University student profiles in the learning to learn competence and their relationship with academic achievement

Perfiles de estudiantes universitarios en la competencia aprender a aprender y su relación con el rendimiento académico

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Abstract:

Learning to learn (LtL) is a key competence that the European Commission has identified for education systems (Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning and Council Recommendation of 22 May 2018 on key competences for lifelong learning). It is usually assumed that students will already handle it well when they start university and that their use of it will improve during their university studies, but this assumption needs testing. The aim of this article is to establish the level of management of this competence as well as possible profiles of how university students use it and their relationship to academic achievement. To this end, we worked with a sample of 1,234 students from three universities in Valencia (Spain) in different study years and study areas, applying the QELtLCUS questionnaire, which evaluates the competence. We performed descriptive analyses, cluster analysis, analyses of differences, and multiple linear regression analyses. The sample subjects displayed an acceptable level of management, albeit with low scores in some important dimensions of LtL. We found two groups with two management profiles: one

with a high competence level and another with a lower competence level. The students in the first group had better scores than those in the second group, with statistically significant results. We also found differences that were not statistically significant by gender, with a higher level of competence in women, with those relating to year and study area being larger. We believe that this research provides relevant data that may be of interest to researchers. It also includes guidance to help teachers work on this competence in university studies.

Keywords: self-regulated learning, learning to learn competence, higher education, learning strategies, academic achievement.

Resumen:

Aprender a aprender (AaA) es una competencia clave propuesta por la Comisión Europea para los sistemas educativos (Recomendación del Parlamento Europeo y del Consejo, de 18 de diciembre de 2006, sobre las competencias clave para el aprendizaje permanente y Recomendación del Consejo, de 22 de mayo de 2018, relativa a las competencias clave para el aprendizaje permanente). Se suele pensar que los estudiantes, al incorporarse a la universidad, la manejan suficientemente y que su uso mejora durante sus estudios universitarios, pero hay que verificar este supuesto. El objetivo de este artículo es delimitar el nivel de manejo de la competencia, así como los posibles perfiles de uso de los estudiantes universitarios y su relación con el rendimiento académico. Para ello, utilizamos una muestra de 1234 estudiantes de tres universidades de Valencia (España), de diferentes cursos y áreas de estudios, y les aplicamos el cuestionario CECA-PEU, que evalúa la competencia. Realizamos análisis descriptivos, de clúster, de diferencias y de regresión lineal múltiple. Los sujetos de la muestra exhibieron un nivel aceptable de manejo, aunque con puntuaciones bajas en algunas dimensiones relevantes de AaA. Encontramos dos grupos con dos perfiles de manejo, uno de ellos con competencia alta y el otro con competencia más baja. El alumnado del primer grupo obtuvo mejores calificaciones que el del segundo y los resultados fueron estadísticamente significativos. Se encontraron también diferencias en función del género (con mayor nivel de competencia en las chicas) que no fueron significativas; más pronunciadas fueron, en cambio, las asociadas con curso y con área de estudio. Creemos que esta investigación aporta datos relevantes que pueden interesar a los investigadores. Asimismo, recoge pautas para ayudar a los profesores a trabajar la competencia en los estudios universitarios.

Descriptores: aprendizaje autorregulado, competencia aprender a aprender, educación superior, estrategias de aprendizaje, rendimiento académico.

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1. Introduction

The concept of "learning to learn" (LtL) has progressively grown in importance in academic literature since the 1980s, but it is only recently that it has been interpreted as a key competence for lifelong learning in the twenty-first century (Recommendation of the European

Parliament and of the Council of 18 December 2006 on key competences for lifelong learning; Council Recommendation of 22 May 2018 on key competences for lifelong learning).

The theoretical basis of this competence principally draws on two lines of research: strategic learning (SL) (Weinstein, 1987) and self-regulated learning (SRL) (Pintrich, 2004; Zimmerman, 2000). Both emphasise students' active participation in the management of their own learning processes (Weinstein & Acee, 2018). The first line is based on cognitive theory (information processing theory) and the second on sociocognitive theory.

The literature since the 1980s on these two constructs commonly has used the term "learning to learn" to refer to both, something that is readily apparent in any bibliographic search.

Typically, both constructs (SL and SRL) include three components: cognitive, metacognitive, and affective-motivational (Boekaerts, 2006; Brandmo et al., 2020; Panadero, 2017; Pintrich, 2004; Weinstein et al., 2000; Zimmerman, 2000).

Indeed, the first classifications of learning strategies included cognitive components (associational and repetition strategies, strategies for preparing and organising information), metacognitive ones (planning, self-regulation, and self-evaluation strategies) and affective-motivational ones (controlling anxiety, attitudes, motivational aspects, self-concept, self-esteem, self-efficacy) (Beltrán, 1987; Weinsten, 1988; Weinstein & Mayer, 1985; Weinstein et al., 1988). The best-known models of self-regulated learning (which usually include a three-phase cycle comprising planning, execution, and self-reflection) also included cognitive, metacognitive, and affective-motivational components in these three phases.

These three dimensions were incorporated into the concept of LtL very early on: cognitive (skills related to processing information), metacognitive (conscience and management of one's own learning processes); and affective-motivational (motivation, attitudes, etc.). This is reflected in the study by Hoskins and Fredriksson (2008) and in the one by Caena and Stringher (2020), when the evolution and the foundations of the formulation of the competence are analysed.

It is true that both theories mentioned above (SL and SRL) emphasise the learner as an autonomous subject who faces his or her own learning in isolation from the others in a certain way. Social aspects have been somewhat peripheral in the theory of strategic learning and also in the theory that concerns itself with self-regulated learning (Meyer & Turner, 2002), even though the latter is based on sociocognitive theory and not exclusively on the cognitive theory of information processing, as in the case of the former. This is the situation in the self-regulated learning models of Zimmerman (1989, 2000), Pintrich (2000), and Boekaerts (1996) (three important authors on the

subject) which do not explicitly mention these aspects.

Indeed, Zimmerman, who is certainly the most cited author with regards to the theory of self-regulated learning, did not include context in his model of three cyclical phases (Zimmerman, 2000) other than a minor reference to specific strategies for structuring the surroundings. Nonetheless, in his triadic models, the influence of the context and of vicarious learning is fundamental to the ability to develop self-regulation skills (Zimmerman, 2013). Boekaerts and Niemivirta (2000) make similar arguments.

It should be noted that Bandura (1986) already emphasised the social aspects of learning in his theory, which is a crucial element in Vygotsky (1978), because learning and hominization occur in social contexts with others, in a continuous process of internalisation of higher skills, which are initially provided by significant subjects from the surroundings. In fact, Vygotsky (1978) and von Glasersfeld (1989) are notable figures in the literature on the social nature of self-regulated learning (Thoutenhoofd & Pirrie, 2015).

With all of these precedents, it is no surprise that in the last decade of the previous century and in the first decade of this one the door was opened to the definition and exploration of regulation models that included shared regulation (Hadwin et al., 2005; Järvelä et al., 2008; McCaslin & Hickey, 2001), emphasising

the development of self-regulatory skills developed in interactive and collaborative learning environments (Hadwin et al., 2017; Hadwin & Oshige, 2011; Järvelä & Hadwin, 2015).

Consequently, there has been an openness to the perspective of socially shared cognition, of a subject who learns with others and from others; so that today we can speak of "co-regulation", referring to the influence of others on a student's learning and specifically on the learning of self-regulatory skills.

With all of this, the social dimension of learning to learn has constantly gained in importance in the different models developed, as noted, among others, by Johnson and Johnson (2017), Panadero (2017), Stringher (2014), and Thoutenhoofd and Pirrie (2015).

Drawing on previous research, the European Union (EU) included LtL as a key competence for educational systems (Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning). In this original formulation, LtL as a competence is understood to include cognitive, affective, and metacognitive dimensions with a very brief mention of socio-relational aspects:

"Learning to learn" is the ability to pursue and persist in learning, to organise one's own learning, including through effective management of time and information, both individually and in groups. [...] awareness of one's learning process [...] identify-

ing available opportunities […] overcome obstacles in order to learn successfully […] gaining, processing and assimilating new knowledge and skills […] use and apply knowledge and skills in a variety of contexts […]. Motivation and confidence are crucial to an individual's competence. (p. 16)

In 2018, the European Council (EC) reformulated this, setting out the "Personal, Social and Learning to Learn Competence" (Council Recommendation of 22 May 2018 on key competences for lifelong learning), which places more importance on social aspects than in the earlier definition:

Personal, social and learning to learn competence is the ability to reflect upon oneself, effectively manage time and information, work with others in a constructive way, remain resilient and manage one's own learning and career. It includes the ability to cope with uncertainty and complexity, learn to learn, support one's physical and emotional well-being […] empathize and manage conflict. (p. 5)

There is a significant overlap with the formulation of LtL from 2006, but there are important additions: empathy and conflict management, resilience and the ability to manage uncertainty and stress, critical thinking, emphasis on team work and negotiation, a positive attitude towards personal well-being, social, and physical well-being and also, with regards to lifelong learning, the importance of an attitude of collaboration, assertiveness, and integrity, as well as developing an attitude aimed at solving problems. As Caena (2019) and Sala et al. (2020) note, who carried out two

works for the implementation of LtL for the EC, this new key competence integrates the earlier LtL competence, incorporating significant elements of personal and social development.

Learning to learn has inspired the interest of researchers and numerous works have been published, some emphasising theoretical reflection, conceptualisation, and the elaboration of models and others the evaluation, but not so much the teaching of the competence. Among others, we should note the works by Caena (2019), Caena and Stringher (2020), Deakin (2007), Deakin et al. (2013), García-Bellido et al. (2012), Hautamäki et al. (2002), Hoskins and Fredriksson (2008), Jornet et al. (2012), Martín and Moreno (2007), Moreno and Martín (2014), Muñoz-San Roque et al. (2016), Pirrie and Thoutenhoofd (2013), Sala et al. (2020), Schulz and Stamov (2010), Stringher (2014), Thoutenhoofd and Pirrie (2015), Villardón-Gallego et al., (2013) and Yániz and Villardón-Gallego (2015).

This interest is justified by the importance of the subject, since acquiring this competence is fundamental for students' development and for them to function in a complex and changing society (Säfström, 2018), in which many current jobs will disappear and the new jobs that emerge will require new competences and skills (Caena, 2019). For the European Political Strategy Centre (2017), LtL is the most important skill of all, because it makes it possible to empower individuals to face challenges in this complex and ambiguous world

(Ehlers & Kellermann, 2019; González-Gascón, 2022; Trilling & Fadel, 2009), providing innovative solutions (OECD, 2018, 2019).

The EU's goal is for students who complete compulsory education to have sufficiently developed the LtL competence, and so it is necessary to work on integrating it into the educational system from early ages. Nonetheless, this is more a wish than a reality, and LtL is still a fundamental competence for university students (Malnes et al., 2012) who need to be more independent and competent in managing their own learning than younger students (Lluch & Portillo, 2018; Ramírez, 2017); the available data do not seem to confirm a sufficient command of the competence and these students also need training in LtL (Cameron & Rideout, 2020; Furtado & Machado, 2016; Morón-Monge & García-Carmona, 2022; Viejo & Ortega-Ruiz, 2018; Zhu & Schumacher, 2016).

A theoretical model on which the scientific community agrees is vital to incorporate LtL effectively in educational systems. In this context, starting from the European Union's formulation of the competence, there have been important works in Europe, such as that by Hautamäki et al. (2002), from the University of Helsinki, who defined this competence and established three components in various dimensions and subdimensions: context-related beliefs (societal frames and perceived support for learning and studying), self-related beliefs (learning motivation, control beliefs, self-evaluation, etc.), and learning competences (learning domain, reasoning domain, management of learning, affective self-regulation). Their aim was to construct a framework for evaluation. A later study by Hoskins and Fredriksson (2008) is also relevant. This was based on the one by Hautamäki et al. and other previous ones. These researchers coordinated the work of the European Union's CRELL network (Centre of Educational Research for Lifelong Learning), sponsored by the EC, to try to agree on a theoretical model and an evaluation protocol. In this case, three dimensions were established: cognitive, metacognitive, and affective, with the goal of designing an instrument to evaluate the competence that would act as a framework for European countries. The results did not satisfy the researchers, who were from various teams from EU member states, who were unable to reach an agreement on a common European indicator. The topic, therefore, remained open. Stringher (2014), also a member of this network, carried out a broad meta-analysis in an attempt to provide an inclusive definition and model. She covers four dimensions: cognitive, metacognitive, affective, and social.

Starting from these works, our research team has developed a theoretical model, constructed from the study of the academic literature, that sets out to be inclusive and comprehensive, and which serves as a reference point for our current research work. It includes five dimensions (cognitive, metacognitive, affective-motivational, social-relational, and ethical) and various subdimensions. The substantiation, formulation, and validation

processes of the model can be consulted in Gargallo-López et al. (2020). The first three dimensions derive from the strategic and self-regulated learning construct, and the fourth from the sociocognitive focus, as explained above. The fifth is our own contribution, and is consistent with the EC's most recent formulation and with other research (Cortina, 2013; Grace et al., 2017; Kass & Faden, 2018). We believe that learners cannot be regarded as competent in LtL if the ethical components involved in learning, in their own personal process of learning, and in their own personal improvement and in that of others are neglected.

Given its importance, we believe that it is vital to establish whether university students manage LtL well and to analyse its impact on academic achievement[1], given that there are few studies available on the topic in higher education. To do so, we have collected data from the research project that is being carried out[2].

Although there are a number of studies on the influence of learning strategies and self-regulated learning on academic achievement in university students (Kosnin, 2007; Hye-Jung et al., 2017; Lucieer et al., 2015; Lugo et al., 2016; Ning & Downing, 2015; Pérez González et al., 2022; Treviños, 2016; Yip, 2019; Zimmerman & Schunk, 2012), we have not found studies that specifically analyse the relationship between LtL and academic achievement.

If, as we believe, not all university students are sufficiently competent in LtL

and its influence on academic achievement is clear, we will have more than strong enough arguments to include this competence in the curricula of university degrees.

Therefore, the general objective of this work is to determine university students' LtL competence profiles and the relationship of these profiles with academic achievement.

This general aim takes shape in more specific objectives such as: evaluating the level of management of the competence in the general sample; establishing competence management profiles; analysing possible differences between groups with different profiles according to a number of relevant variables such as gender, age, year, or area of study; specifying the influence on academic achievement of the different dimensions of the competence according to belonging to the group or groups with the highest and lowest command; and evaluating whether there is a difference in academic achievement between the groups established by the profiles of management of the competence.

2. Method and materials

2.1. Research design

We used a quantitative non-experimental descriptive correlational design (McMillan & Schumacher, 2010).

2.2. Participants

The sample comprised 1234 students from three universities in the city of

Valencia (Spain), two public ones: the Universidad de Valencia (UV, 32.09% of the sample) and the Universidad Politécnica de Valencia (UPV, 35.65%), and one private: the Universidad Católica de Valencia (UCV, 32.25%). The sample was selected using purposive non-probability sampling, with the criterion being to obtain a suffi-

ciently varied and representative sample from different large fields/areas of knowledge from the three universities (health sciences, engineering and architecture, and education).

Table 1 shows the characteristics of the sample.

TABLE 1. The sample's characteristics.

Gender	68.14% (843) females, 31.6% (391) males
Age	mean = 20.7 years; σ = 3.91; range: 17-55 years
	17-18: 97 (15.3%) 17-18: 131 (21.8%)
	19-22: 460 (72.3%) 19-22: 384 (63.9%)
	=> 23: 79 (12.4%) => 23: 86 (14.3%)
Study area	32.1% (397) from health sciences, 32.3% (399) from education, 35.6% (439) from engineering and architecture
Study year	1st: 46.6% (576) 2nd: 24.9% (308) 3rd: 18.8% (233) 4th: 8.4% (104) 5th: 1.3% (16)*

*Medicine students, a degree with 6 study years.

2.3. Instruments

The QELtLCUS questionnaire was used (Gargallo-López et al., 2021), which the research team drew up and validated to evaluate the competence in question, based on the model mentioned above (Gargallo-López et al., 2020).

To evaluate academic achievement, we calculated the mean of the grades from the first term as these are the ones closest to when the questionnaire was administered.

The QELtLCUS questionnaire comprises 85 items answered on a five-item Likert-type response scale. These gather information from the five dimensions of the theoretical model, which, in turn, contain twenty-one first-level subdimensions and some second-level subdimensions, in accordance with the theoretical model. Table 2 shows these along with their reliability figures, which are adequate. In the subdimensions, the McDonald's ω is greater than .60, meaning that they are stable.

The content validity of the questionnaire was established through analysis and evaluation of the content of the items and of their groupings into dimensions and subdimensions by seven experts (Bandalos, 2018), considering their validity, intelligibility, absence of ambiguity, and location.

TABLE 2. Structure of the questionnaire and reliability data.

DIMENSIONS/ SCALES	FIRST-LEVEL SUBDIMENSIONS/SUBSCALES	SECOND-LEVEL SUBDIMENSIONS/SUBSCALES
1. COGNITIVE 33 items $\alpha = .91$ $\omega = .88$	1. Managing information effectively $\alpha = .87$ $\omega = .85$	1.1. Searching for and selecting information $\alpha = .71$; $\omega = .71$
		1.2. Attention in class. Note taking $\alpha = .70$; $\omega = .70$
		1.3. Establishing connections between what is learning and what is learned $\alpha = .63$; $\omega = .63$
		1.4. Preparing and organising information $\alpha = .66$; $\omega = .67$
		1.5. Comprehensive memorisation $\alpha = .70$; $\omega = .70$
		1.6. Information retrieval $\alpha = .63$; $\omega = .62$
		1.7. Organising information to retrieve it in exams and pieces of work $\alpha = .56$; $\omega = .56$
	2. Communication skills $\alpha = .90$ $\omega = .90$	2.1. Oral communication/expression skills $\alpha = .85$; $\omega = .86$
		2.2. Communicating in foreign languages $\alpha = .88$; $\omega = .88$
	3. Using ICT $\alpha = .75$ $\omega = .76$	
	4. Critical and creative thinking $\alpha = .77$ $\omega = .77$	
2. METACOGNITIVE 12 items $\alpha = .90$ $\omega = .85$	5. Knowledge of objectives, evaluation criteria, and strategies $\alpha = .72$ $\omega = .72$	
	6. Planning, organising, and managing time $\alpha = .72$ $\omega = .73$	
	7. Self-evaluation, control, self-regulation $\alpha = .64$ $\omega = .64$	
	8. Solving problems $\alpha = .66$ $\omega = .67$	

3. AFFECTIVE AND MOTIVATIONAL 16 items $\alpha = .86$ $\omega = .87$	9. Intrinsic motivation $\alpha = .72$ $\omega = .72$	
	10. Tolerating frustration. Resilience $\alpha = .63$ $\omega = .63$	
	11. Internal attributions $\alpha = .62$ $\omega = .63$	
	12. Self-concept, self-esteem, self-efficacy $\alpha = .73$ $\omega = .74$	
	13. Physical and emotional well-being $\alpha = .77$ $\omega = .77$	
	14. Anxiety $\alpha = .73$ $\omega = .73$	
4. SOCIAL/ RELATIONAL 15 items $\alpha = .90$ $\omega = .90$	15. Social values $\alpha = .75$ $\omega = .74$	
	16. Attitudes of cooperation and solidarity. Interpersonal relationships $\alpha = .74$ $\omega = .74$	
	17. Teamwork $\alpha = .84$ $\omega = .84$	17.1. Working with and helping classmates $\alpha = .77$; $\omega = .77$
		17.2. Teamwork. Personal engagement $\alpha = .75$; $\omega = .75$
	18. Controlling environmental conditions $\alpha = .70$ $\omega = .70$	
5. ETHICS 9 items $\alpha = .86$ $\omega = .86$	19. Social responsibility in learning $\alpha = .71$ $\omega = .71$	
	20. Values. Honesty and respect $\alpha = .78$ $\omega = .78$	
	21. Respecting ethical and deontological codes (ítems 83, 84 y 85) $\alpha = .71$ $\omega = .71$	

The questionnaire's construct validation was checked through confirmatory factor analysis (CFA) (Gargallo-López et al., (2021) using the lavaan program (Rosseel 2012), as there was a theoretical model whose validity was to be tested and given that there was a clear idea of what items comprised each dimension and subdimension of the instrument (Lloret-Segura et al., 2014). The indicators of fit of the model at the level of each dimension are adequate, as is that of the questionnaire at a global level (see Figure 1 and Tables 3 and 4). Furthermore, regarding the reliability of the dimensions and the global reliability of the questionnaire, values greater than .70 were obtained for all of the dimensions and globally, based on Cronbach's α and McDonald's ω (1999) (see Table 5), and so the internal consistency of the scale is appropriate. Therefore, the CFA of the questionnaire was satisfactory and supports the evidence for the validity of the internal structure of the questionnaire. For more detail of the results of the validation of the questionnaire, see Gargallo-López et al. (2021).

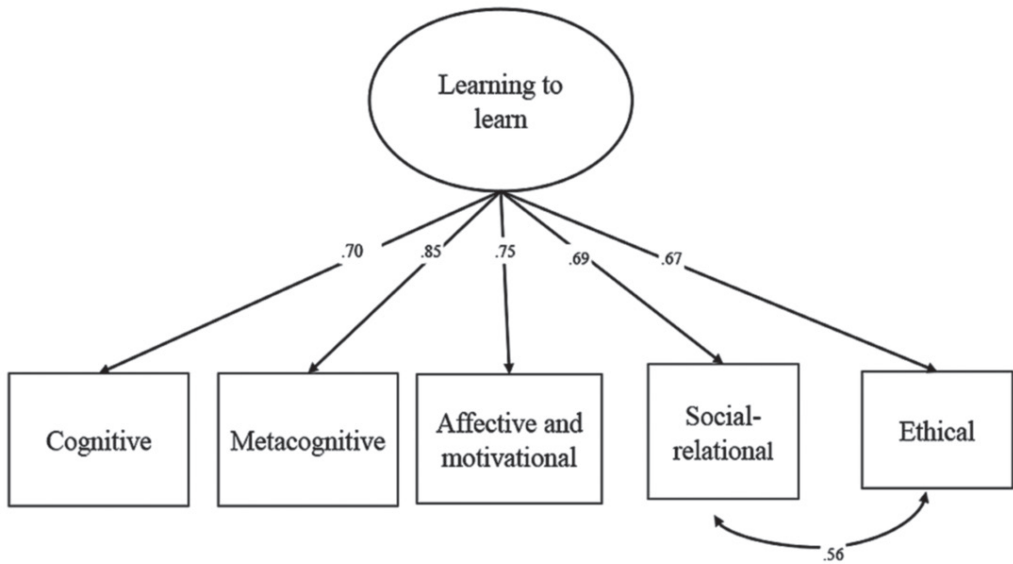FIGURE 1. Model of the LtL construct. confirmatory factor analysis.

TABLE 3. Indicators of fit of the LtL construct.

| χ² RMSEA | | | | | | | |
χ²	df	p	RMSEA	Int 90%	Pclose	CFI	SRMR
2.659	4	.616	.000	(.000-.036)	.994	1.000	.021

TABLE 4. Indicators of fit of the LtL dimensions.

| Dimensions or scales | χ² | | | RMSEA | | | | |
	χ²	df	p	RM-SEA	Int 90%	Pclose	CFI	SRMR
Cognitive	1564.417	482	.000	.043	(.040-.045)	1.000	.954	.053
Metacognitive	63.122	50	.101	.015	(.000-.025)	1.000	.997	.030
Affective and motivational	288.564	98	.000	.040	(.034-.045)	.999	.966	.047
Social-relational	71.461	84	.833	.000	(.000-.010)	1.000	1.000	.032
Ethical	14.491	24	.935	.000	(.000-.006)	1.000	1.000	.023

TABLE 5. Global Cronbach's α and MacDonald's ω coefficients and Cronbach's α and MacDonald's ω coefficients of the dimensions of the questionnaire.

Dimensions	Coefficients
Global	α = .91 ω = .88
Cognitive	α = .91 ω = .88
Metacognitive	α = .90 ω = .85
Affective and motivational	α = .86 ω = .87
Social-relational	α = .90 ω = .90
Ethical	α = .86 ω = .86

2.4. Process

The data were collected online in the first trimester of the 2022–2023 academic year. The students responded in a single ordinary class session through an online application. The requirements of the Ethics Committee of the Universidad de Valencia were taken into account: the students were informed of the aims and process of the research, and participation was voluntary. Before answering, they gave informed consent and then completed the questionnaire, including demographic data, but no data that personally identified them, in order to respect their anonymity.

2.5. Data analysis

The data analysis includes descriptive statistics, cluster analysis, χ2 test and the Mann-Whitney U test, using the SPSS 26.0 program.

The cluster analysis used the two-step method, which produces similar results to latent class analysis (Benassi et al., 2020).

The factor scores for each dimension and subdimension were calculated using the mean obtained for the items from each one. This makes it possible to maintain the same metrics for the scale and make comparisons between dimensions and subdimensions (DiStefano et al., 2009). Each dimension and subdimension is unifactorial, and the loadings of the items generally do not differ (Abad et al., 2011).

3. Results

The results section comprises three parts. The first includes descriptive statistics for the LtL dimensions/subdimensions. In the second, the profile of the students depending on how they manage the competence, specifying the characteristics of the groups. The third relates academic achievement to group profiles.

3.1. Descriptive statistics of the LtL competence

As the aim is to evaluate the level of management of the competence of the students studied, it is appropriate to analyse the mean scores in the dimensions and subdimensions of the competence. Considering the sample as a whole, the students' mean scores display a medium-high level (Table 6), with the high-

est in the social-relational and ethical dimension, followed by the affective-motivational, metacognitive, and cognitive ones, in which it is medium-high. The subdimensions with the highest scores are attitudes of cooperation and solidarity (4.48 out of 5); values, honesty, and respect (4.41); social values (4.32); and respect for ethical codes (4.31). The subdimensions with a lower level of competence are controlling anxiety (3.05), and planning (3.19). The value of the standard deviation indicates considerable homogeneity in the responses.

In the cognitive dimension, the Information management subdimension has the highest competence level with higher means in elaboration and organisation (4.00) and in making connections (3.93), and lower in organising for retrieval (3.74). In the other three subdimensions, there is adequate ICT management (3.81), and intermediate competence in critical and creative thinking (3.62) and in communication skills (3.55 and 3.52).

In the metacognitive dimension, the competence level is medium-high in three

subdimensions: self-evaluation (3.97), knowledge of objectives (3.95), and problem solving (3.92). In contrast, it is medium in planning (3.19).

In the affective-motivational dimension, the competence level is high in intrinsic motivation (4.19) and internal attributions (4.26), medium-high in self-concept and self-esteem (3.98), and physical and emotional well-being (3.83). In tolerating frustration, it is medium, and in controlling anxiety it is medium-low.

In the social-relational dimension, the competence level is high in all of the subdimensions, with the highest means in attitudes of cooperation and solidarity (4.48) and social values (4.32). The lowest mean was in controlling environmental conditions (4.07), although this score was still high.

In the ethical dimension, the competence level is high in the three subdimensions, with the highest level in values, honesty, and respect (4.41), and the lowest in social responsibility (4.06).

TABLE 6. Descriptive statistics of the LtL competence dimensions/subdimensions.

	Mean	SD	Asymmetry	Kurtosis	Kolmogorov-Smirnov normality test	
					Statistics test	Asyptotic significance
COGNITIVE	*3.70*	*0.52*	*-0.286*	*0.378*	*0.022*	*.200*
Information management	3.83	0.49	-0.569	1.068	0.036	.001
Data search and selection	3.77	0.69	-0.532	0.342	0.126	.000
Pay attention in class	3.78	0.89	-0.782	0.403	0.177	.000

Making connections	3.93	0.75	-0.674	0.624	0.178	.000
Elaboration and or-ganisation	4.00	0.85	-0.927	0.614	0.14	.000
Comprehensive memorisation	3.72	0.86	-0.634	0.107	0.121	.000
Data retrieval	3.86	0.75	-0.56	0.341	0.127	.000
Data retrieval organi-sation	3.74	0.75	-0.472	0.29	0.107	.000
Communication skills	*3.54*	*0.78*	*-0.331*	*-0.405*	*0.049*	*.000*
Oral Skills	3.55	0.87	-0.44	-0.106	0.117	.000
Communication in foreign languages	3.52	1.05	-0.467	-0.53	0.102	.000
ICT management	3.81	0.86	-0.643	0.016	0.129	.000
Critical and creative thinking	3.62	0.75	-0.335	-0.083	0.091	.000
METACOGNITIVE	***3.76***	***0.54***	***-0.388***	***0.766***	***0.051***	***.000***
Knowledge of objectives	3.95	0.75	-0.639	0.286	0.132	.000
Planing, organising	3.19	0.95	-0.272	-0.402	0.093	.000
Self-assessment, self-con-trol, self-regulation	3.97	0.66	-0.69	0.966	0.139	.000
Problem solving	3.92	0.64	-0.701	1.468	0.144	.000
AFECTIVE-MOTIVACIONAL	***3.82***	***0.49***	***-0.585***	***1.651***	***0.037***	***.001***
Intrinsic motivation	4.19	0.72	-1.19	2.062	0.144	.000
Frustration tolerance	3.63	0.89	-0.511	0.148	0.143	.000
Internal attributions	4.26	0.72	-1.28	2.412	0.186	.000
Self-concept, self-steem, self-efficacy	3.98	0.66	-0.739	1.49	0.143	.000
Physical and emotional well-being	3.83	0.80	-0.661	0.323	0.139	.000

Controlling anxiety	3.05	1.06	0.035	-0.798	0.083	.000
SOCIAL-RELATIONAL	*4.26*	*0.51*	*-1.622*	*6.492*	*0.074*	*.000*
Social values	4.32	0.66	-1.348	3.183	0.152	.000
Cooperation and solidarity attitudes	4.48	0.58	-1.943	7.049	0.185	.000
Working and helping colleagues	4.15	0.72	-1.038	1.686	0.155	.000
Teamwork. Personal involvement	4.18	0.67	-1.03	2.223	0.133	.000
Controling enviromental conditions	4.07	0.74	-0.943	1.29	0.158	.000
ETHICAL	*4.26*	*0.53*	*-1.406*	*5.142*	*0.080*	*.000*
Social responsibility	4.06	0.73	-0.859	1.168	0.129	.000
Values. Honesty and respect	4.41	0.63	-1.54	4.472	0.180	.000
Respect for ethical codes	4.31	0.61	-1.378	3.728	0.146	.000

3.2. Student profiles in LtL and their characteristics

We set out to establish competence management profiles to define the groups that emerged from them, with a view to determining possible differences between these groups in relevant variables and also in academic achievement. To obtain the profiles of the students in the learning to learn competence, a cluster analysis was performed using the two-step process. Given the non-normality of the variables and the skew and kurtosis indices (Table 6), we opted for the maximum likelihood estimation method.
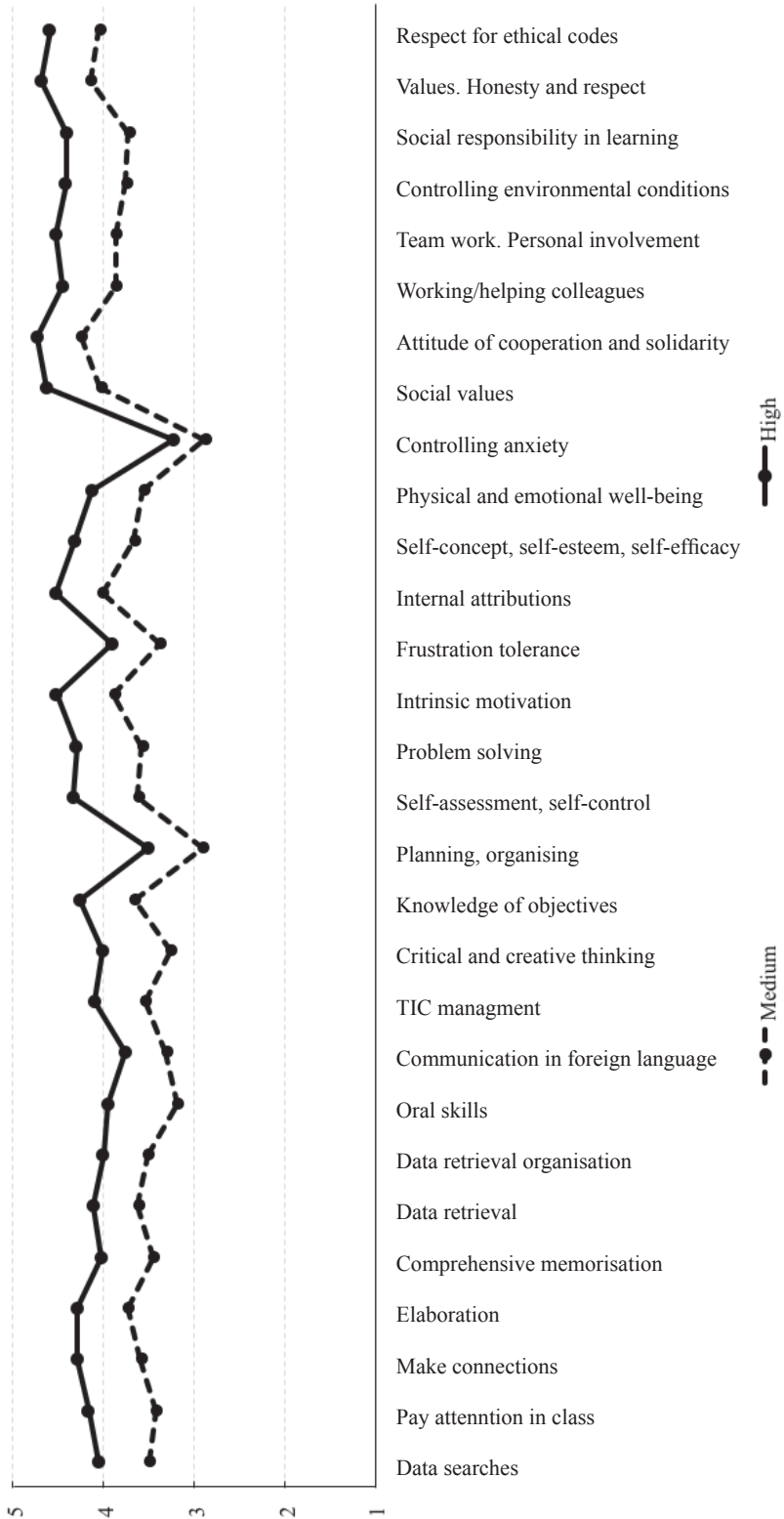
The optimal number of groups that the method estimates is 2, having tested options with 3 and 4 groups. The two-group cluster is most parsimonious as it is the clearest and has the most solid grouping. The two groups are of a similar size (Table 7), with a clear separation between the two (Figure 2), one with a high competence level and another with a lower average competence level.

TABLE 7. Groups of LtL competence.

Group	N	%
Average	634	51.4%
High	600	48.6%
Total	1234	

FIGURE 2. The group profiles in the LtL competence

Respect for ethical codes

Values. Honesty and respect

Social responsibility in learning

Controlling environmental conditions

Team work. Personal involvement

Working/helping colleagues

Attitude of cooperation and solidarity

Social values

Controlling anxiety

Physical and emotional well-being

Self-concept, self-esteem, self-efficacy

Internal attributions

Frustration tolerance

Intrinsic motivation

Problem solving

Self-assessment, self-control

Planning, organising

Knowledge of objectives

Critical and creative thinking

TIC managment

Communication in foreign language

Oral skills

Data retrieval organisation

Data retrieval

Comprehensive memorisation

Elaboration

Make connections

Pay attenntion in class

Data searches

High

Medium

The characteristics of both groups are as follows:

– Intermediate competence group. This is the larger (51.4% of the students) and displays an intermediate competence level. The pattern of the group is similar to the general pattern discussed above (Figure 2). In both the ethical dimension and the social-relational one, the level is medium-high, being lower in the other three dimensions (cognitive, metacognitive, and affective-motivational).

In the subdimensions, the maximum and minimum values follow the general pattern.

– High competence group. This is the smallest (48.6% of the students) and it has a high level. The pattern is similar to the general one (Figure 2). The ethical and social-relational dimensions have the highest means. The other three are lower but are still high. Similarly, the maximum and minimum values of the subdimensions are consistent with those of the general pattern.

TABLE 8. The groups' characteristics.

	Average group	High group
Gender	Males: 209 (33.2%)	Males: 182 (30.3%)
	Females: 425 (66.8%)	Females: 418 (69.7%)
Age	17-18: 97 (15.3%)	17-18: 131 (21.8%)
	19-22: 460 (72.3%)	19-22: 384 (63.9%)
	=> 23: 79 (12.4%)	=> 23: 86 (14.3%)
Study year	1st: 250 (40.0%) Average age = 19.86	1st: 326 (54.7%) Average age = 20.21
	2nd: 173 (27.7%) Average age = 20.31	2nd: 135 (22.7%) Average age = 19.99
	3rd: 147 (23.5%) Average age = 21.32	3rd: 86 (14.4%) Average age = 22.01
	4th: 55 (8.8%) Average age = 22.58	4th: 49 (8.2%) Average age = 24.27
Study area	Health sciences: 236 (37.1%)	Health sciences: 161 (26.8%)
	Engineering and architecture: 229 (36.0%)	Engineering and architecture: 229 (35.3%)
	Education: 171 (26.9%)	Education: 228 (37.9%)

Once the groups were established, it was necessary to identify their characteristics and analyse possible differences between them according to a range of relevant variables, as mentioned in the study objectives. To do so, we considered the personal and contextual variables of gender, age, year, and field of study. With regards to gender (Table 8), in the medium competence group, the percentage of males is higher than the percentage of females. The inverse is the case in the high competence group. Pearson's $\chi 2$ (.987) is not statistically significant ($p = .321$), and so there is no association between gender and competence group.

In relation to age, in the medium competence group, the mean is 20.60, slightly below that of the high competence group, which has a mean of 20.78. As the assumption of normality is not fulfilled, we used the Mann-Whitney U test, and found statistically significant differences between the means of the two groups ($Z = -1.960$; $p = .050$). Consequently, the learning to learn competence increases as age increases.

With regards to the year, in the medium group the percentage of students in the second, third, and fourth years is greater than that of the high group, while in the high group, the percentage of students from the first year is greater than in the medium group. Pearson's $\chi 2$ (32.318) is statistically significant ($p < .001$), meaning there is an association between the year and the competence group.

Nonetheless, it is necessary to bear in mind when analysing the sample that in the first year there is a large group of students who are older than their fellow students, 17–18 years. Given the characteristics of the sample and the previous result for differences by age, we compared the age in the two LtL groups within each year group. As Table 8 shows, the mean age of the high competence group is higher than that of the medium competence group in each year, with the exception of the second year, although the Mann-Whitney U test did not show any statistically significant differences in any year between the two groups.

It appears then that the greater or lesser proportion of students in the higher competence group is also mediated by age and not just by their year.

Finally, considering the field of study, in the medium competence group, health science subjects are more numerous by percentage, followed by engineering and architecture and education, while in the high competence group, the field with the highest percentage is education, followed by engineering and architecture and health sciences. Pearson's $\chi 2$ (21.994) is significant ($p < .001$), giving an association between the area of study and the competence group. Both groups differ in their composition, with a higher percentage of education and lower in health sciences in the high competence group and the inverse in the medium group.

3.3. LtL and academic achievement

Multiple regression analyses and analyses of differences between the two groups were performed to study the relationship between the command of the competence

and academic achievement, as stated in the study objectives.

3.3.1. Regression

To analyse the influence of the LtL dimensions on academic achievement according to whether the subjects were from the higher or lower competence group, we implemented a complete multiple regression model for each group, with the criterion being academic achievement and the predictors the five LtL dimensions.

The proposed regression model was significant in the medium group ($F_{5.563}$ = 3.740, p = .002), with an explanation by the predictors for academic achievement of 2.3% (adjusted R^2 = .023). It was also significant in the high group ($F_{5.563}$ = 9.183, p < .001), with an explanation of 6.8% (adjusted R^2 = .068).

As for significant predictors that contribute to the explanation of the model (Table 9), only the metacognitive dimension was significant in the medium group. In the case of the high group, they were all significant except for the ethical dimension, with the cognitive dimension having the greatest contribution and the social-relational dimension the smallest. They were all positive, apart from the social-relational dimension, which was negative.

TABLE 9. Regression model.

Group		B	Error Dev.	Beta	t	Sig.
Overall	(Constant)	4.708	.303		15.561	.000
	Cognitive	**.305**	**.079**	**.140**	**3.863**	**.000**
	Metacognitive	**.284**	**.086**	**.135**	**3.319**	**.001**
	Affective-motivational	**.241**	**.086**	**.103**	**2.800**	**.005**
	Social-Relational	-.121	.101	-.054	-1.195	.232
	Ethical	-.041	.093	-.019	-.440	.660
Average	(Constant)	4.983	0.52		9.582	.000
	Cognitive	0.227	0.122	0.084	1.867	0.062
	Metacognitive	**0.263**	**0.127**	**0.105**	**2.069**	**0.039**
	Affective-motivational	0.128	0.125	0.05	1.026	0.305
	Social-relational	-0.004	0.14	-0.002	-0.03	0.976
	Ethical	-0.048	0.13	-0.022	-0.367	0.714
High	(Constant)	5.61	0.997		5.629	0
	Cognitive	**0.397**	**0.134**	**0.136**	**2.971**	**0.003**
	Metacognitive	**0.336**	**0.137**	**0.116**	**2.453**	**0.014**
	Affective-motivational	**0.386**	**0.142**	**0.119**	**2.724**	**0.007**
	Social-relational	**-0.462**	**0.191**	**-0.111**	**-2.419**	**0.016**
	Ethical	-0.152	0.165	-0.042	-0.924	0.356

3.3.2. Differences in achievement by competence group

The relationship obtained in the cluster analysis that explains students' academic achievement by the LtL management group to which they belong is presented here. To do so, we used the Mann-Whitney U test, as the assumption of normality is not fulfilled.

The high-competence group has a higher mean academic achievement (7.37) than the medium-competence group (6.92) (Table 10). Furthermore, according to the Mann-Whitney U test, the difference between both means is statistically significant, and has a small effect size (.040). Consequently, the better the learning to learn competence, the better the academic achievement obtained.

TABLE 10. Academic performance according to group.

Group	Mean	Standard deviation	t	Sig.	Partial eta squared
Average	6.92	1.10	-6.997	.<001	.040
High	7.37	1.12			

4. Discussion

Our aim in this work was to analyse the profiles of university students in LtL competence management and its potential relationship with academic achievement. We also set out to evaluate the level of management of the competence: considering for all of the sample that the mean scores for the dimensions and subdimensions of the competence reflected an acceptable level of competence. This was higher in the social-relational and ethical dimensions than in the others, in which the mean scores were also moderately high, with the sole exception of planning in the metacognitive dimension and controlling anxiety in the affective-motivational one.

Another objective of the work was to establish competence management profiles. Using cluster analysis, we found two similar-sized groups of students with different levels of LtL competence management, one of them with a medium competence level and another with a high level. In the higher competence group, all of the mean scores for the subdimensions of the competence were greater than 4, with just three exceptions, which were greater than the mean of 3: planning, tolerating frustration, and controlling anxiety. In the lower competence group, the mean of the scores was above 3, with two exceptions below 3: planning and controlling anxiety.

We also set out to establish the influence of the different dimensions of the competence on academic achievement. The regression analysis showed that the metacognitive dimension was essential in relation to academic achievement, as it appeared in both groups.

Three more dimensions appeared in the high group that explained the achievement. The two most important dimensions were the cognitive and the affective-motivational. The other two contributed slightly less, albeit with higher scores than the medium group, with the social-relational being negative.

Therefore, in the high group, information management from critical and creative thinking is fundamental in the construction of knowledge, always from an internal attribution and intrinsic motivation (Figure 2). This group also possesses a high command of the social-relational competence, better than that of the intermediate group. Nonetheless, the negative relationship with academic achievement suggests that for the construction of knowledge, personal information management is fundamental even when supported by teamwork (Table 9).

Another objective was to assess whether there was a difference in academic achievement between the groups that manage the competence differently. It was found that the students from the group with the higher command of the competence obtained higher scores than those from the other group and the results were statistically significant. We have not found studies that specifically analyse the LtL competence and its relationship with academic achievement in university students, and so this is an important contribution by our work. There are studies that consider the relationship between learning strategies and self-regulated learning (constructs that are connected to LtL) and achievement, and their influence has been verified. These include the works by Ergen and Kanadli (2017), Hye-Jung et al. (2017), Lucieer et al. (2016), Lugo et al. (2016), Ning and Downing (2015), Piovano et al. (2018), Sahranavard et al. (2018) and Yip (2019).

We also set out to analyse possible differences between the groups with differing levels of management of the competence depending on different relevant variables.

When analysing this relationship, we found that female subjects had a better command of the competence, albeit without statistically significant differences, in line with other studies (Ray & Garavalia, 2003; Virtanen & Nevgi, 2010). With regards to age, the scores were very similar, with the mean age of the subjects with more competence being higher, in this case with significant differences.

Contrary to expectations, the percentage of students from the second, third, and fourth years was higher in the medium competence group than in the high-level group and in the high-competence group, the percentage of first-year students was higher than in the medium-competence group. In this case, the differences were statistically significant, and there is an association between year and level of competence, with a higher percentage of year-1 students in the high competence group

than in the other years. This is striking because there are studies that confirm that students start university insufficiently prepared for LtL (Cameron & Rideout, 2020; Furtado Rosa & Machado Tinoco, 2016; Viejo & Ortega-Ruiz, 2018; Zhu & Schumacher, 2016) and it is assumed that they will learn to learn at university. Further research with larger samples would be necessary to see whether these results are confirmed. If this were the case, it would be necessary to reflect in-depth on the reasons why the level of LtL competence does not increase in higher years as would be expected as students progress through their university training.

In any case, we have already seen in the analyses that being in the higher competence group also depended on age, given that in all cases the high competence group in each year was older than the medium competence group.

Moreover, although we have not found works that study evolution of the LtL competence through the years of the degrees, there are some studies that are close in subject matter. Lynch (2006) analysed the relationship between various learning strategies and academic level, depending on year in the degree programme, finding that students in higher years did better in effort and self-efficacy while those from the first year were associated more with extrinsic motivation. Gargallo-López et al. (2012) studied the evolution of learning strategies during the first year of university in excellent and intermediate students. They found

that the excellent students had better mean scores than the overall means for metacognitive, affective, and information processing strategies and that both groups increased their extrinsic motivation, their anxiety, and their external attributions and they placed less value on the tasks, at the end of this year. Higgins et al. (2021) studied the changes that occurred in self-regulated learning in a sample of Australian students over three years and they found that, in the first year, from the first to the second semester, the self-efficacy, sense of value and academic competence scores, learning strategies (which included searching, preparing, organising, critical thinking, and self-regulation) time management and place of study all worsened. Nonetheless, in the second semester of the third year, the self-efficacy and learning strategies scores improved, although not the other two, which had reduced since the first measurement, taken in the first term of the first year.

Although the measurement instruments are not the same and neither is the type of study, as the first one is transversal like ours while the other two are longitudinal, it is true that we observed that no improvement occurs in them in any of the scores relating to learning strategies and self-regulated learning, as the students' progress move through the years, given that in some cases there are advances and in others reversals.

So, studies are needed that consider in more depth what we have found in the present work, and it would be appropriate

to do so, because there are important questions that merit an answer.

With regards to field of study, a greater percentage of students from educational sciences were in the high competence group, followed by those from engineering and architecture and those from health sciences, and a greater percentage of this last group is in the medium competence group. In this case, the differences are also statistically significant, with an association between the study area and competence group. These results are also peculiar, because the students who access the health science specialities (medicine, nursing and physiotherapy), at the Universidad de Valencia, from which the sample from this area of study is taken, need very high grades to enter these programmes, and further study is needed on why their achievement in LtL is apparently lower than that of other areas that do not have such high entry requirements.

5. Conclusions, limitations of the study, and future research

The results of this work prove the influence of command of the LtL competence on academic achievement, and so it is possible to assume that an increase in this competence could improve academic performance. This possibility leads us to suggest that university teachers should work on this competence in their modules to foster its improvement in their students. Although the sample includes one group of students with a relatively high level of management of the compe-

tence, it is true that the other group has a lower level. And there are subdimensions of the competence that it is necessary to work on, because of their importance and because the scores in them are relatively low: this is the case of planning, organisation, and time management (it is important to bear in mind, with the data from the study, that metacognitive strategies, which include planning, are the clearest predictor of achievement, as they fulfil this role in both groups), also the case of critical and creative thinking, oral communication skills, attention in class, comprehensive memorisation, and communication in foreign languages, tolerating frustration, and controlling anxiety.

Teachers' commitment would be needed to implement curriculum designs that integrate the components of competence into the teaching of the subjects, along with the other content taught in them, specifying these (teamwork, planning, critical thinking, information management, etc.) in learning outcomes and including teaching and evaluation procedures. We believe that this is the best option, contrasting with the application of specific training programmes for learning strategies and self-regulation in short periods, of which we have examples in the literature (Hernández et al., 2010; Hofer & Yu, 2009; Norton & Crowley, 1995; Ryder et al., 2017; Wibrowski et al., 2017; Yan et al., 2020). Although this would be an acceptable option, it is by integrating the teaching and evaluation of LtL in the subjects that the teachers deliver that an effective improvement

in the competence can be achieved by working on their components in context, thus favouring their use and transfer.

To achieve this and tackle these tasks, it is vital to train university teachers. Developing educational innovation projects and implementing courses and workshops on the LtL competence and on its teaching and evaluation appear to be necessary initiatives for making them widespread in the organisation.

Finally, we should note some limitations of this work. The main one is that the sample is not representative of the university population, as the data were collected from degrees in several areas of study at three universities in the city of Valencia, and it would be advisable to compare our results with those from samples that are representative. It is true that the sample is broad and, although it is not representative, it is sufficiently representative of these study areas.

Furthermore, the data were collected using a self-report questionnaire, in which the students comment on the basis of their perception, interpretation, and evaluation of the statements of the items in the instrument, which does not always reflect whether what the students say they do is what they really do when they learn. However, it is true that this limitation is shared by all of the many studies that use this type of instrument, as using them is the most practical way of collecting data from broad samples.

Despite all of this, we believe that our study provides data on an important subject that has been little studied, and it raises new questions that should be considered in subsequent works.

An approach to the subject that features a multi-methodological design that integrates quantitative methodology, (with information collected through the questionnaire used in this study) and a qualitative methodology (using phenomenographic-type methods [interview, observation, discussion groups] and authentic evaluation approaches in order to analyse use of the LtL competence when doing real tasks [portfolios, essays, groups work, and the outcomes resulting from it, etc.]) is a challenge that this team hopes to tackle, while also encouraging others to do likewise.

Notes

[1] Although the term academic achievement is multidimensional and has been interpreted in various ways, it is usually understood as the product of learning, the level of knowledge someone can demonstrate in a given field compared with the norm for the age and the academic level in question (Grasso, 2020). In the literature, the most frequent use is the average grade that each student obtains in a given academic period, which is an operational and functional way of describing the results (Tejedor, 1988) and this is how we define the term in this study.

[2] This is the "La competencia aprender a aprender en la universidad, su diseño y desarrollo curricular. Un modelo de intervención y su aplicación en los grados universitarios" project [The learning to learn competence in the university, its design and curriculum development: a model for intervention and its application in university degrees] (PID2021-123523NB-I00), funded by MCIN/AEI /10.13039/501100011033 and by the European Regional Development Fund (ERDF).

References

Abad, F., Olea, J., Ponsoda, J. V., & García, C. (2011). *Medición en ciencias sociales y de la salud [Measuring in social and health sciences].* Síntesis.

Bandalos, D. L. (2018). *Measurement theory and applications for the social sciences.* The Guilford Press.

Bandura, A. (1986). *Social foundations of thought and action: a social cognitive theory.* Prentice-Hall.

Beltrán, J. (1993). *Procesos, estrategias y técnicas de aprendizaje [Learning procedures, strategies and techniques].* Síntesis.

Benassi, M., Garofalo, S., Ambrosini, V., Sant'Angelo, R. P., Raggini, R., De Paoli, G., Ravani, C., Giovagnoli, V., Orsoni, M., & Piraccini, G. (2020). Using two-step cluster analysis and latent class cluster analysis to classify the cognitive heterogeneity of cross-diagnostic psychiatric inpatients. *Frontiers in Psychology, 11*, 1-11. https://doi.org/10.3389/fpsyg.2020.01085

Boekaerts, M. (1996). Self-regulated learning at the junction of cognition and motivation. *European Psychologist, 1* (2), 100-112. https://doi.org/10.1027/1016-9040.1.2.100

Boekaerts, M. (2006). Self-regulation and effort investment. In E. Sigel, & K. A. Renninger (Eds.), *Handbook of child psychology. Volume four: Child psychology in practice* (pp. 345-377). John Wiley & Sons.

Boekaerts, M., & Niemivirta, M. (2000). Self-regulated learning: Finding a balance between learning goals and ego-protective goals. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 417-451). Academic Press. https://doi.org/10.1016/b978-012109890-2/50042-1

Brandmo, C., Panadero, E., & Hopfenbeck, T. (2020). Bridging classroom assessment and self- regulated learning. *Assessment in Education, 27* (4), 319-331. https://doi.org/10.1080/0969594X.2020.1803589

Caena, F. (2019). *Developing a European framework for the personal, social & learning to learn key competence (LifEComp). Literature review & analysis of frameworks.* Publications Office of the European Union. https://data.europa.eu/doi/10.2760/172528

Caena, F., & Stringher, C. (2020). Towards a new conceptualization of learning to learn. *Aula Abierta, 49* (3), 207-216. https://doi.org/10.17811/rifie.49.3.2020.199-216

Cameron, R. B., & Rideout, C. A. (2020). «It's been a challenge finding new ways to learn»: First-year students' perceptions of adapting to learning in a university environment. *Studies in Higher Education, 42* (11), 668-682. https://doi.org/10.1080/03075079.2020.1783525

Cortina, A. (2013). *¿Para qué sirve realmente la ética? [What is ethics useful for?].* Paidós.

Council Recommendation of 22 May 2018 on key competences for lifelong learning. *Official Journal of the European Union*, C 189/1, of 4 June 2018. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018H0604(01)

Deakin, R. (2007). Learning how to learn: The dynamic assessment of learning power. *The Curriculum Journal, 18* (2), 135-153. https://doi.org/10.1080/09585170701445947

Deakin, R., Haigney, D., Huang, S., Coburn, T., & Goldspink, Ch. (2013). Learning power in the workplace: The effective lifelong learning inventory and its reliability and validity and implications. *The International Journal of Human Resource Management, 24* (11), 2255-2272. https://doi.org/10.1080/09585192.2012.725075

DiStefano, C., Zhu, M., & Mîndrilă, D. (2009). Understanding and using factor scores: Considerations for the applied researcher. *Practical Assessment, Research, and Evaluation, 14* (20). https://doi.org/10.7275/da8t-4g52

Ehlers, U. D., & Kellermann, S. A. (2019). *The future skills report. International Delphi survey on the next skills project.* Baden-Wurttemberg-Cooperative State University.

Ergen, B., & Kanadli, S. (2017). The effect of self-regulated learning strategies on academic achievement: A meta-analysis study. *Eurasian Journal of Educational Research, 17* (69), 55-74. https://ejer.com.tr/the-effect-of-self-regulated-learning-strategies-on-academic-achievement-a-meta-analysis-study/

European Political Strategy Centre. (2017). *10 trends transforming education as we know it. European Union.* https://op.europa.eu/en/publication-detail/-/publication/227c6186-10d0-11ea-8c1f-01aa75ed71a1

Furtado, A., & Machado, A. M. (2016). Learning to learn the nursing consultation: Comprehensive analysis in the perspective of the student. *International Archives of Medicine, 9* (388), 1-9. https://doi.org/10.3823/2259

García-Bellido, R., Jornet, J., & González-Such, J. (2012). Una aproximación conceptual al diseño de instrumentos de evaluación de la competencia aprender a aprender en los profesionales de la educación [A conceptual approach for the design of instruments in education professionals for the evaluation of the competence learning to learn]. *Revista Iberoamericana de Evaluación Educativa, 5* (1), 204-215. https://revistas.uam.es/riee/article/view/4436

Gargallo-López, B., Almerich, G., Suárez-Rodríguez, J. M., & García-Félix, E. (2012). Estrategias de aprendizaje en estudiantes universitarios excelentes y medios. Su evolución a lo largo del primer año de carrera [Learning strategies in excellent and average university students. Their evolution over the first year of the career]. *Relieve, 18* (2). https://doi.org/10.7203/relieve.18.2.2000

Gargallo-López, B., Pérez-Pérez, C., García-García, F. J., Giménez, J. A., & Portillo, N. (2020). La competencia aprender a aprender en la universidad: propuesta de modelo teórico [The skill of learning to learn at university. Proposal for a theoretical model]. *Educación XX1, 23* (1), 19-44. https://doi.org/10.5944/educXX1.23367

Gargallo-López, B., Suárez-Rodríguez, J. M., Pérez-Pérez, C., Almerich, G., & García-García, F. J. (2021). El cuestionario CECAPEU. Un instrumento para evaluar la competencia aprender a aprender en estudiantes universitarios [The QELtLCUS questionnaire. An instrument for evaluating the learning to learn competence in university students]. *Relieve, 27* (1). https://doi.org/10.30827/relieve.v27i1.20760

González-Gascón, E. (2022). Learning to learn at the university. A marketing experience using the TAM. *Technology Science and Society Review, 12* (3), 1-10. https://doi.org/10.37467/revtechno.v11.4416

Grace, S., Innes, E., Patton, N., & Stockhausen, L. (2017). Ethical experiential learning in medical, nursing and allied health education: a narrative review. *Nurse Education Today, 51*, 23-33. https://doi.org/10.1016/j.nedt.2016.12.024

Grasso, P. (2020). Rendimiento académico: un recorrido conceptual que aproxima a una definición unificada para el ámbito superior [Academic performance: A conceptual journey that approximates a unified definition for the higher level]. *Revista de Educación, 11* (20), 87-102.

Hadwin, A. F., Järvelä, S., & Miller, M. (2017). Self-regulation, co-regulation and shared regulation in collaborative learning environments. In D. H. Schunk, & J. A. Greene (Eds.), *Handbook of self-regulation of learning and performance* (2nd ed.) (pp. 83-106). Routledge / Taylor & Francis Group.

Hadwin, A. F., & Oshige, M. (2011). Self-regulation, coregulation, and socially shared regulation: Exploring perspectives of social in self-regulated learning theory. *Teachers College Record, 113* (2), 240-264.

Hadwin, A. F., Wozney, L., & Pontin, O. (2005). Scaffolding the appropriation of self-regulatory activity: A socio-cultural analysis of changes in teacher-student discourse about a graduate student portfolio. *Instructional Science, 33* (5-6), 413-450. https://doi.org/10.1007/s11251-005-1274-7

Hautamäki, J., Arinen, P., Niemivirta, M. J., Eronen, S., Hautamäki, A., Kupiainen, S., Lindblom, B., Pakaslahti, L., Rantanen, P., & Scheinin, P. (2002). *Assessing learning-to-learn: a framework*. Opetushallitus.

Hernández, F., Sales, P. J., & Cuesta, J. D. (2010). Impacto de un programa de autorregulación del aprendizaje en estudiantes de grado [A self-regulated learning intervention programme: Impact on university students]. *Revista de Educación, 353*, 571-588.

Higgins, N. L., Rathner, J. A., & Frankland, S. (2021). Development of self-regulated learning: a longitudinal study on academic performance in undergraduate science. *Research in Science & Technological Education*. https://doi.org/10.1080/02635143.2021.1997978

Hofer, B. K., & Yu, S. L. (2009). Teaching self-regulated learning through a «learning to learn» course. *Teaching of Psychology, 30* (1), 30-33. https://doi.org/10.1207/S15328023TOP3001_05

Hoskins, B., & Fredriksson, U. (2008). *Learning to learn: What is it and can it be measured?* European Commission, Joint Research Centre, Institute for the Protection and Security of the Citizen y Centre for Research on Lifelong Learning (CRELL).

Hye-Jung, L., Lee, J., Makara, K. A., Fishman, B. J., & Teasley, S. D. (2017). A cross-cultural comparison of college students' learning strategies for academic achievement between South Korea and the USA. *Studies in Higher Education, 42* (1), 169-183. https://doi.org/10.1080/03075079.2015.1045473

Järvelä, S., & Hadwin, A. F. (2015). Promoting and researching adaptive regulation: New frontiers for CSCL research. *Computers in Human Behavior, 52*, 559-561. https://doi.org/10.1016/j.chb.2015.05.006

Järvelä, S., Järvenoja, H., & Veermans, M. (2008). Understanding dynamics of motivation in socially shared learning. *International Journal of Educational Research, 47* (2), 122-135. https://doi.org/10.1016/j.ijer.2007.11.012

Johnson, D. W., & Johnson, R. T. (2017, September 22-23). *Cooperative learning* [Plenary presentation]. I Congreso Internacional de Innovación Educativa, Zaragoza, España. https://2017.congresoinnovacion.educa.aragon.es/documents/48/David_Johnson.pdf

Jornet, J. J., García-Bellido, R., & González-Such, J. (2012). Evaluar la competencia aprender a aprender: una propuesta metodológica [Assessing the competence learning to learn: a methodological proposal]. *Profesorado. Revista de Currículum y Formación del Profesorado, 16* (1), 103-123. http://hdl.handle.net/10481/23009

Kass, M., & Faden, R. R. (2018). Ethics and learning health care: The essentials roles of engagement, transparency, and accountability. *Learning Health Systems, 2* (4), 1-3. https://doi.org/10.1002/lrh2.10066

Kosnin, A. M. (2007). Self-regulated learning and academic achievement in Malaysian undergraduates. *International Educational Journal, 8* (1), 221-228.

Lloret-Segura, S., Ferreres-Traver, A., Hernández-Baeza, A., & Tomás-Marco, I. (2014). El análisis factorial exploratorio de los ítems: una guía práctica, revisada y actualizada [Exploratory item factor analysis: A practical guide revised and updated]. *Anales de Psicología, 30* (3), 1151-1169. https://doi.org/10.6018/analesps.30.3.199361

Lluch, L., & Portillo, M. C. (2018). La competencia de aprender a aprender en el marco de la educación superior [Learning to learn in higher education]. *Revista Iberoamericana de Educación, 78* (2), 59-76. https://doi.org/10.35362/rie7823183

Lucieer, S. M., Jonker, L., Visscher, C., Rikers, R. M., & Themmen, A. P. (2016). Self-regulated learning and academic performance in medical education. *Medical Teacher, 38* (6), 585-593. https://doi.org/10.3109/0142159X.2015.1073240

Lugo, C. S. J., Hernández, G. R., Escoto, M. del C., & Montijo, E. L. (2016). Relación de los estilos y estrategias de aprendizaje con el rendimiento académico en estudiantes universitarios [Relationship of styles and learning strategies with the academic performance in university students]. *Revista de Estilos de Aprendizaje, 9* (17), 268-288. https://doi.org/10.55777/rea.v9i17.1054

Lynch, D. J. (2006). Motivational factors, learning strategies and resource management as predictors of course grades. *College Students Journal, 40* (2), 423-427.

Malnes, M., Vuksanović, N., & Simola M. (coords.). (2012). *Bologna with student eyes 2012*. European Students' Union ESU. https://esu-online.org/wp-content/uploads/2016/07/BWSE2012-online1.pdf

Martín, E., & Moreno, A. (2007). *Competencia para aprender a aprender [Learning to learn competence]*. Alianza Editorial.

McCaslin, M., & Hickey, D. T. (2001). Self-regulated learning and academic achievement: A Vygotskian view. In B. J. Zimmerman, & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theoretical perspectives* (pp. 227-252). Lawrence Erlbaum Associates.

McDonald, R. P. (1999). *Test theory: A unified treatment*. Psychology Press.

McMillan, J. H., & Schumacher, S. (2010). *Research in education: Evidence-based inquiry* (7th ed.). Pearson.

Meyer, D. K., & Turner, J. C. (2002) Using instructional discourse analysis to study the scaffolding of student self-regulation. *Educational Psychologist, 37* (1), 17-25. https://doi.org/10.1207/S15326985EP3701_3

Moreno, A., & Martín, E. (2014). The Spanish approach to learning to learn. In R. Deakin, C. Stringher, & K. Ren (Eds.), *Learning to learn* (pp. 196-213). Routledge.

Morón-Monge, H., & García-Carmona, A. (2022). Developing prospective primary teachers' learning-to-learn competence through experimental activities. *International Journal of Science Education, 44* (12), 2015-2034. https://doi.org/10.1080/09500693.2022.2108929

Muñoz-San Roque, I., Martín-Alonso, J. F., Prieto-Navarro, L., & Urosa-Sanz, B. (2016). Autopercepción del nivel de desarrollo de la competencia de aprender a aprender en el contexto universitario: propuesta de un instrumento de evaluación [Self-perceived level of development of learning to learn competence in the university context: A proposed measuring instrument]. *Revista de Investigación Educativa, 34* (2), 369-383. https://doi.org/10.6018/rie.34.2.235881

Ning, H. K., & Downing, K. (2015). A latent profile analysis of university students' self-regulated learning strategies. *Studies in Higher Education, 40* (7), 1328-1346. https://doi.org/10.1080/03075079.2014.880832

Norton, L. S., & Crowley, C. M. (1995). Can students be helped to learn? An evaluation of an approach to learning programme for first year degree students. *Higher Education, 29*, 307-328. https://doi.org/10.1007/BF01384496

OECD. (2018). *PISA Global Competence Framework*. OECD. https://www.oecd.org/pisa/Handbook-PISA-2018-Global-Competence.pdf

OECD. (2019). *OECD Future of Education and Skills 2030. Conceptual Learning Framework. Learning Compass 2030*. https://bit.ly/3ksvYDK

Panadero, E. (2017). A review of self-regulated learning: Six models and four directions for research. *Frontiers in Psychology, 8* (422), 1-28. https://doi.org/10.3389/fpsyg.2017.00422

Pérez-González, J. C., Filella, G., Soldevila, A., Faiad, Y., & Sánchez-Ruiz, M. J. (2022). Integrating self-regulated learning and individual differences in the prediction of university academic achievement across a three-year-long degree. *Metacognition and Learning, 17* (3), 1141-1165. https://doi.org/10.1007/s11409-022-09315-w

Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 452–502). Academic Press. https://doi.org/10.1016/B978-012109890-2/50043-3

Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review, 16* (4), 385-407. https://doi.org/10.1007/s10648-004-0006-x

Piovano, S., Roisen, E., Fischer, C., Rodriguez, G., & Victorero, B. (2018). Estrategias de aprendizaje que utilizan los estudiantes de 1.º año de los departamentos de psicología y ciencias pedagógicas, administración y ciencias sociales y sistemas de una universidad privada [Learning strategies used by 1st year students of the departments of psychology and pedagogical sciences, administration and social sciences and systems of a private university]. *RAES: Revista Argentina de Educación Superior, 10* (17), 98-114.

Pirrie, A., & Thoutenhoofd, E. D. (2013). Learning to learn in the European Reference Framework for lifelong learning. *Oxford Review of Education, 39* (5), 609-626. https://doi.org/10.1080/03054985.2013.840280

Ramírez, J. J. (2017). *La competencia «aprender a aprender» en un contexto educativo de ingeniería [«Learn to learn» competence in an engineering educational context]* [Doctoral thesis]. TDX (Tesis Doctorals en Xarxa). http://hdl.handle.net/10803/456383

Ray, M. W., & Garavalia, L. S. (2003, 21-25 de abril). *Gender differences in self-regulated learning, task value, and achievement in developmental college students* [Conference paper]. Annual Meeting of the American Educational Research Association, Chicago, EE. UU.

Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning]. *Official Journal of the European Union*, L 394/10, of 30 December 2006. https://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=O-J:L:2006:394:0010:0018:en:PDF

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of statistical software, 48* (2), 1-36. https://doi.org/10.18637/jss.v048.i02

Ryder, G., Rusell, P, Burton, M. Quinn, P., & Daly, S. (2017). Embedding peer support as a core learning skill in higher education. *Journal of Information Literacy, 11* (1), 184-302. https://arrow.tudublin.ie/ittsupart/10/

Säfström, C. A. (2018). Liveable life, educational theory and the imperative of constant change. *European Educational Research Journal, 17* (5), 621-630. https://doi.org/10.1177/1474904118784480

Sahranavard, S., Niri, M. R., & Salehiniya, H. (2018). The relationship between self-regulation and educational performance in students. *Journal of Education and Health Promotion, 7*, 154. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6332646/pdf/JEHP-7-154.pdf

Sala, A., Punie, Y., Garkov, V., & Cabrera Giraldez, M. (2020). *LifeComp: The European framework for personal, social and learning to learn key competence*. Publications Office of the European Union. https://data.europa.eu/doi/10.2760/302967

Schulz, M., & Stamov, C. (2010). Informal workplace learning: An exploration of age differences in learning competence. *Learning and Instruction, 20* (5), 383-399. https://doi.org/10.1016/j.learninstruc.2009.03.003

Stringher, C. (2014). What is learning to learn? A learning to learn process and output model. In R. Deakin, C. Stringher, & K. Ren (Eds.), *Learning to learn* (pp. 9-32). Routledge.

Tejedor, F. J. (Coord.). (1998). *Los alumnos de la Universidad de Salamanca. Características y rendimiento académico [Students from the Salamanca University. Caracteristics and academic achievement]*. Ediciones Universidad de Salamanca.

Thoutenhoofd, E. D., & Pirrie, A. (2015). From self-regulation to learning to learn: Observations on the construction of self and learning. *British Educational Research Journal, 41* (1), 72-84. https://doi.org/10.1002/berj.3128

Treviños, L. (2016). *Estrategias de aprendizaje y rendimiento académico en estudiantes universitarios de Huancayo [Learning strategies and academic performance in college students from Huancayo]* [Master thesis]. Repositorio de la Universidad Nacional del Centro del Perú. http://hdl.handle.net/20.500.12894/4485

Trilling, B., & Fadel, C. (2009). *21st century skills. Learning for life in our times*. Jossey-Bass.

Viejo, C., & Ortega-Ruiz, R. (2018). Competencias para la investigación: el trabajo de fin de Máster y su potencialidad formativa [Competence for research: The master's thesis and its scientific training potentiality]. *Revista de Innovación y Buenas Prácticas Docentes, 5*, 46-56. http://hdl.handle.net/10396/16951

Villardón-Gallego, L., Yániz, C., Achurra, C., Iraurgi, I., & Aguilar, M. C. (2013). Learning competence in university: Development and structural validation of a scale to measure. *Psicodidáctica, 18* (2), 357-374. https://doi.org/10.1387/RevPsicodidact.6470

Virtanen, P., & Nevgi, A., (2010). Disciplinary and gender differences among higher education students in self-regulated learning strategies. *Educational Psychology, 30* (3), 323-347.

von Glasersfeld, E. (1989). Cognition, construction of knowledge, and teaching. *Synthese, 80* (1), 121-140. https://doi.org/10.1007/BF00869951

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Weinstein, C. E. (1987). *LASSI user's manual for those administering the learning and study strategies inventory*. H&H Publishing Company.

Weinstein, C. E. (1988). Assessment and training of student learning strategies. In R. R. Schmeck (Ed.), *Learning strategies and learning styles* (pp. 291-316). Plenum Press.

Weinstein, C. E., & Acee, T. W. (2018). Study and learning strategies. In R. F. Flippo, & T. W. Bean (Eds.), *Handbook of college reading and study strategy research* (pp. 227-240). Routledge.

Weinstein, C. E., Husman, J., & Dierking, D. (2000). Self-regulation interventions with a focus on learning strategies. In M. Boekaerts, P. R. Pintrich, & M. Zeinder (Eds.), *Handbook of self-regulation* (pp. 727-747). Academic Press. https://doi.org/10.1016/B978-012109890-2/50051-2

Weinstein, C. E., & Mayer, R. E. (1985). The teaching of learning strategies. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (pp. 315-327). MacMillan.

Weinstein, C. E., Zimmerman, S. A., & Palmer, D. R. (1988). Assessing learning strategies: The design and development of the Lassi. In C. E. Weinstein, E. T. Goetz, & P. A. Alexander (Eds.), *Learning and study strategies* (pp. 25-40). Academic Press.

Wibrowski, C. R., Matthews, W. K., & Kitsantas, A. (2017). The role of a skills learning support program on first-generation college students' self-regulation, motivation, and academic achievement: a longitudinal study. *Journal of College Student Retention: Research, Theory and Practice, 19* (3), 317-332. https://doi.org/10.1177/1521025116629152

Yan, Z., Chiu, M. M., & Ko, P. Y. (2020). Effects of self-assessment diaries on academic achievement, self-regulation, and motivation. *Assessment in Education: Principles, Policy and Practice, 27* (5), 562-583. https://doi.org/10.1080/0969594X.2020.1827221

Yániz, C., & Villardón-Gallego, L. (2015). Competencia para aprender [Competence to learn]. In L. Villardón-Gallego (Coord.), *Competencias genéricas en educación superior [Generic competencies in higher education]* (pp. 25-53). Narcea.

Yip, M. C. W. (2019). The linkage among academic performance, learning strategies and self-efficacy of Japanese university students: A mixed-method approach. *Studies in Higher Education, 46* (8), 1565-1577. https://doi.org/10.1080/03075079.2019.1695111

Zhu, J., & Schumacher, D. J. (2016). Learning to learn and teaching to learn. *MedEdPublish, 5*, 63. https://doi.org/10.15694/mep.2016.000063

Zimmerman, B. J. (1989). A social cognitive view of self-regulated academic learning. *Journal of Educational Psychology, 81* (3), 329-339. https://doi.org/10.1037/0022-0663.81.3.329

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13-39). Academic Press. https://doi.org/10.1016/B978-012109890-2/50031-7

Zimmerman, B. J. (2013). From cognitive modeling to self-regulation: A social cognitive career path. *Educational Psychology, 48* (3), 135-147. https://doi.org/10.1080/00461520.2013.794676

Zimmerman, B. J., & Schunk, D. H. (2012). *Self-regulated learning and academic achievement. Theory, research, and practice*. Springer-Verlag.

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