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Content validation of the 'learning to learn' competence in undergraduate studies

Validación de contenido de la competencia "aprender a aprender" en los grados universitarios

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Abstract

This paper aims to validate the content of the 'learning to learn' competence (LTL) in undergraduate studies. LTL is in line with the Student-Centred Learning approach and is at the heart of the European Higher Education Area. Unfortunately, the academic community has not yet reached an agreement about the contents that define LTL, or common standards for assessments. While seeking a solution, we validated the content of one operative model of LTL for undergraduate students. Four types of key informants and a group of experts participated in the study. The findings revealed an agreement on the relevance of contents to define this competence. The tendency results showed that traditional content types (cognition and metacognition) were more closely associated with one another. After content validation, we enhanced the initial model using qualitative data the experts provided. Stability standards, limitations of the model to validate its content, and an emerging ethical factor in the learning process are discussed.

Keywords: learning to learn; model; Higher Education; content validation.

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Resumen

El objetivo de este trabajo fue validar el contenido de la competencia "aprender a aprender" (AaA) en los grados universitarios. AaA va en la línea del paradigma del aprendizaje centrado en el estudiante y está en pleno corazón del Espacio Europeo de Educación Superior. Lamentablemente, la comunidad académica aún no ha llegado a un acuerdo sobre los contenidos que definen AaA y tampoco sobre unos estándares comunes para su evaluación. En busca de una solución a este problema, validamos el contenido de un modelo operativo sobre AaA pensado para estudiantes de grado. Cuatro tipos de informantes clave y un grupo de expertos participaron en el estudio. Los resultados revelaron un acuerdo sobre la relevancia de los contenidos para definir esta competencia. El análisis de tendencias mostró que los contenidos más tradicionales (cognición y metacognición) estaban más estrechamente asociados entre sí que el resto. Tras la validación de contenido, ajustamos el modelo inicial utilizando los datos cualitativos que los expertos proporcionaron. Se discuten los estándares de estabilidad, las limitaciones del modelo para validar su contenido y un factor ético emergente en el proceso de aprendizaje.

Palabras clave: aprender a aprender; modelo; educación superior; validación de contenido.

Introduction

Education quality is a core point in the European Higher Education Area (EHEA). At least since the London Communiqué in 2007, Student-Centred Learning and lifelong learning have become more relevant for such quality. Although traditional research into learning process has focused on the International Standard Classification of Education – ISCED1-2, it has also centred on universities in the second half of the 20th century.

Just before the year 2000, we wondered about learning skills in Higher Education for personal development, beyond disciplinary skill sets (Rawson, 2000). Thereafter, the instruction worldview began to be replaced with the current learning paradigm.

In parallel, Higher Education institutions considered Competency-Based Education (CBE) more firmly (Echols et al., 2018; Gargallo López, 2017), particularly since the last decade. The time-based curriculum became obsolete for outcome needs in prevailing university systems, and the programmes in which students demonstrate their skill and knowledge seemed more suitable (Kelly & Columbus, 2016).

That was the line of the Project OECD DeSeCo for learning key competences and sustainably holding for the labour market. The European Commission (2018) brought to light its proposal about this in 2006 with eight generic competences, which included 'learning to learn' (LTL), which has an impact on all the others. In this sense, our study aimed to validate the LTL contents at the undergraduate level. We presently covered a regional application in Spain to replicate the study later in other regions.

Research problem and context

Incorporating LTL systematically into undergraduate studies requires an operative model to monitor how well students do when learning by themselves. Regrettably, no agreement has been reached about the contents defining LTL, as evidenced from reading

the last textbook on this topic (Deakin Crick et al., 2014). The research problem here involves the need for a model and an agreement being reached about it, otherwise, evaluation is impossible. We obtained the model from a systematic literature review, which has been recently published (Gargallo López et al., 2020), and is briefly reported herein. Consequently, we aimed to find out an agreement through content validation.

The environment of this study is chiefly the EHEA (48 countries). Knowledge-based society and economy were recognised as a goal in March 2000 during the European Council in Lisbon. Short-term change is inherent in these scenarios, and there are studies as to how European education systems may cope with change (Säfström, 2018). In this regard, universities still have much to do since, once graduated, students who know how to learn are called to succeed in fast-changing environments and can revert great progress value into their communities (Garcia-Garcia et al., 2021).

Underemployment in knowledge-based society is an increasingly frequent concern (Monfort et al., 2018; Vegetti & Adăscăliței, 2017)leaving aside real convergence indicators. In this paper, we use cluster analysis to examine the convergence patterns of income inequality, absolute redistribution (a measure of governments' effectiveness in correcting for inequality, and the 2012-2015 Bologna Follow-up Group recommended cooperation between employers and education institutions. That pointed to four key stakeholders: students, teachers, employers, and employees. We considered their viewpoints in this work for the content validation of LTL.

Background

Since 1960-1970, courses were implemented for interpreting data, and categorising and applying principles. Metacognition then grew in relevance. In the 1980s and 1990s, research associated cognition with behaviour, emotions, and motivation. Contributions to metacognition and self-regulation of learning began to be printed (Panadero, 2017).

At the beginning of the 21st century, knowing how to learn predicted the success of the learning strategies to acquire new content in cooperative environments (Johnson & Johnson, 1999). Cooperation meant a step up from the Bandura's (1986) 'social' sense of learning. That made an epistemological difference. In this point, who studied leaning strategies conceived students as isolated learners, while self-regulation studies focused on learning with other people in shared contexts. These learning theories impacted on Higher Education.

At college, "The work of the student is generally understood to be autonomous and sustained by the philosophy of learning to learn" (Martínez & Moreno, 2007, p. 739). In this sense, Student Centred-Learning leads to improve the students' grade because they become responsible and engaged during their learning process (Huéscar Hernández et al., 2020; Marshik et al., 2017). Offering students the opportunities to act autonomously makes them more confident, and it is essential to be successful in the future workplace (Henri et al., 2018). There, adapting to new scenarios entails knowledge management in line with knowing how to learn by oneself. However, we require a theoretical model on LTL to appraise whether students are proficient in this competence.

Theoretical models must be operative to facilitate the design and implementation of assessment tools, teaching, and learning a competence from the CBE perspective.

Some of the instruments available for assessing LTL included too few items, between 9 and 18 (Muñoz San Roque et al., 2016; Villardón-Gallego et al., 2013). The assessment of such a competence with those reduced tools would be deficient, and probably there is a lack of a comprehensive theoretical model.

The Centre for Educational Assessment of the University of Helsinki proposed their model, albeit for evaluations as part of the Project LEARN (Hautamäki et al., 2002). This model provided three main dimensions regarding contextual and personal beliefs and learning competences.

Hoskins & Fredriksson (2008) directed another project in the Centre for Research on Education and Lifelong Learning (CRELL, European Commission). They developed an instrument after content analyses inspired in cognitive and social-cultural paradigms. The instrument comprised cognitive, metacognitive, and affective dimensions thought for pre-university education. Eventually, the team did not meet the expected common European standards, even after testing in several countries (Kupianen et al., 2008).

Project Tuning focused on LTL in Higher Education to fulfil Bologna Process aims. Procedures for teaching, learning, and assessment were set out (González & Wagenaar, 2005). Unfortunately, they did not make valid and reliable tools.

Still the work of Stringher in Deakin Crick et al. (2014) was useful for specifying an operative model about LTL. She reviewed 40 definitions and 90 studies and included four inferential models from the Project Alberta in Canada, Gibbons', the framework for LTL by the University of Helsinki, and the Project ELLI by the University of Bristol. The findings once again stated that LTL is not limited to study skill factors, nor to cognitive and metacognitive variables.

After this last review, there was silence in the academic community for content and theory construction. Recently, the Research Group on University Pedagogy, Teaching, and Learning of the University of Valencia incorporated new components into the LTL competence that previous studies did not include (Gargallo López et al., 2020) (Figure 1). They also considered important review papers like that of Stringher and constructed a model.

We took this model content for the content validation of the LTL competence. At this point, our decision requires clarification to avoid misconceptions. The model we were considering for validation runs from the scientific literature, and not from the European Commission, nor from any other political institution. The model is coherent with the notion of LTL held by the European Commission and assumes its last updates either (European Commission, 2018); i.e., aspects concerning personal development like motivation, self-esteem, emotional well-being, and resilience. It also contains social development items, such as teamwork skills, empathy, and cooperation, and even ethics for learning. The novelty of the model lies in its integration potential. Previous research did not provide more comprehensive and operative models for defining LTL.

Rooted in the literature review, they extracted cognitive, metacognitive, affective, and social/relational dimensions. The first two came mainly from information-processing theories. The third one came from the research published at that same time, but the effect of motivation for learning gained relevance with the advances made in the 1990s. They designed the social/relational factor according to the social-cognitive approach.

The authors added an ethical dimension to include content related to character and moral education, although they did not find this content in the literature review. In any case, they argued that aspects like civic and moral values, deontological codes and responsibility during the learning process are relevant for LTL. These points may be directly associated with all the other four dimensions (Vila Merino, 2017) and complete them.

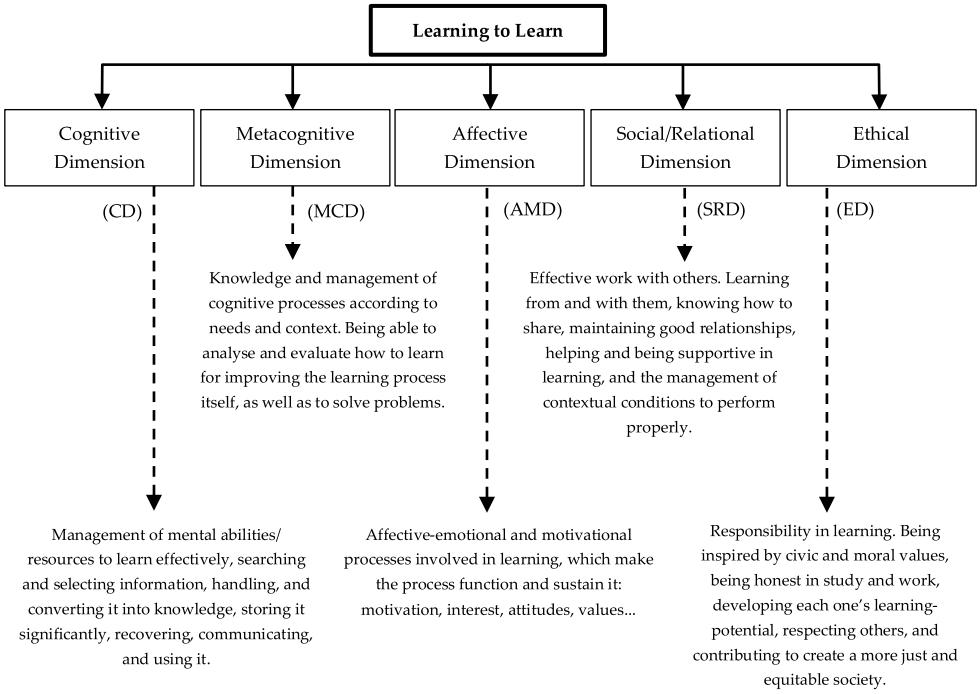


Figure 1. The model for content validation (Gargallo López et al., 2020).

Method

Objective

This paper aimed to validate the content of the LTL competence in undergraduate studies. We also conducted additional analysis regarding gender and affiliation to contribute to a better understanding of LTL in Higher Education.

Participants

We identified four key informants in line with the Bologna Follow-up Groups to fit content validation to the EHEA. We selected 67 participants and divided them into four sections. The selection followed one inclusion criterion for each section:

- Employers were directors in the human resources departments of companies.
- Teachers had more than 20 years experience and were committed to LTL.
- Students had an average mark ≥8.5 out of 10 points in their academic records.
- Employees were postgraduates and were also committed to LTL.

We selected the participants in their working centres. We firstly contacted the reference centres in Valencia for access reasons. They gave us some names until we had enough for typical content validation purposes.

We took advantage of our contact networks at the University of Valencia, the Polytechnic University of Valencia, and the Catholic University of Valencia (Spain) to identify students and teachers. The Health Science employers who participated in the study were the director and vice-director from a university hospital. The Engineering employers were heads in the human resources departments of several companies, consultancies, institutes of technology, and the Valencian Employment and Training Service. In the field of Education, directors of several educational institutions answered. Similarly, the employers came from this type of centres. Despite 10-20 subjects having sufficed (McCoach et al., 2013), the sample surpassed this size to reinforce empirical guarantees.

Each section was composed only of one type of key informant. The following groups were involved: teachers (n=19), students (n=16), employers (n=14), and employees (n=18). Although we appreciate these data, the key informants were only stakeholders in Higher Education and not experts. For this reason, a group of experts (n=6) was consulted to compare their ratings to those of the informants. This expert group produced relevant qualitative data to supplement content validation. The total sample size was n=73.

The experts were chair professors in the Education area of universities from Cordoba, Barcelona, Murcia, Navarre, Santiago de Compostela, and Valencia, and one of them was from Morelos, Mexico. They worked in diverse departments, from educational theory and philosophy to research methods and educational diagnosis. All of them were familiar with content validation and with the LTL competence.

When collecting data, students were doing their bachelor's programmes. All the subjects belonged to the areas of Educational Sciences, Health Sciences or Engineering, and they came from the three Spanish universities (two public and one private). We considered the criterion of parity in the sample. It had .64-fold more females than males due to availability. The selected universities were no more suitable than others, but we had better access to them, which conferred control and security.

This study belongs to a broader research project on LTL in undergraduate studies. In this stage of the project, we are interested in validating the content of the LTL competence to work on solid dimensions later. Previous studies in Higher Education did not complete this task. The Project Tuning provided non-validated procedures for assessments, and other studies did not validate specific LTL contents at this level of education. Therefore, it is still necessary to do this to avoid future systematic mistakes before studying the competence more thoroughly in this context.

We conducted content validation with non-probabilistic and incidental sampling. We believe that voluntary engagement was a guarantee of interest by the informants. We carefully selected the experts by considering their experience in all the contents of the model. The contents of the original model are shown in Table 1.

We will perform a perceptual analysis after content validation and before testing the model's skills with university students. That following study could be handled with experimental design and will provide information about how students think they learn to learn in undergraduate studies. Until then, designing an experiment makes no sense, and could even be counterproductive and unrealistic.

Instrument

The subjects rated the LTL contents provided in the model according to their relevance. They used a survey with a 5-point Likert scale as follows: 1 = Not important; 2 = Somewhat important; 3 = Moderately important; 4 = Important; 5 = Very important.

In the group of experts, open-ended questions were available in the instrument just in case they considered providing qualitative feedback to the theoretical proposal.

Table 1

Contents of the original model (Gargallo López et al., 2020).

Code	Content
CD	Cognitive dimension
CD1	Effective information management
CD2	Oral communication skills
CD3	Written communication skills
CD4	ICT skills
CD5	Critical and creative thinking
MCD	Metacognitive dimension
MCD6	Self-awareness, knowledge of the task, and strategies to deal with the task
MCD7	Planning, organisation, and time management
MCD8	Self-assessment, control, and self-regulation
MCD9	Problem-solving skills
AD	Affective-Motivational dimension
AD10	Positive attitude towards learning and self-improvement
AD11	Internal attributions
AD12	Self-concept, self-esteem, and self-efficacy
AD13	Physical and emotional wellbeing and anxiety management
SRD	Social-Relational dimension
SRD14	Social values
SRD15	Attitudes towards cooperation and solidarity, and interpersonal relationships
SRD16	Teamwork
SRD17	Control of environmental conditions
ED	Ethical dimension
ED18	Attitudes and moral values

Procedure and data analysis

In the study to build the model, they systematically reviewed the literature on the LTL competence. The search included several databases, such as WoS, Scopus, ERIC, PsycInfo, ProQuest, ResearchGate, Academia.edu, Scholar Google, ISOC, Teseo and Dialnet.

Once the theoretical framework of the competence was ready for validation, our team held a meeting. At that time, we decided who would be the key informants and how to group them to assess the theoretical proposal. The experts were also carefully selected.

After contacting centres, we called all the selected participants to a meeting. Only two hospital directors could not attend due to a serious case in emergency services. After excluding these two subjects, the response rate was 100%. Therefore, the authors did not deal with the non-response bias. We performed data collection in the presence of several researchers from our team, which enabled us to collect surveys with no missing data.

We blocked the groups of participants by type of key informant and knowledge area to avoid information flows among them from different backgrounds as much as possible. At least two or three of us were assigned to each block section (Figure 2) to monitor and control the assessment meetings.

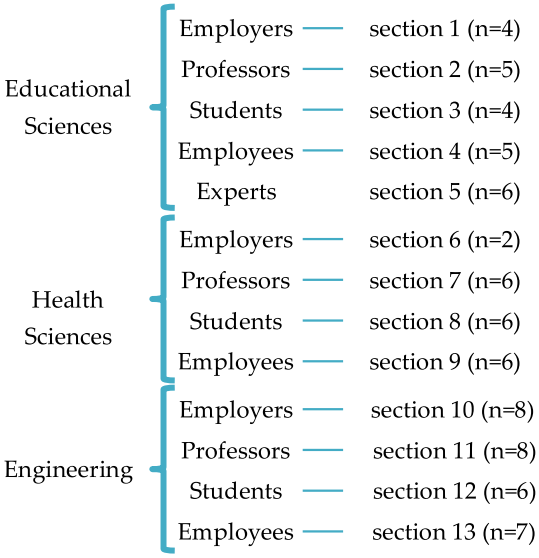


Figure 2. Block sections according to area of knowledge and role.

Altogether 13 sessions were conducted to assess the competence so that the culture of each knowledge area was parcelled out and did not disturb each another. The experts rated individually, although they are shown as one section to fit the data analysis.

Normal distribution was assumed for CD (KS=.807, p=.533), MCD (KS=1.15, p=.142), AD (KS=.716, p=.684), and SRD (KS=1.241, p=.092), but not for ED (KS=.1.97, p=.001). Thus, the descriptive global data consisted of mean scores, except for ED, which consisted of median scores as a robust solution.

We computed Kruskal-Wallis' H-test for cross-subject validation. There were two grouping variables for the H-test: [1] the type of key informant, including experts as a category; [2] and knowledge area. Similarly, we wondered about the differences between subjects depending on their gender and the university they belonged to, while this information was not so relevant for content validation. It was not stated as such in any document that we found. Key informants and knowledge areas were significant for the analysis, and gender and university supplemented the general findings, given the areas are commonly different according to gender and other variables that require some control. In the gender analysis, we computed a Mann-Whitney U. The U values were standardised, including correction for ties.

Content validation was also supplemented with the correlational analysis by obtaining the Spearman coefficient. This provides a better understanding of tendencies in the importance attached to the dimensions of the theoretical model.

We preferred tests based on ranges for content validation instead of other more sensitive ones. All the same, they seemed too robust for this purpose. Therefore, we estimated inter-rater reliability (IRR) by employing an accurate version of the Omega coefficient for ordered scores. That is to say, we assumed a congeneric model by allowing factor loadings to vary in their model. Indeed, we carried out four isolated factor analyses with Varimax rotation for CD, MCD, AD, and SRD. Each was reduced to one factor, except for ED as it had only one component, which was not normally distributed, and the factor analysis was not a possibility.

The numerator of the calculation function for the Omega coefficient was the squared sum of factor loadings, as in the usual version for continuous data. In the denominator, we substituted this sum, plus the errors for the polychoric correlations, multiplied by the constant 2, and all that multiplied by the number of levels on the Likert scale (5 in this study). We computed the coefficient as suggested for ordinal datasets (Gadermann et al., 2012; Viladrich et al., 2017).

We held a meeting to examine in depth the open-ended answers of the experts. We made a synthesis of all their contributions and considered this information to refine the contents of the initial model without changing its general structure.

Results

The model on LTL was highly rated. Results are shown in Figure 3. We ordered components by weights in the figure. ED was the model's most relevant dimension, followed by MCD, SRD, CD, and AD, respectively. All the average scores were above 4 out of 5 points on the Likert scale.

We reported differences between the median and the mean for each model component. These differences allowed us to know where the highest distortions were when assuming means as representative measures for the global descriptive statistics. The highest distortions resulted in CD3, MCD9 and SRD17, all of which had differences below .38 points. ED was remarkable with a difference of .015 points.

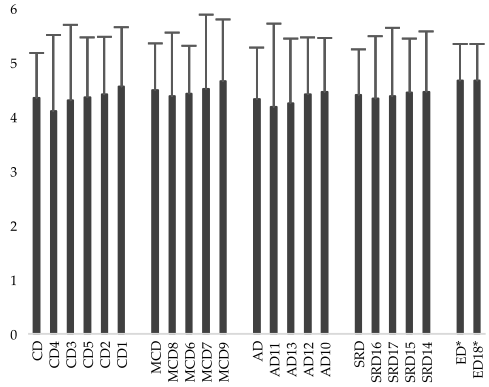
Limit bars were obtained based on standard deviations and were adapted to the normal curve multiplying by 1.96. With a 95% confidence interval (95%CI), scores were at the highest mid of the scale. As no component had a lower average score, we

interpreted that they were all sufficiently relevant for both key informants and experts, and we did not delete any of them from the theoretical model.

Content validation

Factor analyses with all four dimensions were possible. The Kaiser-Meyer-Olkin test returned values above .6, as shown in Table 2. We assumed the rule of thumb to indicate that data fitted. For IRR, the Omega coefficient was rather high and always above .7.

'Oral communication skills' (CD2) had the heaviest load in the CD factor (λ=.820), 'self-evaluation, control, and self-regulation' (MCD8) in the MCD factor (λ=.824), 'self-concept, self-esteem, and self-efficacy' (AD12) in the AD factor (λ=.885), and 'teamwork' (SRD16) in the SRD factor (λ=.830).



	Mean	SD	Mean-Med	Limit**
CD	4.345	.433	.005	.849
CD4	4.104	.800	-.104	1.569
CD3	4.299	.716	.368	1.403
CD5	4.358	.565	.142	1.108
CD2	4.410	.527	.090	1.033
CD1	4.552	.544	-.052	1.067
MCD	4.495	.452	.005	.885
MCD8	4.381	.584	.119	1.146
MCD6	4.429	.456	.071	.894
MCD7	4.515	.680	-.015	1.332
MCD9	4.657	.664	.343	1.302
AD	4.328	.509	.047	.998
AD11	4.182	.893	-.182	1.750
AD13	4.253	.624	.081	1.224
AD12	4.417	.566	.083	1.109
AD10	4.460	.525	.207	1.030
SRD	4.406	.449	.052	.880
SRD16	4.333	.577	.167	1.132
SRD17	4.379	.674	-.379	1.321
SRD15	4.449	.518	.217	1.015
SRD14	4.462	.628	.038	1.231
ED	4.667*	.333*	-.015	.830
ED18	4.667*	.333*	-.015	.830

*Median and IQR

**CI=95%

Figure 3. Componential relevance (see components on https://doi.org/10.5944/educxx1.23367).

Although we obtained all these factors as a latent variable, this was not the research project phase to conduct construct validation. After designing an instrument will come the time to implement a confirmatory factor analysis and assess the validity of one construct on LTL. This we should do with a bigger sample, in a different context and by a two-way analysis. In this stage, we reduced contents into factors (dimensions) to simply test IRR. Moreover, ED is not currently included as a factor because we report content validation.

Before studying the agreement about the components, we found some interesting details when estimating changes in the average scores of each group (Figure 4). Changes were notably more marked in the group of experts. This highlighted the exceptional situation of the experts when rating, and it was not difficult to figure out that they probably used other different criteria to assess the competence under study. The group of experts was considerably smaller, but the changes in the average scores reinforced the reasons for seeking their qualitative regard.

Table 2

Inter-rater reliability (IRR)

	KMO test	**$(\Sigma\lambda)^2$**	**ω**
CD	.685**	12.06	.794
MCD	.721**	9.215	.727
AD	.749**	10.001	.744
SRD	.663**	9.053	.708

**p<.001

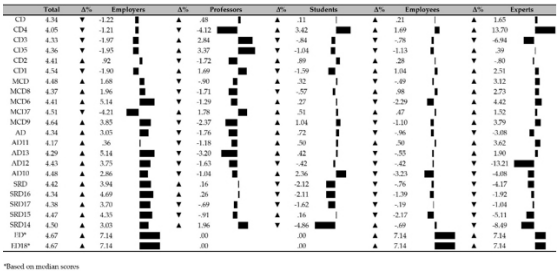


Figure 4. Changes in key informants and experts' scores.

ED also entailed a particular situation. As expected with the median scores, the changes in this dimension were either high or non-existent. However, when computing changes with the mean, we found similarities to other dimensions in all the groups, except for the group of experts. Employers changed by .22 percentage points, professors by 1.02%, students by -1.06%, employees by -.18% and experts by -7.44%. So, there was not much difference between ED and the other dimensions, except, perhaps, for the group of experts.

We found no disagreement in any of the five dimensions between participants and between knowledge areas (Table 3). The differences between areas were found only in four contents: CD1 (x^2=6.76, p=.034), CD5 (x^2=10.85, p=.004), MCD6 (x^2=6.09, p=.047), and SRD15 (x^2=8.385, p=.015). Between subjects, no differences appeared in this respect.

Results considering gender and affiliation

The results were satisfactory to verify an agreement between both key informants and knowledge areas. Nevertheless, when we analysed the data with other grouping variables, we did not find the same, as shown in Table 4.

When we grouped data according to gender, we found significant differences in the way that males and females rated SRD and CD. When we grouped the participants according to their university affiliation, only SRD rated differently. The ratings of all the other dimensions were agreed, and the participants evaluated them equally according to gender and affiliation.

Table 3

Agreement (participants and areas of knowledge)

	Between subjects			**Between areas**		
	x^2	df	p	x^2	df	p
CD	.221	4	.994	2.323	2	.313
MCD	3.613	4	.461	1.738	2	.419
AD	3.277	4	.513	2.389	2	.303
SRD	2.424	4	.658	5.801	2	.055
ED	2.092	4	.719	.302	2	.860

Table 4

Agreement (gender and university affiliation)

	Gender			**University**		
	Mann-Whitney U	Z score	p	x^2	df	p
CD	268.500	-2.593	.010	2.135	2	.344
MCD	329.000	-1.705	.088	.802	2	.670
AD	360.500	-.989	.323	2.479	2	.289
SRD	283.000	-2.175	.030	6.088	2	.048
ED	338.500	-1.428	.153	2.360	2	.307

Detection of tendencies

Logically, CD and MCD correlated more strongly because they both are somewhat cognitive dimensions (Figure 5). AD was also considerably associated with MCD and CD. Here are some instructions to clarify the reading of Figure 5. Dashed lines represent the correlations below .5, and continuous lines denote stronger correlations. Those coefficients inside the star-shaped lines lie exactly in the middle of each line between two dimensions. Therefore, .461** refers to the association between ED and MCD, .575** between CD and AD, and so on.

The view of the experts

Following the qualitative considerations of the group of experts, we partially reformulated the theoretical model on LTL. One of the experts stressed that the use of non-verbal communication and foreign languages influenced CD beyond oral and written skills. Another expert stated that volitional aspects of learning could explain AD in part, and more statements were related to ED. We reformulated all those contents, which are shown in Table 5.

Given these contributions, we added some contents to the initial version of the model as subdimensions. In no case did we delete any aspect of the model. In general, as it was a highly rated model in all its dimensions, we found no justification to eliminate contents once they had been properly validated.

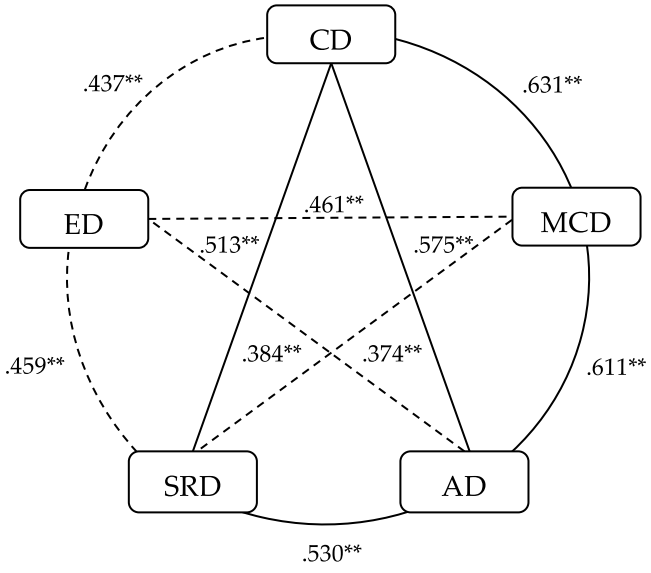


*Figure 5. Rho correlations (**p<.005).*

Discussion and conclusions

The LTL contents of the model were highly rated and validated. We confirmed a reliable agreement. Findings were novel because never had LTL been validated with participants alluding to Bologna Follow-Up Groups, and they are relevant for the European Union objective to face short-term change in knowledge-based society and economy.

The model can be useful for teaching and assessing, just like other previous models about learning (i.e., Savery, 2019; Xue, 2020). However, the connection of technology to education needs to be grounded in theoretical frameworks and methodological principles. Task-based language teaching (TBLT. However, LTL entails a broader construct. Some authors have call it 'meta-competence' or 'meta-learning' by not only regarding metacognition (Caena & Redecker, 2019; Deakin Crick et al., 2014; Garcia-Garcia et al., 2021). Defining one integrative model about LTL was difficult for this reason, and we did not only validate such a model but also found coherence with research history after trend analysis.

After carrying out content validation, the additional analyses run to detect trends were useful for affirming the stability of LTL contents. We observed that the highest correlation was between CD and MCD. Both dimensions were closely related for conceptual causes and were also connected in research history. The first studies about learning and meta-learning from the 1960s to 1990s (constructivism, strategies, self-regulation, etc.) began to connect these dimensions, which have a lot to do with data processing and management. Accordingly, university students should know how to transform datasets into complex and structured knowledge.

The second highest correlation was observed between AD and CD, which leads to a double tendency 'CD-MCD-AD'. It is not surprising because affection and motivation appeared next in research studies as predictors of learning. So, we cannot attribute all successful learning to metacognitive factors, nor to self-awareness during the learning process (Efklides, 2011; Jiang & Kleitman, 2015). Contrary, recent studies underlined metacognitive elements to explain learning (Radovan, 2019), but cognition may depend on the students' beliefs about their self-regulation (Vosniadou et al., 2021)study strategies and academic performance in 366 pre-service teachers. A Beliefs about Learning and Teaching (BALT. In any case, be it as it may, MCD obtained the highest average relevance of these three dimensions, and CD and AD were the lowest rated out of the five.

SRD also correlated fairly with CD, which agrees with the research advances made at the end of the 20th century. Thus, the higher the level of association between the relevance attached to the five dimensions, the more recent research advances were. Briefly, components were more important as they became older in research history.

Understanding the use of learning makes students competent for generating new knowledge and adapting to changes, rather than simply learning available knowledge. If learning makes sense to the learner, learning is conscious (Wall & Hall, 2016), and if it is conscious, we can assume that students are willing to learn what they are learning (Caena & Stringher, 2020)antes y después de la Recomendación del 2006 sobre Competencias clave. Sin embargo, aprender a aprender está etiquetado por algunos como concepto no científico, que requiere una definición acordada (Coffield, 2002.

The experts in our study emphasised a similar conclusion when proposing volitional control for the model.

ED was the most difficult dimension to analyse yet, at the same time, received the highest rates. Gargallo López et al. (2020) incorporated this dimension into the model, although they found no previous contributions with sufficient empirical validity. We excluded ED from the IRR analyses because the model included only one component in relation to it. Consequently, future studies may delve into this dimension to extract different theoretical components, and to analyse the reliability of the importance attached to this whole dimension. This means that future studies should retest ED before trusting its relevance.

Table 5

Summary template with the enhanced theoretical model

List of dimensions and contents
✓ Cognitive Dimension
Effective information management.
Oral communication skills.
Written communication skills.
Non-verbal communication skills.
Multilingual management.
ICT management.
Critical and creative thinking.
✓ Metacognitive Dimension
Knowledge of oneself, of the task and tackling.
Planning, organising, and managing time.
Self-assessment, control, and self-regulation.
Problem solving.
✓ Affective Dimension
Positive attitudes towards learning and improvement.
Internal attributions.
Self-concept, self-esteem, and self-efficacy.
Physical and emotional well-being.
Emotional self-regulation and anxiety control.
✓ Social/Relational Dimension
Social values.
Positive attitudes towards cooperation and solidarity.
Teamwork.
Controlling environmental conditions.
✓ Ethical Dimension
Responsibility in learning.
Ethical and civic values and attitudes.
Respect for ethical and deontological codes.

According to the exploratory findings, ED was the only dimension of the model whose relevance scores did not highly correlate with the scores of the other dimensions (rho=.461, or below).

Ethics are commonly associated with the end of education. However, CBE consists of applying processes to achieve a certain objective. The model considered ethics as a part of the learning process, and not as an objective itself. This idea is probably not developed much in the literature and is even less developed in the mentality of the people that Bologna Follow-Up Groups involve as stakeholders in Higher Education. This would explain the confusion in ED assessments due to the lack of awareness about the existence of ethical contents that affect undergraduate students' learning process.

We found a limitation in the feasibility of the ED analysis. Apart from that, we only conducted four isolated factor analyses to test IRR. Future studies could advance with a confirmatory factor analysis of the whole theoretical model. Now the relevance of the model contents and dimensions has been validated with key informants and experts and taking the step towards construct validation is possible.

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