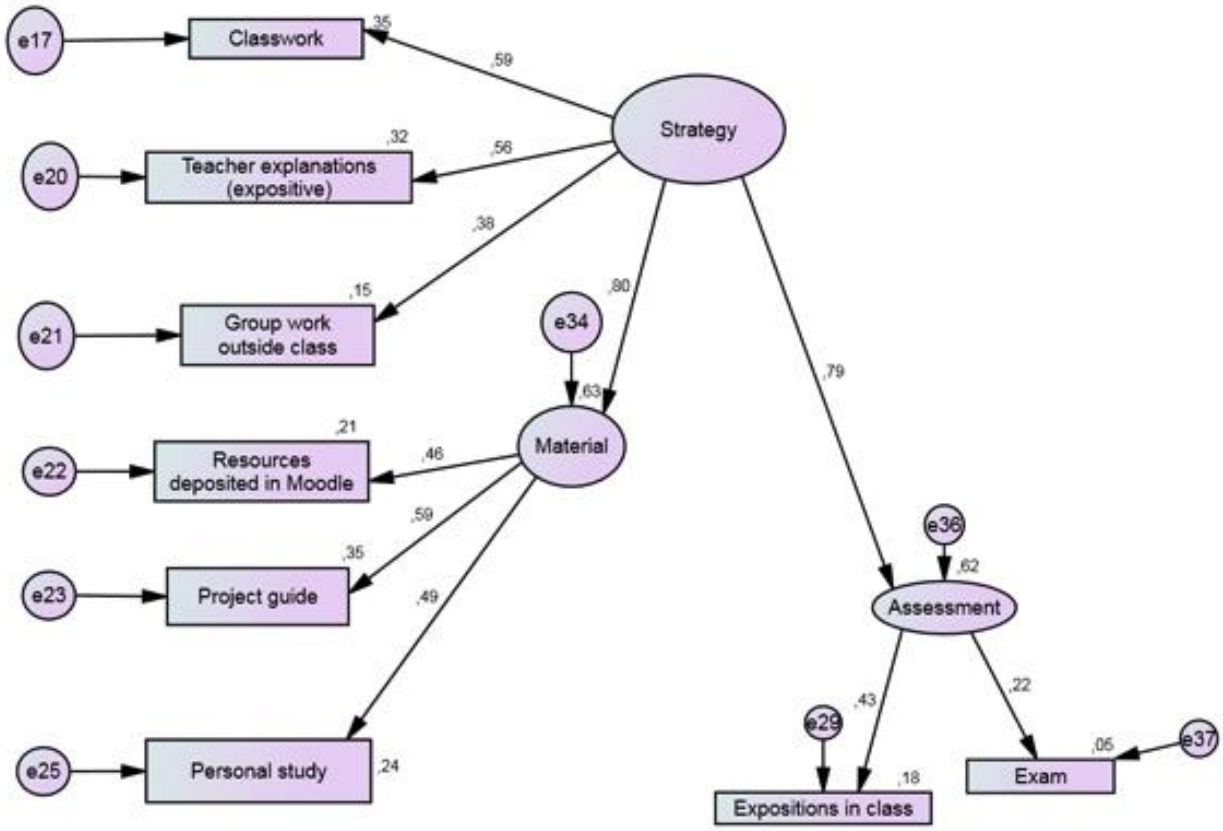

Fig. 5. Conventional student model

The conventional student model differs from the practical due to the presence of work outside the classroom in terms of strategy and a preference for personal class expositions and exams in terms of assessment. The goodness-of-fit indexes of the model make it adequate: Chi-square = 116.578; Degrees of freedom = 18; CMIN/DF = 6.47; CFI = .88; RMSA = .07; IFI = .88; NFI =.85

Model 3. “Critical students”

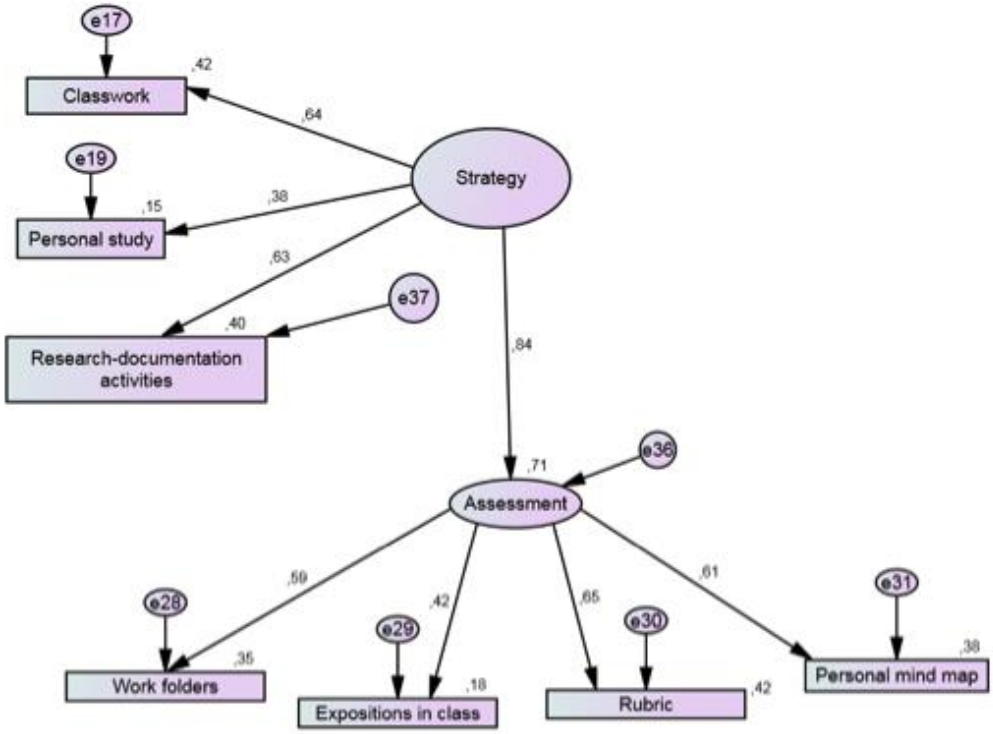

Fig. 6. Critical student model

This third model is defined by two dimensions: strategy and assessment. Strategy is specified by group work in class and personal study. In turn, assessment involves both more cooperative strategies (work folders, rubrics) and individual (expositions in class, personal mind map). It combines the personal and the shared. The model's goodness-of-fit indexes make it sufficiently adequate: Chi-square = 18.806; Degrees of freedom = 13; CMIN/DF = 1.44; CFI = .99; RMSA = .026; IFI = .99; NFI =.97.

Model 4. "Efficient students"

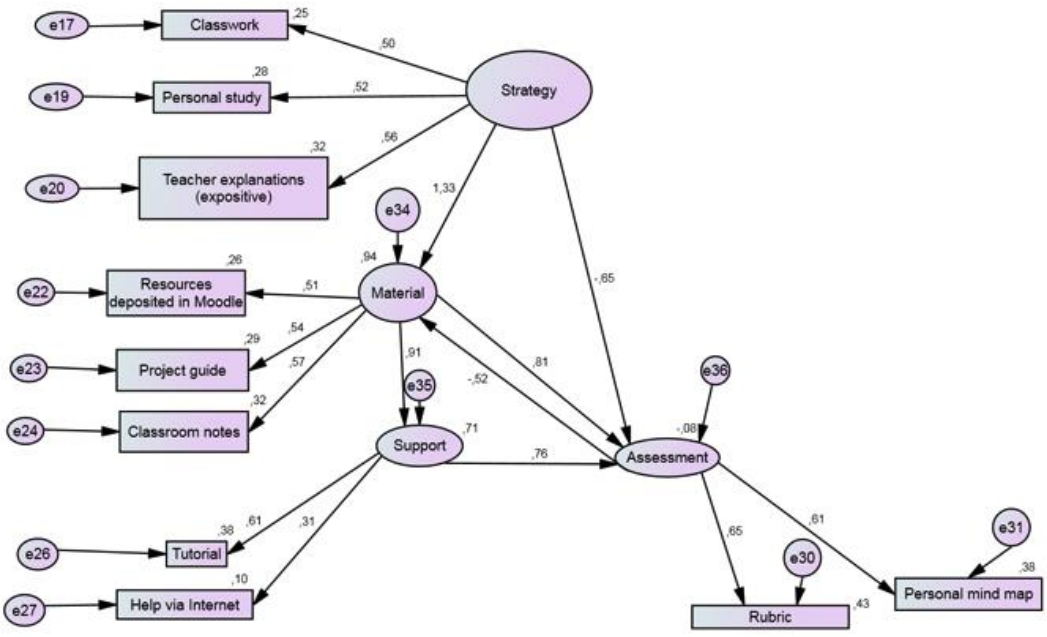

Fig. 7. Efficient student model

The efficient student model is the most complex of the four resulting models. It consists of four dimensions, as shown.

In this model, the strategies strongly determine the materials and assessment. The type of support needed by the students is determined by the material. On the other hand, a reciprocal relationship (represented in Figure 7 by two arrows) between material and evaluation is observed, in such a way that the more the materials represented in the model are used, the more the use of rubrics and personal mind maps appears in the assessment strategies, and the less they are used in these strategies, the less use is made of the material. In addition, the assessment is also influenced by the support received by the students. The model fit indices are also adequate: Chi-square = 106.254; Degrees of freedom = 29; CMIN/DF = 3.66; CFI = .91; RMSA = .06; IFI = .92; NFI = .89.

A closer examination of the results reveals a series of descriptors in which all the models coincide to a greater or lesser extent:

- Teacher explanations. Although autonomous work and creative initiatives are valued and implemented, the acknowledgement and valuation that is granted to the information and explanations derived from the teacher's exposition over any other medium, resource or content source is verified. This aspect is consistent with transmissive models, strongly anchored in university academic tradition.

- Likewise, rubrics or assessment templates are designed to provide independence and encourage collaboration, but they entail the risk of induction. They can be managed as a tool for “risk avoidance” against the flight from creativity and spontaneity, becoming a template that synthesises the teacher’s perspective – and their assessment levels – in terms of the "correct answer", which instead of promoting autonomy may end up inducing a certain response and way of expressing knowledge. Although, paradoxically, the aim is to promote self-regulation, collaborative work and development of the singular interpretation of the contents.

- Class notes and teacher explanation: Although the intention is to promote student autonomy, it is observed that students tend to reassure themselves, and to do so will use scenarios and resources that literally replicate "the truth" expounded by the teacher. For this purpose, the usual annotations (notes) that literally compile the teacher’s contributions, susceptible to reproduction, are highlighted. This is the descriptor that best defines the model for conventional and efficient students.

- Personal study and performance. Work projects promote cooperative work, but, as we have seen, where students pay the most attention and afford credibility is in individual and guided tasks. The collaborative aspect mainly becomes interesting in the work group or team, but scarcely in collective interactions, and this "insularity" or "collaboration between like-minded" is another risk observed on a recurring basis.

- Resources deposited in Moodle: These are resources elaborated, expounded and selected by the teacher. They contain the knowledge that needs to be disclosed, and little relevance is given to the personal search for information which, among other things, may not coincide with the view of the “academic authority”. Moreover, an impression of security is given by the fact that the material is selected by the teacher and includes tasks from other courses which, in terms of the model, function as a guide and convey the sensation of security. In short, this way "the students adapt and deliver productions that coincide with what the teacher expects to find".

These coincidences highlight the solidity of direct instruction, in other words, the literal transmission of content through sequences and processes that are deemed necessary to achieve a given learning (Kirschner et al., 2006). It is the teacher who systematically proposes the expositions and experiences, alternating the participation of the students this way, always under the teacher’s guidance and direction. Similarly, the teacher administers the resources and supports, progressively withdrawing them in order to favour “controlled” autonomy. This general framework of direct instruction cannot be confused with the so-called "traditional teaching" of a verbalistic, passive nature hinging only around the teacher's dissertation. In direct instruction, students carry out practical activities, but always closely supervised by the teacher (Montanero, 2019). This is, as we see, at the base of active teaching, albeit at its embryonic or initial level.

3. Conclusion

In view of the results obtained, four clusters have been identified in the sample of students selected for the study, associated with Practical, Conventional, Critical and Efficient student models. The most representative cluster would be between the dependent and the cooperative, which corresponds to the Practical model, whose most typical features are related to a tendency to value learning as an effect of active participation in a sequence of activities proposed by the teacher. Moreover, from this perspective, knowledge emerges spontaneously through the experiences developed. Likewise, the relationships between equals and direct and close contact with a teacher who motivates and guides throughout the teaching sequence are significantly valued. Hence, the materials proposed and guidelines received appear as basic pillars of teaching. Seen from this position, assessment corresponds more to creative and shared production than to a uniform or repetitive response, but without losing sight of the fact that it corresponds to the received guidelines.

To a great extent, as we have seen, collaborative work has progressed in such a way that learning means an experience in common, with the aim of creating meanings and providing answers to complex questions. However, it is still far from the required self-learning that facilitates self-regulated access to the different sources of information in order to progress beyond predefined guidelines and integrate into the extensive knowledge map now drawn by telematic networks and which make the more different training spaces accessible.

But having said this, it can also be said that, based on the data obtained, we cannot talk about pure models, although in theory they are admitted and useful for understanding and analysing practices. When referring to reality, the gradient of nuances is greater than the precise and sharp definitions. The models that appear in the results are indicative representations, but not exhaustive, as they are more about setting trends that proposing closed and definitive patterns.

Likewise, if other samples were considered, another outcome could be reached (they are tentative for this study; if another one were carried out, a different image could be configured). The proposals that appear serve as indicators that help us make decisions to guide ourselves towards positions that promote a training process characterised by active participation, collaborative work and involvement in personnel with a sufficiently high degree of autonomy to be able to self-regulate and make use of knowledge in new and changing situations.

Similarly, we are witness to the publication of practical experiences or theoretical statements, but there is still little research that offers contrasted data to correct and advance towards a model characterised by collaborative involvement and the development of autonomy in learning. In other words, progressing towards a perspective focused on student learning, organised on a self-regulated basis that ensures training capable of transferring knowledge to different and dynamic situations (Hernández, 2012; Sue, 2014). Other studies such as the one by Gargallo-López et al. (2017) also evaluated the impact that this model based on the practical and participatory experience of the students had on the development of a learning style oriented towards mobilising conceptual change and its functional use in diverse contexts.

With this contribution, the intention is not to make a robust and definitive statement. Instead, the aim is to present contrasted information to help further progress; thus, at the same time as achievements are shown, other shadows and spaces appear that are not as optimistic as might be mistakenly assumed at a superficial glance.

This work has carried out the field study, obtaining and analysing it to correct the excess of idealisms in order to reveal the progress made, sometimes more moderate than would be desirable, and the challenges still pending. We could say that we are not facing resounding changes and we are still far from the proposals described in the theoretical and normative statements. Nevertheless, the changes in university education are starting to become a reality and for their consolidation to prosper, further research is needed that shows real and necessary possibilities from the empirical field.

From this perspective, research stands out as a fundamental element for the understanding and transformation of teaching. Theoretical lucubration and practical narrative serve us well, but until we have contrasted empirical data, they are only tentative frames of reference. Research based on practice reveals evidence backed by revised facts and information, which allows for further progress. This does not mean that the present study shows a radical transformation of innovative

practices in the university, but at least it provides indications closely linked to the real situations, which thus serve as spaces through which to travel, explore and expand.

This analysis that we have presented reveals our shortcomings, insofar as it points to a model which, owing to superficiality, occasionally conceals more than it teaches. For example, we believe that we are promoting autonomous and cooperative work, and yet it is not clear that this is the case.

Among the limitations detected in the study, since the rules of probabilistic selection of subjects are not followed, the subjects represent the only University of Huelva –local situation-. Another is that the sample was heterogeneous by gender, which could help reduce the reliability. In this sense, it implies restrictions when generalizing the results.

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References

Attali, 1998 – *Attali, J.* (1998). Pour un modèle européen d'enseignement supérieur. Francia: Stock. [Electronic resource]. URL: https://bit.ly/3bnqR1Y

Bricall, 2000 – *Bricall, J.* (2000). Informe Universidad 2000. [Electronic resource]. URL: https://bit.ly/3aggAok

Dearing, 1997 – *Dearing, R.* (1997). Higher Education in the learning Society. London, United Kingdom: Jossey-Bass Inc. [Electronic resource]. URL: http://www.leeds.ac.uk/educol/ncihe

Declaration of Bologna, 1999 – Declaration of Bologna (1999). [Electronic resource]. URL: https://bit.ly/2vKIKbX

Dumont et al., 2010 – *Dumont, H., Istance, D., F. Benavides* (eds.) (2010). The Nature of Learning: Using Research to Inspire Practice, Educational Research and Innovation. OECD Publishing. París. DOI: 10.1787/9789264086487-es

Fombona et al., 2016 – *Fombona, J., Iglesias, M. J. y Lozano, I.* (2016). El trabajo colaborativo en la educación superior: una competencia profesional para los futuros docentes. *Educ. Soc. Campinas*. 37(135): 519-538. DOI: 10.1590/ES0101-73302016147914

Gargallo et al., 2011 – *Gargallo, B., Suárez, J., Garfella, P., Fernández, A.* (2011). The TAMUFQ Questionnaire (Teaching and Assessment Methodology of University Faculty Questionnaire). An Instrument to Asses the Teaching Methodology of University Faculty. *Estudios sobre Educación*. 21: 9-40. [Electronic resource]. URL: https://bit.ly/2Jd5MeQ

Gargallo-López et al., 2017 – *Gargallo-López, B., Pérez-Pérez, C., Verde-Peleado, I., y García-Félix, E.* (2017). Estilos de aprendizaje en estudiantes universitarios y enseñanza centrada en el aprendizaje. *RELIEVE-Revista Electrónica De Investigación y Evaluación Educativa*. 23(2): 1-24.

González Sanmamed, Raposo Rivas, 2009 – *González Sanmamed, M., Raposo Rivas, M.* (2009). Evaluation of university professors in actions favoring the European Convergence process. *Revista de Educación*. 349: 361-390. [Electronic resource]. URL: https://bit.ly/3dojR6V

Henriquez, y Arámburu, 2019 – *Henriquez, P., y Arámburu, V.* (2019). Análisis cualitativo en torno al uso de estrategias de enseñanza por docentes universitarios en contextos de formación de agentes educativos. *Archivos Analíticos de Políticas Educativas*. 27(85).

Hernández, 2012 – *Hernández, R.* (2012). Does continuous assessment in higher education support student learning? *Higher Education*. 64: 489-502.

Kember, Kwan, 2000 – *Kember, D., Kwan, K.P.* (2000). Lecturers' Approaches To Teaching and Their Relationship to Conceptions of Good Teaching. *Instructional Science: An International Journal of the Learning Sciences*. 28(5), 469. [Electronic resource]. URL: https://bit.ly/33HWfFS

Kirschner et al., 2006 – *Kirschner, P.A., Sweller, J., y Clark, R.E.* (2006). Why minimal guidance during instruction does not work: an analysis of the failure of constructivist, discovery, problem based, experiental, and inquiry based teaching. *Educational Psychologist*. 41(2): 75-86. DOI: 10.1207/s15326985ep4102_1

López López, 2018 – *López López, M.C., León Guerrero, M.J., y Pérez García, P.* (2018). El enfoque por competencias en el contexto universitario español. La visión del profesorado. *Revista de Investigación Educativa*. 36(2): 529-545. DOI: 10.6018/rie.36.2.314351

Monereo, y Pozo, 2003 – *Monereo, C., y Pozo, J.I.* (eds.) (2003). La universidad ante la nueva cultura educativa. Madrid, España: Síntesis.

Monroy, y Hernández Pina, 2014 – Monroy, F., y Hernández Pina, F. (2014). Factores que influyen en los enfoques de aprendizaje universitario. Una revisión sistemática. *Educación XXI*. 17(2): 105-124. DOI: 10.5944/educxx1.17.2.11481

Montalvo et al., 2018 – *Montalvo, D., Monge, C. y Torrego, J.C.* (2018). Marco general de la innovación educativa en España: legislación, formación, teoría e investigación. En Carlos Monge y Patricia Gómez, Innovando la docencia desde la formación del profesorado. Madrid, España: Síntesis.

Montanero, 2019 – *Montanero, M.* (2019) Métodos pedagógicos emergentes para un nuevo siglo ¿Qué hay realmente de innovación? Teoría de la Educación. *Revista Interuniversitaria*. 31(1): 5-34. doi: 10.14201/teri.19758

Navarro et al., 2015 – *Navarro, I., González, C., López, B. y Botella, P.* (2015). Aprendizaje de contenidos académicos y desarrollo de competencias profesionales mediante prácticas didácticas centradas en el trabajo cooperativo y relaciones multidisciplinares. *Revista de Investigación Educativa*. 33(1): 99-117. DOI:10.6018/rie.33.1.183971

Porlán, 2018 – *Porlán, R.* (Coord.) (2018). Enseñanza Universitaria. Cómo mejorarla. Madrid: Morata.

Pozo, y Pérez Echeverría, 2009 – *Pozo, J.I., y Pérez Echeverría, M.P.* (2009). Psicología del aprendizaje universitario: la formación en competencias. Madrid: Morata.

Pozuelos, y García Prieto, 2018 – *Pozuelos, F.J., y García Prieto, F.J.* (2018). Innovar en educación superior: trabajo por proyectos, aula invertida y evaluación formativa. En C. Monge y P. Gómez Hernández. *Innovando la docencia desde la formación del profesorado*. Madrid: Editorial Síntesis.

Pozuelos et al., 2012 – *Pozuelos, F.J., Rodríguez, F.P., y Travé, G.* (2012). Interdisciplinary Approach in the Higher Education Context. A Case Study. *Revista de Educación*. 357: 561-585. DOI: 10-4438/1988-592X-RE-2010-357-073

Prieto, 2008 – *Prieto, L.* (coord.) (2008). La enseñanza universitaria centrada en el aprendizaje. Barcelona: Octaedro.

Prosser, Trigwell, 1999 – *Prosser, M., Trigwell, K.* (1999). Understanding learning and teaching: The experience in higher education. Buckingham: SRHE and Open University Press.

Schweisfurth, 2015 – *Schweisfurth, M.* (2015). Learner-centred pedagogy: Towards a post-2015 agenda for teaching and learning. *International Journal of Educational Development*. 40: 259-266.

Schweisfurth, 2015 – *Schweisfurth, M.* (2015). Learner-centred pedagogy: Towards a post-2015 agenda for teaching and learning. *International Journal of Educational Development*. 40(C): 259-266. DOI: 10.1016/j.ijedudev.2014.10.011

Sue, 2014 – *Sue, T.* (2014). Student-Centred Learning: A Humanist Perspective. *Teaching in Higher Education*. *19*(3): 266-275.

Tran, 2013 – *Tran, T.T.* (2013). Limitation on the development of skills in higher education in Vietnam. *Higher Education: The International Journal of Higher Education and Educational Planning*. 65(5): 631-644. DOI: 10.1007/s10734-012-9567-7