



Habilidades para el futuro laboral. Un modelo basado en pensamiento crítico en estudiantes de Formación Profesional y Bachillerato

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RESUMEN

La Industria 4.0 ha transformado significativamente la sociedad y el mercado laboral, resaltando la importancia de habilidades como el pensamiento crítico para el éxito profesional y el desarrollo personal. Esta habilidad es crucial en áreas personales, sociales y profesionales. Esta investigación profundiza en el potencial predictivo de las disposiciones hacia el pensamiento crítico en relación con las habilidades consideradas necesarias para los escenarios laborales futuros, considerando una cohorte de estudiantes ($n=2948$) matriculados en Formación Profesional o Bachillerato en Andalucía, España. Se utilizó el modelado de ecuaciones estructurales (SEM) para el análisis de datos, mediante el paquete lavaan 0.6-9 en la versión 4.1.1 de R. Los resultados revelan que el pensamiento crítico influye o posee capacidad predictiva sobre variables asociadas con habilidades laborales, como las de tipo cognitivo y de adaptabilidad, así como las de colaboración e integración. Esta evidencia respalda la imperativa integración de actividades de pensamiento crítico en planes de estudio de Formación Profesional y Bachillerato. Al fomentar estas habilidades, se promoverá que los egresados sean adaptables y competentes ante la evolución del mercado laboral por su capacidad para pensar críticamente y resolver problemas complejos.

Palabras clave: Bachillerato, Formación Profesional, Habilidades futuro laboral, Pensamiento crítico

Skills for a working future. A model based on critical thinking in Vocational Training and Baccalaureate students

ABSTRACT

Industry 4.0 has significantly transformed society and the labour market, highlighting the importance of skills such as critical thinking for professional success and personal development. This skill is crucial in personal, social, and professional areas. This research delves into the predictive potential of dispositions toward critical thinking in relation to the skills considered necessary for future labour scenarios, considering a cohort of students ($n=2948$) enrolled in Vocational Training or Baccalaureate in Andalusia, Spain. Structural equation modeling (SEM) was used for data analysis, using the lavaan 0.6-9 package in version 4.1.1 of R. The results reveal that critical thinking influences or has predictive capacity over variables associated with labour skills, such as cognitive and adaptability types, as well as collaboration and integration. This evidence supports the imperative integration of critical thinking activities into Vocational Training and Baccalaureate curricula. By fostering these skills, it will promote graduates to be adaptable and competent in the face of the evolution of the labour market due to their ability to think critically and solve complex problems.

Keywords: Baccalaureate, Critical thinking, Future work skills, Vocational education



1. Introduction

1.1. Essential skills for the future work

The fourth industrial revolution, or Industry 4.0, has ushered in an era dominated by the pervasive integration of information technologies, reshaping our global landscape into one that is increasingly dynamic, complex, and interconnected. This shift has not only redefined the fabric of our economies and societies but also necessitated a profound transformation in the skill sets required by individuals to navigate this new paradigm effectively (Almerich et al., 2018; Castellanos & Escott, 2020; Pérez-García, et al., 2021; Romero-Díaz de la Guardia et al., 2022; Urán-Jiménez & García-Espinoza, 2021).

Amidst these developments, the labour market faces significant upheavals. Certain jobs are predicted to vanish, while others may see unprecedented growth, underscoring the urgent need for individuals to cultivate new competencies tailored to these evolving demands (Benedikt & Osborne, 2013; OECD, 2018; Tamayo & Wisley, 2018; UNESCO, 2021a; World Economic Forum, 2016).

The question of which skills will be paramount in this future landscape is critical. Ageverre et al. (2020) suggest that the most valuable skills will be those that are versatile, fundamental to personal growth, and applicable across multiple disciplines and professions. This encompasses digital literacy, advanced cognitive abilities, executive function, and socioemotional competencies—often collectively referred to as soft skills, which include teamwork, problem-solving, emotional intelligence, professional ethics, and a sense of global citizenship (Deloitte Access Economics, 2017; Doyle, 2022).

Deloitte Access Economics (2017) emphasizes the importance of skills for individual, business, and societal success, noting an increased focus on identifying future-critical skills. Several studies and reports have contributed to this discussion (Davies et al., 2011; Deloitte Access Economics, 2017; Hays, 2020a; Hays, 2020b; LinkedIn, 2020; World Economic Forum, 2016), highlighting a broad skill set. However, the Future Work Skills H2020 report (Davies et al., 2011) notably outlines ten key skills essential for navigating social changes and succeeding in the future workforce, as illustrated in Figure 1.

1.2. Critical thinking as a construct

Critical thinking, identified as a key future skill by Davies et al. (2011), involves higher order thinking essential for sense-making, decision making, and navigating the complexities of a globalized world (Bezanilla et al., 2018; Bezanilla et al., 2021; Chacón-Cuberos et al., 2021; Flores, 2016; Franco & Almeida, 2015). This skill encompasses good judgement, logical reasoning (Facione, 2023), and involves various mental functions to question and modify beliefs and actions (Godoy, 2017). It is characterized by cognitive skills—interpretation, analysis, evaluation, inference, explanation, and self-regulation—and a dispositional dimension, which includes the attitudes necessary for effective critical thinking (Facione, 2023; Sosu, 2013). Critical thinking is thus a comprehensive approach to life, integrating abilities, beliefs, and values, driving actions and social commitment essential for educational, professional, and societal sustainability (Grež Cook, 2018; Bianchi et al., 2022) - see Figure 2.

Critical thinking, a vital 21st-century skill (Daflizar & Alfian, 2023), holds significant value across all domains, particularly within the professional landscape, where it's regarded as a fundamental requirement for employees irrespective of their level of responsibility (Bezanilla et al., 2018). Indeed, various reports and research studies have highlighted it as an essential skill (Aguerrevere et al., 2020; Tamayo & Wisley, 2018; World Economic Forum, 2016).

Among the various alternatives for measuring critical thinking, the scale proposed by Sosu (2013) was selected for this study, as it has been validated in the Spanish context by Olmedo-Moreno et al. (nd). This scale structures critical thinking into two dimensions: Executive Critical Thinking (ECT) and Reflective Critical Thinking (RCT). ECT refers to the ability to manage and generate new ideas, make decisions, and critically question information with a more action-oriented approach. This dimension encompasses a proactive attitude toward innovation and the active pursuit of information that facilitates continuous improvement, as well as a willingness to incorporate new perspectives, even when they challenge previously held beliefs. On the other hand, RCT is more focused on introspection, personal evaluation, and the consideration of various perspectives and the potential consequences of decisions. This dimension emphasizes a deep analysis of one's experiences, the careful consideration of alternative viewpoints, and the deliberate justification of decisions and actions. The focus here is on critical reflection and thorough analysis of both the implications and the validity of information before taking action or forming an opinion.

1.3. Critical thinking in new pedagogical trends

Grež Cook (2018) and Tamayo and Wisley (2018) stress the challenge posed by the information age to global educational systems, necessitating adaptation to manage overwhelming data access. This era highlights the importance of critical thinking for navigating information, influencing pedagogy, policies, and curricula (Sosu, 2013). This focus traces back to Freire's 70s Pedagogy of Liberation and the Critical Thinking movement in North America and Great Britain, responding to students' lack of critical skills. The urgency for developing these skills has significantly increased recently.

Gonzales Llontop and Otero Gonzales (2021) emphasize the necessity of fostering critical thinking across all educational stages and areas, recognizing it as a key intellectual process for conscious reasoning, problem-solving, and decision-making. The OECD's Definition and Selection of Competencies (DeSe-

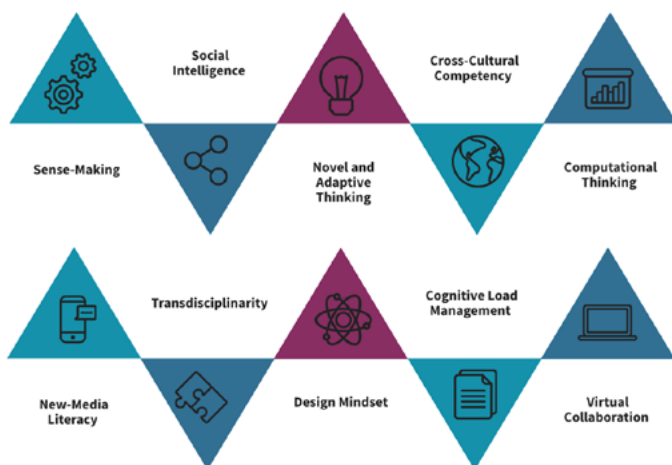


Figure 1. Future work skills. Source Davies et al. (2011)

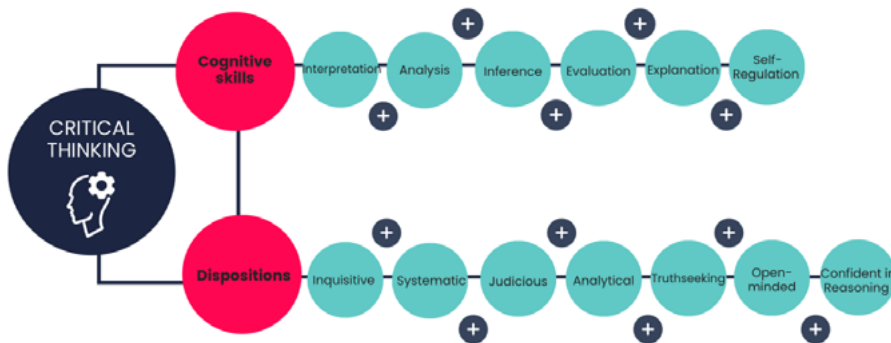


Figure 2. Critical thinking and the dimensions that make it up. Own work.

Co) project (2005) underscores critical thinking as central to key competencies for societal, personal, and economic well-being. This approach is supported by the European Parliament (2006) and the European Union Council (2018), advocating for competency-based education to enhance personal development, citizenship, and employability, reflected in Spanish education law (LOMLOE, 2020). Additionally, higher education acknowledges the critical role of thinking skills in navigating a global, information-rich world, with modern vocational education and training (VET) prioritizing soft skills like creativity, innovation, and entrepreneurship, where critical thinking plays a pivotal role (Ministerio de Educación y Formación Profesional, 2020; Benzanilla et al., 2021; Tapia et al., 2019).

Nonetheless, although critical thinking is considered to be a key element, effective teaching in relation to this skill is challenged by the complexity of the construct itself. In fact, many teachers are not sure about what and how they should teach. Likewise, they are not sure about the way in which critical thinking should be evaluated, leading them to implement teaching processes which do not always bring about its development. A recent study has identified a downward trend in the exercise of critical thinking among students, highlighting the need to design methodological scenarios that promote this crucial skill in students (Gewerc et al., 2023). In order to strengthen this type of thinking, teaching methods must be employed that model the process, promoting data analysis and interpretation skills, the ability to make inferences, provide explanations, and make decisions and solve problems. This reiterates the need to train future teaching staff to employ basic methodological approaches founded on evidence gathered from research conducted in classrooms (Cobo-Huesa et al., 2021; Gonzales Llontop & Otero Gonzales, 2021).

Today's society faces global challenges from digital technologies and other crucial issues like inequality, poverty, and climate change, necessitating a reinvention of education to equip students with skills to transform societies and ensure sustainability (Bolívar, 2021). Education must align with the 2030 Agenda and the UN Sustainable Development Goals (SDG) to help create a more just, peaceful, equitable, and sustainable society (United Nations, 2015). As UNESCO (2021a) states, we need an education that addresses complexity and ensures sustainability, guiding the world towards fairer, sustainable futures (UNESCO, 2021b). Schools should prioritize technology, information analysis, knowledge management, and transformative actions (Ramírez-Montoya et al., 2022). The European Commission's GreenComp framework aims to enrich education by promoting sustainability competencies, including critical thinking, a high-level cognitive process essential for facing complexity and change (Bianchi et al., 2022).

As Chacón-Cuberos et al. (2021) states, skill acquisition should start early to prepare students for a globalised, digital, complex society. Education must train individuals for full and sustainable participation in society (Guitert et al., 2007). This requires a skills-based teaching-learning framework for personal development, social integration, and job insertion (Gómez-Ruiz et al., 2013; González & Wagenaar, 2006; Hernández-Pina et al., 2014; OECD, 2005).

In light of the potential importance of engaging in critical thinking in different spheres such as those pertaining to the personal-social, educational and occupational setting, the present research examined the predictive capacity of variables measuring dispositions towards critical thinking on variables related to future work skills. This analysis was performed in the context of post-compulsory education students (Baccalaureate and VET) in Andalusia (Spain).

1.4. Relationship between critical thinking and skills for the work environment

One significant area of research focuses on the correlation between critical thinking skills and job performance across different professions. Ateş et al. (2023) conducted a study that revealed a positive relationship between critical thinking and job performance among nurses, emphasizing that critical thinking is essential for effective clinical decision-making and overall job competency. Similarly, a study found that critical thinking has a significant impact on clinical decision-making in nursing, indicating that enhanced critical thinking skills can lead to improved job performance in healthcare settings (Lee et al., 2017).

Suarta et al. (2017) highlighted that employers seek candidates who possess critical thinking abilities alongside problem-solving and communication skills. This aligns with findings from Putra et al. (2021), who noted that students with strong critical thinking skills are better equipped for job readiness and entrepreneurship, indicating that these skills provide a competitive edge in the job market.

Furthermore, the incorporation of critical thinking into educational curricula has been demonstrated to effectively equip students to confront complex challenges in the workplace. Kamsinah et al. (2020) emphasized that critical thinking encompasses deep reasoning and the capacity to critically assess information—abilities that are becoming increasingly indispensable in today's rapidly evolving job market. This perspective is reinforced by Nguyen (2024), who contended that fostering critical thinking skills in students is crucial for navigating the multifaceted demands of contemporary employment.

2. Research methods

2.1. Design and sample

The study employed a non-experimental, ex post facto, descriptive and cross-sectional research design. Multi-stage sampling was used for sample selection. Firstly, stratified sampling was employed to select educational centres delivering Baccalaureate education and basic, intermediate and higher-level vocational training. Participating centres were selected from all publicly and privately-run centres in Andalusia (Table 1).

Table 1.

Selection of participating centres

Educational course	Ownership	Selected centres
Vocational training	Public (state)	570
	Private	331
Baccalaureate	Public (state)	599
	Private	197

Source: Own work.

Secondly, within participating centres, further sampling was performed to select volunteers from amongst the young people undertaking to each type of educational provision under study in the present research. The overall participating sample from which data was collected corresponded to 2948 students.

Table 2 summarizes the characteristics of the participating sample based on a set of socio-demographic variables (sex, current studies, type of centre, province, current course, average grade of the previous course, work experience, volunteer experience). Of all participants in the present research, 53.49% were women and 46.51% were men. Average age was 19.55 years ($\sigma = 5.58$) with 60.99% undertaking vocational training and 39.01% enrolled on Baccalaureate studies at public or state-funded (89.62%), mixed-funding (9.43%) or private (0.95%) centres in Andalusia. 67.34% of those surveyed were undertaking the first year of studies and the remaining were on the second year. Almost half of the sample were on course to achieve a good passing grade (47.17%) and only 3.53% were on course to fail. Further, 30.16% stated also holding a job position and 12.98% had engaged in some type of volunteering.

Table 2.

Socio-demographic variables

Variable	Values	N	%
Sex	Male	1371	46.51
	Female	1577	53.49
Current studies	Basic VET	90	3.05
	Intermediate VET	833	28.26
	Higher level VET	875	29.68
	Baccalaureate	1150	39.01
Type of centre	Public (state-funded)	2642	89.62
	Mixed-funding (subsidised)	278	9.43
	Private	28	0.95

Variable	Values	N	%
Province	Granada	1921	65.16
	Malaga	75	2.54
	Almeria	1	0.03
	Seville	129	4.38
	Cordoba	123	4.17
	Huelva	195	6.62
	Jaen	30	1.02
	Cadiz	474	16.08
Current course	First	1979	67.34
	Second	960	32.66
Previous course average grade	Fail	101	3.53
	Low pass	200	6.98
	Average pass	786	27.44
	Good pass	1351	47.17
	Excellent pass	426	14.87
Work experience	Yes	886	30.16
	No	2052	69.84
Volunteering experience	Yes	382	12.98
	No	2562	87.02

Source: Own work.

Four hypotheses have been proposed, reflecting the intention to examine the direct and indirect effects of critical thinking, both as a general construct and in its specific dimensions (reflective and executive), on future work skills, including cognitive, adaptability, collaboration, and integration skills.

H1: The construct of critical thinking (CT) has a direct positive effect on cognitive and adaptability skills (CAS) in the context of future work skills.

H2: The construct of critical thinking (CT) has a direct positive effect on collaboration and integration skills (CIS) in the context of future work skills.

H3: Reflective critical thinking (RCT) has a direct effect on future work skills.

H4: Executive critical thinking (ECT) has a direct effect on future work skills.

2.2. Instruments

In order to collect the necessary data for the present study, the following instruments were employed:

1. Self-registration form. A questionnaire was administered which included a mix of sociodemographic variables. Data on the following was collected: sex, current studies, type of centre, province, current course, average grade of the previous course, work experience, volunteer experience.
2. Critical thinking disposition scale (CTDS) (Sosu, 2013), version adapted to the Spanish context (Olmedo-Moreno et al., nd). This instrument (see Appendix I) enables measurement of critical thinking according to dispositions of the tendency to put it into practice. This scale is comprised by a total of 11 items organised into two dimensions (reflective critical thinking and executive critical thinking) and evaluated along a five-point Likert scale, with options ranging from totally disagree (1)

to totally agree (5). This instrument has demonstrated acceptable internal consistency [Cronbach $\alpha = .745$; McDonald $w = .756$].

3. Future work skills scale (Expósito-López et al., 2019), adapted version validated for use with the population of interest (Chacón-Cuberos et al., 2021). The adapted instrument (see Appendix II) includes a total of 9 items which refer to skills identified by the "The Future Skills 2020 Project" (Davies et al., 2011), grouped into two dimensions - cognitive and adaptability skills on the one hand, and collaboration and integration skills on the other (Chacón-Cuberos et al., 2021). Each skill is presented alongside a detailed description and includes an example scenario in order to ensure that all participants respond from the same perspective. Four response options are provided which represent different levels of achievement: Level 1 (0-10), level 2 (11-13), level 3 (14-17) and level 4 (18-20). This scale has demonstrated acceptable internal consistency ($\alpha = .714$).

2.3. Procedure

Firstly, the managers of selected educational centres were contacted and invited to participate in the present research. They were given information about the study (study purpose, methodology, expected impact and ethical considerations) via an information pack. Secondly, centres that agreed to participate in the research were provided with access to a file containing study instruments in paper (provided by project researchers or sent by post to those centres located further away). Some centres accepted their participation online, therefore they were provided with a digital version (developed with the Limesurvey application).

The entire procedure adhered to the ethical principles for research stipulated by the Declaration of Helsinki in 1975 and later updated in Brazil in 2013. The study received ethical approval from the Ethical Committee of the University of Granada, with the reference number N°1858/CEIH/2020.

2.4. Data analysis

Data analysis was conducted using structural equation modelling (SEM) to elucidate the relationships between the constructs of interest. This approach aimed to assess the degree of association between these constructs or latent variables by examining the observed relationships among the manifest variables used to measure them. Models were proposed in which the scale variables defining critical thinking (CT) were considered as explanatory (exogenous) variables, whilst future work skills (FWS) were considered as outcome variables, in other words, endogenous variables. The aim of this was to calculate the predictive capacity of CT constructs on dimensions pertaining to FWS. Initially, the CT scale was considered as a global construct (one single dimension) and, secondly, the influence of its two latent variables CT (Olmedo-Moreno et al., nd) on the variables pertaining to FWS were considered.

In order to perform this analysis, gathered data was imported into RStudio 2021.09.0+351 software version R 4.1.1. Firstly, in order to develop the database, entries for the examined variables with missing values or outliers were excluded. As preliminary steps, the degree of sampling adequacy was analysed, alongside the normality of data distribution. Subsequently, to specify, identify, calculate and evaluate different models, the lavaan package was used in its version 0.6-9 (Rosseeel, 2012). Fit of the proposed

models was estimated through the chi-squared statistic but, also, given the sensitivity of this statistic to sample size (Schumacker & Lomax, 2010), other fit measures were also used such as the comparative fit index (CFI) and the Tucker-Lewis Index (TLI). Further, absolute fit indices were estimated for all models according to root mean square error (RMSEA) and standardised root mean square residual (SRMR) values.

To obtain estimates of model parameters and a set of indicators of fit of the model to gathered data, the diagonally weighted least squares (DWLS) model was used as this was deemed most appropriate for categorical ordinal data (Xia & Yang, 2019; Savalei & Rhemtulla, 2013; Míndrilă, 2010). The NLMINB method was used as the optimization technique. Once the fit of the model was established and with the intention of achieving a better fit, the modification indices were calculated that allow residual covariances to be detected between the observed variables not explained by the model. Alongside, standardised parameters, estimated parameters, and the significance of regression weights were calculated. These calculations provided a comprehensive understanding of the model, including the strength, direction, and importance of the relationships between the variables, as well as the relative importance of the different paths in the model. They also allowed us to identify the variables that are most important for the model.

3. Results

3.1. Prior assumptions

Firstly, the Mardia test was conducted to examine multi-variate normality of the overall set of variables (pertaining to both FWS and CT). A statistically significant outcome was produced [23.362, $df = 1771$, $p < .001$], indicating that data were not normally distributed. Nonetheless, this test alone does not provide a practical evaluation of normality given that it is highly sensitive to sample size ($n = 2498$). Thus, in line with recommendations made by Stevens (2009), descriptive statistics were calculated for asymmetry and kurtosis for each variable with the aim of examining whether individual variables showed deviations from a normal distribution (see Table 3). As can be observed, examination of kurtosis produced a value of 4.17 in the case of CT6, exceeding the threshold of 3 which can be considered as the limit for deviation from a univariate normal distribution in data collected from large samples (Westfall & Henning, 2013). Based on this, it was decided to exclude this variable from the structural models.

Outcomes from the Bartlett sphericity test revealed that the correlation matrix is not an identity matrix [1399,5; $df = 20$; $p < .001$]. On the other hand, as can be shown in Table 3, measures of sampling adequacy (MSA) were calculated to identify any potential issues with the data, producing values equal to or higher than .8 for all variables. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy for the overall set of variables was equally acceptable [KMO = .88]. These results can be shown in Table 3.

3.2. Predictive capacity of the overall construct of critical thinking on future work skills

To test hypotheses H1 and H2, a model was proposed to examine the existence of causal relationships, considering the CT scale as a predictive exogenous variable conforming to a single dimension (Sosu, 2013). The two dimensions of the FWS scale were considered as the dependent endogenous variables. Name-

Table 3.

Measures of asymmetry and kurtosis for variables describing skills [S1-S10] and critical thinking [CT1-CT11]

	Mean	Asymmetry	Kurtosis	MSA		Mean	Asymmetry	Kurtosis	MSA
S1	2.83	0.04	-1.29	.91	CT1	3.67	-0.56	-0.38	.90
S2	2.27	-0.05	-1.04	.90	CT2	3.91	-0.71	0.03	.86
S3	2.39	-0.33	-1.29	.86	CT3	3.69	-0.59	-0.62	.89
S5	2.54	-0.17	-1.17	.92	CT4	3.54	-0.34	-0.51	.86
S6	3.13	-0.81	-0.31	.91	CT5	3.51	-0.37	-0.60	.83
S7	2.67	-0.41	-1.23	.92	CT6	4.50	-2.04	4.17	.84
S8	3.25	-1.15	0.76	.90	CT7	3.95	-0.89	0.21	.88
S9	3.10	-0.60	-0.63	.92	CT8	4.18	-1.06	0.70	.87
S10	2.84	-0.58	-0.78	.92	CT9	3.92	-0.71	-0.15	.87
					CT10	3.49	-0.39	-0.77	.80
					CT11	3.90	-0.74	0.14	.85

Source: Developed by the authors

ly, the CAS (cognitive and adaptability skills) dimension, which grouped together items S1, S3, S5, S6, S8 and S9, and the CIS (collaboration and integration skills) dimension, which grouped together items S2, S7 and S10 (Chacón-Cuberos et al., 2021). Following inspection of modification indices and in consideration of what is known about the relationships it was sought to examine, a correlation term was added between the S2 and S3 FWS scale variables. Following specification of the model, analysis of model fit produced acceptable indices [CFI = .959; TLI = .953; NFI = .952]. Absolute indices also indicated good model fit [RMSEA = .042; SRMR = .042]. Figure 3 presents a path diagram of the developed model. Error terms have been removed in order to aid visualisation.

with a stronger influence exerted on the dimension of cognitive skills and adaptability CAS [b = 0.311] than the dimension of collaboration and integration skills [b = 0.271]. A correlation was also confirmed to exist between the S2 (social intelligence) and S3 (novel and flexible thinking) variables from the FWS scale [b = 0.251].

Table 4.

Standardised coefficients pertaining to the predictive capacity of CT on the FWS dimensions

			Est	LI	LS	SE	Z	p-value
CT	→	CAS	0.311	0.293	0.328	0.009	35.387	.000
CT	→	CIS	0.271	0.239	0.302	0.016	16.741	.000
CIS	↔	CAS	0.955	0.893	1.018	0.032	29.974	.000
S2	↔	S3	0.251	0.195	0.306	0.028	8.873	.000

Source: Own work.

3.3. Effect of the CT construct on the latent variables pertaining to FWS. Multi-group approach

Analysis following a multi-group approach was proposed with the aim of detecting potential differences in the relationships between constructs between students undertaking vocational training (n = 1798) and Baccalaureate studies (n = 1150). This model produced better fit according to calculated statistics [CFI = .961; TLI = .955; NFI = .946; RMSEA = .041; SRMR = .043]. As can be seen in Table 5, differences can be seen, to a certain extent, between the standardised regression weights estimated for the two groups. With regards to the predictive capacity of CT on cognitive skills and adaptability, a stronger influence can be seen within the group undertaking vocational training. In the case of the predictive capacity of collaborative and integration skills, only a minor difference is seen between groups. These differences may be explained in light of the stronger orientation of students undertaking vocational training towards their immediate working future.

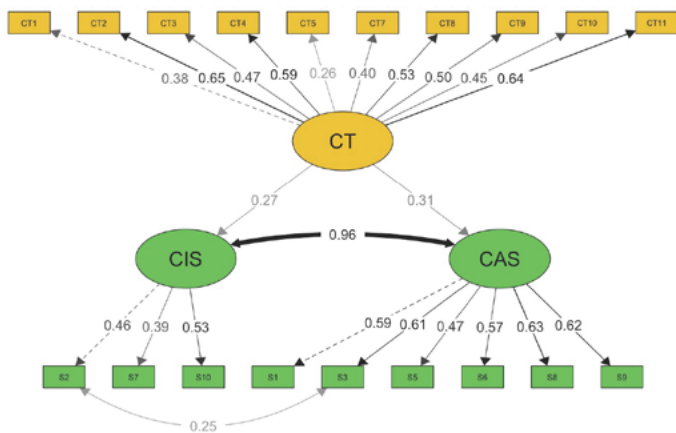


Figure 3. Path diagram of the predictive capacity of CT on dimensions pertaining to FWS. Own work.

Table 4 presents estimated standardised coefficients alongside 95% confidence intervals. From these results, it can be observed that the regressions produced in the model (CT → CIS and CT → CAS) are statistically significant [p < .001]. Thus, it can be concluded that the construct of critical thinking has a predictive capacity or influence over the two dimensions of the FWS scale. In both cases, a moderate predictive capacity is seen,

Table 5.

Standardised coefficients pertaining to the predictive capacity of CT on FWS dimensions. Multi-group approach

	Stage	Est	LL	UL	SE	Z	p-value
CT → CAS	VET	0.350	0.329	0.371	0.011	32.824	.000
	Bacc	0.254	0.224	0.285	0.016	16.400	.000
CT → CIS	VET	0.286	0.248	0.324	0.019	14.733	.000
	Bacc	0.251	0.194	0.308	0.029	8.637	.000
CIS ↔ CAS	VET	0.973	0.897	1.048	0.039	25.146	.000
	Bacc	0.921	0.818	1.023	0.052	17.626	.000

Source: Own work

3.4. Predictive capacity of the latent variables of CT on the latent variables of FWS

In order to test H3 and H4 hypotheses and determine the more specific predictive capacity exerted by the variables comprising the CT scale, a second phase of analysis was performed in which the two latent variables or dimensions making up the CT scale were considered as the exogenous variables or predictors. This analysis was conducted in line with the validation performed in a similar context by Olmedo-Moreno et al. (nd). On the one hand, the observable variables CT1, CT7, CT8, CT9, CT10 and CT11, which encapsulate RCT (reflective critical thinking) were considered and, on the other hand, ECT (executive critical thinking) was considered, which groups together the observable variables CT2, CT3, CT4 and CT5. The model was improved by removing the variable CT6 in consideration of kurtosis and by adding an interaction term between the variables S2 and S3, following perusal of the modification indices produced. The estimated model presented highly acceptable fit indices (CFI = .968; TLI = .962; NFI = .961; RMSEA = .038; SRMR = .038).

Table 6.

Standardised coefficients pertaining to the predictive capacity of TE dimensions on HFL dimensions.

	Est	LL	UL	SE	Z	p-value
RCT → CAS	0.399	0.316	0.482	0.042	9.409	.000
RCT → CIS	0.281	0.159	0.403	0.062	4.521	.000
ECT → CAS	-0.060	-0.141	0.022	0.042	-1.428	.153
ECT → CIS	0.011	-0.105	0.128	0.060	0.191	.849

Source: Own work.

Given the outcomes presented in Table 6, it can be observed that the proposed relationships were not statistically significant. Specifically, regressions estimating the predictive capacity of the executive critical thinking dimension on the FWS dimensions were not significant, suggesting that no influence existed. Nonetheless, the regressions established between the “reflective critical thinking” dimension and FWS did prove to be statistically significant, supporting the existence of a positive predictive capacity of this dimension on both dimensions of the FWS scale. Further, the strongest relationship emerged with regards to the cognitive skills and adaptability dimension (b = 0.399). Figure 4 presents the path diagram of this structural model.

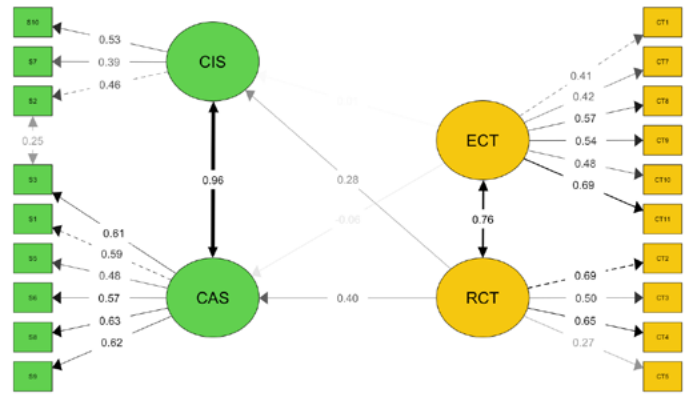


Figure 4. Path diagram of the predictive capacity of CT dimensions on FWS dimensions. Own work.

3.5. Predictive capacity of CT dimensions on FWS dimensions. Multi-group approach

Finally, a structural model was proposed to analyse the influence or predictive capacity of the dimensions of critical thinking on the dimensions pertaining to future work skills. A multi-group approach was used with the aim of uncovering potential differences in outcomes as a function of whether respondents were undertaking vocational training (n = 1798) or Baccalaureate studies (n = 1150). Fit statistics again demonstrated that the model was well suited to the collected data (CFI = .970; TLI = .964; NFI = .955; RMSEA = .037; SRMR = .039).

Table 7.

Standardised coefficients pertaining to the predictive capacity of CT dimensions on FWS dimensions. Multi-group approach

	Stage	Est	LL	UL	SE	Z	p-value
RCT → CAS	VET	0.413	0.304	0.521	0.055	7.444	.000
	Bacc	0.405	0.271	0.539	0.068	5.937	.000
RCT → CIS	VET	0.260	0.105	0.415	0.079	3.294	.001
	Bacc	0.324	0.124	0.524	0.102	3.181	.001
ECT → CAS	VET	-0.034	-0.141	0.074	0.055	-0.616	.538
	Bacc	-0.122	-0.254	0.010	0.067	-1.813	.070
ECT → CIS	VET	0.046	-0.102	0.195	0.076	0.609	.542
	Bacc	-0.048	-0.239	0.143	0.098	-0.494	.621

Source: Own work.

In the same way as seen following analysis of the predictive capacity of the overall construct, it can be observed in Table 7 that, for all groups, no statistically significant regression coefficients were produced with regards to the predictive capacity of the executive critical thinking dimension on future work skills. On the other hand, the reflective critical thinking dimensions was shown to have an influence on both dimensions of future work skills. Nonetheless, taking this analytical approach, no meaningful difference was detected between groups. Only a slight difference emerged in the regression weights pertaining to collaboration and integration skills, with the association being stronger in the group of Baccalaureate students (b = 0.324) than in the group of vocational training students (b = 0.260).

4. Discussion

The primary finding of this study is that when CT is considered as a unified construct, its influence on the dimensions of FWS is both significant and positive. However, when CT is divided into its two dimensions (executive critical thinking and reflective critical thinking) only RCT has been confirmed to have a significant influence on future work skills, specifically on cognitive and adaptability skills and collaboration and integration skills.

This result suggests that while RCT fosters deep reflection, self-evaluation, and a careful consideration of various perspectives, which are crucial for developing key competencies for the workforce, ECT may not have the same direct impact. One possible interpretation is that ECT, being more action-oriented and focused on immediate decision-making and problem-solving, may not directly engage with the deeper reflective processes that are required for the development of long-term work skills, which are more reliant on adaptability, collaboration, and critical evaluation.

In the educational field, these findings are particularly significant, as they highlight the importance of fostering reflective critical thinking in students, as it promotes the deep cognitive processes needed to navigate complex work environments. The ability to critically evaluate experiences, learn from them, and consider diverse perspectives is essential for preparing students for the evolving challenges of the modern job market. Therefore, educational curricula should emphasize the development of reflective critical thinking skills to better equip students with the competencies required for future employment.

Critical thinking is commonly described as a higher-order, intentional cognitive process (Lipman, 1997), where different mental functions enable individuals to reflect on, question, and make decisions about their thoughts, beliefs, and actions (Godoy, 2017). Critical thinking is an important construct which, given its influence on students' future work skills, should be worked on within the educational context. In support of this, outcomes obtained in the present study highlight the predictive capacity of a set of variables regarding critical thinking on variables related with future work skills. In an inter-connected society, subject to the constant flux of information and continuous change, the acquisition of transversal, generic and transferrable skills (Aguerrevere et al., 2020), such as critical thinking, is key to successful engagement in both the social and occupational spheres (Bezanilla et al., 2018; Bezanilla et al., 2021; Flores, 2016; Franco & Almeida, 2015).

Obtained outcomes enable the importance of critical thinking in occupational contexts to be underlines, in accordance with other previously published reports (Aguerrevere et al., 2020; Bezanilla et al., 2018; Tamayo & Wisley, 2018; World Economic Forum, 2016). This situation has turned critical thinking into one of the most demanded skills in the educational ambit (Sosu, 2013). As stated by Gonzales Llontop and Otero Gonzales (2021), the development of critical thinking is essential at all educational stages. Claims supported by its incorporation within educational policies and the curriculum

More specifically, prior examinations of the constructs of critical thinking (Olmedo-Moreno et al., nd) have managed to confirm that "reflective critical thinking" is the dimension to have a direct predictive capacity on future work skills. This dimension groups together measurements of aspects such as reflection on the motives behind a debate, the reasons behind personal decisions, reflection around personal experiences, checking information accuracy, reflection on the consequences

of decisions and reflection on personal actions. This group of variables exerts a greater predictive capacity on cognitive skills and adaptability. This analysed aspects such as the ability to evaluate and contribute ideas, innovative and flexible thinking, computational thinking, the capacity to evaluate and develop content for different channels of communication, creative management, and knowledge management. Thus, the importance of the reflective aspects of critical thinking were highlighted. This is in accordance with contributions made by Godoy (2017) in terms of intentionality and its influence on certain skills considered to be key for professional practice in current occupational contexts (Chacón-Cuberos et al., 2021; Davies et al., 2011).

In another sense, multi-group analysis revealed the CT construct to have a greater predictive capacity on FWS within VET students. This greater influence may be explained by the specific focus of VET towards the professional setting and the fact that students undertaking such training are facing more immediate insertion in the working world. As stated by Jalil Naji (2018), vocational training should create the conditions and measures needed to prepare students and facilitate their short-term insertion in the job market. This suggestion takes on even more meaning in light of the new dual VET model. This model confers greater responsibility onto study centres over student training and, according to recent studies, improves their chances for occupational insertion relative to a traditional model (Bentolila & Jansen, 2019). Various attempts at educational reform carried out in Spain have sought to adjust the vocational training model to meet the needs of the productive system (Brunet & Böcker Zavarro, 2017). One such attempt is particularly evident in the First Strategic Plan for Vocational Training within the Educational System (Ministerio de Educación y Formación Profesional [Ministry of Education and Vocational Training], 2019) and the recent Modernisation Plan for Vocational Training (Ministerio de Educación y Formación Profesional [Ministry of Education and Vocational Training], 2020). It also serves to highlight that this difference was not maintained when analysis was conducted based on the latent variable of CT.

Findings of the present research support the inclusion of critical thinking skills as a central aspect to be developed within post-compulsory non-university teaching settings. Similar conclusions have been made in relation to higher education contexts (Benzanilla et al., 2021; Tapia et al., 2019).

5. Conclusion

It is important to approach work on critical thinking skills from early ages but, especially, at educational stages that are more strongly linked to future work contexts such as vocational training, although the Baccalaureate context should not be ignored. Educational bodies must provide recommendations, guidelines and strategies as a way of infusing skills inherent to critical thinking into the development of curricular content and subjects at these stages.

Developing critical thinking should be a general objective to work on in the context of non-university post-compulsory education, having demonstrated in this study its influence or predictive capacity on the skills for the future employment of students in training. This consideration is of special interest in the context of professional training, given the special connection of this educational stage with the labour insertion of students. In this field, thinking critically is a rising value and the generation of adequate environments that encourage reflection and expression of arguments must be promoted.

Although it is a construct with an entity in itself, critical thinking is connected to everyday situations both academically and at work, therefore its treatment from education should be tackled transversally from the different subjects of the curriculum.

Finally, it is important to mention some of the limitations of the present work. For instance, representativeness of the sample in relation to the different provinces should be improved, whilst other parameters not considered here should also be considered in the future. Differences may exist according to gender, the level of vocational training being undertaken, academic year and, even, final year grades. Examination of these parameters may reveal other interesting lines of future research.

Building on the findings of this research, future studies could explore several promising lines of inquiry. For instance, investigating the development of critical thinking across different educational levels and academic subjects in vocational training could provide deeper insights into how these skills evolve and interact with specific content areas. Additionally, longitudinal studies assessing the long-term impact of critical thinking skills on students' transition to the workforce would offer valuable information about its practical relevance. Furthermore, examining the role of gender, academic performance, and specific vocational disciplines could uncover nuanced differences in how critical thinking is fostered and utilized across diverse student populations. These avenues would help refine educational strategies aimed at enhancing critical thinking in various contexts.

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References

- Aguerrevere, G., Amaral, N., Bentata, C., & Rucci, G. (2020). *Políticas Sociales en Respuesta al Coronavirus. Desarrollo de habilidades para el mercado laboral en el contexto de la COVID-19*. Banco Interamericano de Desarrollo.
- Almerich, G., Díaz-García, I., Cebrián-Cifuentes, S., & Suárez-Rodríguez, J. (2018). Estructura dimensional de las competencias del siglo XXI en alumnado universitario de educación. *RELIEVE*, 24(1), art. 5. <http://doi.org/10.7203/relieve.24.1.12548>
- Ateş, N., Erdal, N., & Seren, A. (2023). The relationship between critical thinking and job performance among nurses: a descriptive survey study. *International Journal of Nursing Practice*, 29(5), e13173. <https://doi.org/10.1111/ijn.13173>
- Benedikt, C., & Osborne, M.A. (2013). *The future of employment: How susceptible are jobs to computerisation?* Oxford Martin Programme on Technology and Employment.
- Bentolila, S., & Jansen, M. (2019). La implantación de la FP dual en España: La experiencia de Madrid. *Información Comercial Española, ICE: Revista de Economía*, 910, 65-80. <https://doi.org/10.32796/ice.2019.910.6923>
- Bezanilla, M.J., Galindo-Domínguez, H., & Poblete, M. (2021). Importance of Teaching Critical Thinking in Higher Education and Existing Difficulties According to Teacher's Views. *Multidisciplinary Journal of Educational Research*, 11(1), 20-48. <https://doi.org/10.4471/remie.2021.6159>
- Bezanilla, M.J., Poblete, M., Fernández, D., Arranz, S., & Campo, L. (2018). El Pensamiento Crítico desde la Perspectiva de los Docentes Universitarios. *Estudios Pedagógicos XLIV*, 1, 89-113.
- Bianchi, G., Pisiotis, U., & Cabrera, M. (2022). *GreenComp. El marco europeo de competencias sobre sostenibilidad*. Oficina de Publicaciones de la Unión Europea.
- Bolívar, A. (2021, May). *Competencias clave, sí; pero los grandes retos del siglo XXI, también*. Ideal En Clase. <https://en-clase.ideal.es/2021/05/14/antonio-bolivar-competencias-clave-si-pe-ro-los-grandes-retos-del-siglo-xxi-tambien/>
- Brunet, I., & Böcker Zavaró, R. (2017). El modelo de formación profesional en España. *Revista Internacional de Organizaciones*, 18, 89-108. <https://doi.org/10.17345/rio18.89-108>
- Castellanos, P.A., & Escott, M.P. (2020). Evolución de las Habilidades Laborales en la Industria 4.0 y su Impacto Financiero. *Revista Innova ITFIP*, 6(1), 106-119. <https://doi.org/10.54198/innova06.06>
- Chacón-Cuberos, R., Expósito-López, J., Romero-Díaz de la Guardia, J.J., & Olmedo-Moreno, E. M. (2021). Skills for Future Work (H2030): Multigroup Analysis in Professional and Baccalaureate Training. *Research on Social Work Practice*, 31(7), 758-769. <https://doi.org/10.1177/10497315211002646>
- Cobo-Huesa C., Abril A. M., & Ariza M. R. (2021). Investigación basada en el diseño en la formación inicial de docentes para una enseñanza integrada de la naturaleza de la ciencia y el pensamiento crítico. *Revista Eureka sobre Enseñanza y Divulgación de las Ciencias*, 18(3), 1-17. https://doi.org/10.25267/REV_EUREKA_ENSEN_DIVULG_CIENC.2021.V18.I3.3801
- Daflizar & Alfian (2023). Nurturing students' 21st-century skills in the classroom: Indonesian EFL teachers' perceived practices. *Issues in Educational Research*, 33(3), 897-919. <http://www.iier.org.au/iier33/daflizar.pdf>
- Davies, A., Fidler, D., & Gorbis, M. (2011). *Future Work Skills 2020*. Institute for the Future for the University of Phoenix Research Institute.
- Deloitte Access Economics. (2017). *Soft skills for business success*. DeakinCo.
- Doyle, A. (2022, October). *What are soft skills. Definition and Examples of Soft Skills*. The balance careers. <https://www.thebalancecareers.com/what-are-soft-skills-2060852>
- European Parliament. (2006). *Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning*. European Parliament.
- European Union Council. (2018). *Council Recommendation of 22 May 2018 on key competences for lifelong learning. Official Journal of the European Union C 189/01*. European Union.
- Expósito López, J., Romero-Díaz de la Guardia, J.J., Olmos-Gómez, M. D. C., Chacón-Cuberos, R., & Olmedo-Moreno, E. M. (2019). Enhancing skills for employment in the workplace of the future 2020 using the theory of connectivity: shared and adaptive personal learning environments in a Spanish context. *Sustainability*, 11(15), 4219. <https://doi.org/10.3390/su11154219>
- Facione, P. A. (2023). *Critical Thinking: What It Is and Why It Counts*. Insight Assessment. The California Academic Press. <https://insightassessment.com/iaresource/critical-thinking-what-it-is-and-why-it-counts/>
- Flores, D. (2016). La importancia e impacto de la lectura, redacción y pensamiento crítico en la educación superior. *Zona Próxima*, 24, 128-135. <http://dx.doi.org/10.14482/zp.22.5832>
- Franco, A., & Almeida, L. S. (2015). Critical thinking in college: Differential analysis by academic year and scientific area. In C. Domínguez (Ed.), *Critical thinking in education: actual challenges* (pp. 25-30). Universidade de Trás-os-Montes e Alto Douro.

- Gewerc, A., González-Villa, Á., & Rodríguez-Groba, A. (2023). Estrategias de aprendizaje y motivación del alumnado del Grado en Pedagogía: Entre la espera de recompensas y el escaso pensamiento crítico. *Aula Abierta*, 52(2), 147-156. <https://doi.org/10.17811/rifie.52.2.2023.147-156>
- Godoy, F. (2017). Enseñanza de la historia escolar. un aporte al desarrollo del pensamiento crítico. *Clio & Asociados*, (25), 34-46. <https://doi.org/10.14409/cya.v0i25.6924>
- Gómez-Ruiz, M.A., Rodríguez-Gómez, G., & Ibarra-Sáiz, M.S. (2013). Desarrollo de las competencias básicas de los estudiantes de Educación Superior mediante la e-Evaluación orientada al aprendizaje. *RELIEVE*, 19(1). <https://doi.org/10.7203/relieve.19.1.2457>
- Gonzales Llontop, R., & Otero Gonzales, C. A. (2021). Perspectivas y retos del pensamiento crítico: nivel de desarrollo en estudiantes de pregrado. *Revista Universidad y Sociedad*, 13(5), 124-133.
- González, J., & Wagenaar, R. (2006). *Una introducción a Tuning Educational Structures in Europe. La contribución de las universidades al proceso de Bolonia*. Universidad de Deusto.
- Grez Cook, F. (2018). Veo, pienso y me pregunto. El uso de rutinas de pensamiento para promover el pensamiento crítico en las clases de historia a nivel escolar. *Revista Praxis Pedagógica* 18(22), 65-84. <https://doi.org/10.26620/uniminuto.praxis.18.22.2018.65-84>
- Guitert, M., Romeu, T., & Pérez-Mateo, M. (2007). Competencias TIC y trabajo en equipo en entornos virtuales. *Revista de Universidad y Sociedad del Conocimiento*, 4(1), 1-12. <https://doi.org/10.7238/rusc.v4i1.289>
- Hays (2020a). *Guía del mercado laboral 2020. Un análisis de sectores y salarios en España*. Hays.
- Hays (2020b). *What Workers Want 2020*. Hays.
- Hernández-Pina, F., Monroy, F., & Maquilon, J. (2014). La acción Tutorial y el Fomento del proceso de aprendizaje. In J. Expósito (Coord.), *La acción Tutorial en la Educación Actual* (pp. 211-226). Síntesis.
- Jalil Naji, M. (2018). Industria 4.0, competencia digital y el nuevo Sistema de Formación Profesional para el empleo. *Revista Internacional y Comparada de Relaciones Laborales y Derecho del Empleo*, 6(1), 164-194.
- Kamsinah, D., & Abdullah, A. (2020). Analysis of critical thinking skills in junior high school students. *Journal of Advances in Education and Philosophy*, 4(6), 234-237. <https://doi.org/10.36348/jaep.2020.v04i06.002>
- Lee, D., Abdullah, K., Subramanian, P., Bachmann, R., & Ong, S. (2017). An integrated review of the correlation between critical thinking ability and clinical decision-making in nursing. *Journal of Clinical Nursing*, 26(23-24), 4065-4079. <https://doi.org/10.1111/jocn.13901>
- Ley Orgánica 3/2020, de 29 de diciembre, por la que se modifica la Ley Orgánica 2/2006, de 3 de mayo, de Educación (LOMLOE). (2020). *Boletín Oficial del Estado*, 340, de 30 de diciembre de 2020.
- LinkedIn. (2020). *Informe empleos emergentes*. LinkedIn.
- Lipman, M. (1997). Thinking in community. *Inquiry: Critical thinking across the disciplines*, 16(4), 6-21.
- Míndrilá, D. (2010). Maximum likelihood (ML) and diagonally weighted least squares (DWLS) estimation procedures: A comparison of estimation bias with ordinal and multivariate non-normal data. *International Journal of Digital Society*, 1(1), 60-66. <http://doi.org/10.20533/ijds.2040.2570.2010.0010>
- Ministerio de Educación y Formación Profesional. (2020). *Plan de modernización de la Formación Profesional. Formando profesionales para el futuro*. Ministerio de Educación y Formación Profesional.
- Ministerio de Educación y Formación profesional. (2019). *I Plan Estratégico: Formación Profesional del Sistema Educativo 2019-2022*. Ministerio de Educación y Formación Profesional.
- Nguyen, T. (2024). Teaching critical thinking to english-major students through the pathways coursebooks (2nd edition) at ufls-ud: challenges and solutions. *Proceedings of the Asiaccall International Conference*, 4, 209-219. <https://doi.org/10.54855/paic.23415>
- OECD (2005). *La definición y selección de competencias clave. Resumen ejecutivo*. OECD.
- OECD (2018). *Towards the implementation of the G20 roadmap for digitalization: skills, business dynamics and competition*. OECD.
- Olmedo-Moreno, E. M., Romero-Díaz de la Guardia, J. J., Expósito-López, J., Chacón-Cuberos, R., Parejo-Jiménez, N. (n.d.). Psychometric validation of the critical thinking disposition scale in the educational context of vocational training. In press Pérez-García, L., García-Garnica, M., & Olmedo-Moreno, E.M. (2021). Skills for a Professional Success from the Educational Setting. *Education Sciences*, 11(27), 1-25. <https://doi.org/10.3390/educsci11010027>
- Romero-Díaz de la Guardia, J. J., García-Garnica, M., Chacón-Cuberos, R., & Expósito-López, J. (2022). Psychometric Validation of a Teamwork Skills Scale in a Vocational Training Context. *SAGE Open*, 12(2). <https://doi.org/10.1177/21582440221103256>
- Putra, R., Sutadji, E., & Nurhadi, D. (2021). Work and entrepreneurship readiness through 21st century skills in vocational school students. *Universal Journal of Educational Research*, 9(3), 497-503. <https://doi.org/10.13189/ujer.2021.090309>
- 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>
- Ramírez-Montoya, M. S., McGreal, R. y Obiageli Agbu, J.-F. (2022). Horizontes digitales complejos en el futuro de la educación 4.0: luces desde las recomendaciones de UNESCO. *RIED-Revista Iberoamericana de Educación a Distancia*, 25(2), 9-21. <https://doi.org/10.5944/ried.25.2.33843>
- Savalei, V., & Rhemtulla, M. (2013). The performance of robust test statistics with categorical data. *British Journal of Mathematical and Statistical Psychology*, 66, 201-223. <https://doi.org/10.1111/j.2044-8317.2012.02049.x>
- Stevens, J. P. (2009). *Applied multivariate statistics for the social sciences (5th ed.)*. Routledge Academic.
- Sosu, E. M. (2013). The development and psychometric validation of a Critical Thinking Disposition Scale. *Thinking Skills and Creativity*, 9, 107-119. <https://doi.org/10.1016/j.tsc.2012.09.002>
- Schumacker, R. E., & Lomax, R. G. (2010). *A beginner's guide to structural equation modeling (3rd ed.)*. Routledge Academic.
- Suarta, I. M., Suwintana, I. K., Sudhana, I. F. P., & Hariyanti, N. K. D. (2017). Employability Skills Required by the 21st Century Workplace: A Literature Review of Labor Market Demand. *Proceedings of the International Conference on Technology and Vocational Teachers (ICTVT 2017)*, 337-342. <https://doi.org/10.2991/ictvt-17.2017.58>
- Tamayo, C.A., & Wisley, J. (2018). Las habilidades que requiere el trabajador del futuro. *Rutas de Formación*, 6, 58-63. <https://doi.org/10.24236/24631388.n6.2018.1904>
- Tapia, T., Arias, A., & Westermeyer, M. (2019). Promoviendo el pensamiento crítico en estudiantes de primer año de educación superior. *Revista Iberoamericana de Educación en Ingeniería*, 1, 6. https://www.scipedia.com/public/Tapia_et_al_2019a
- UNESCO (2021a). *Los Futuros de la Educación. Aprender a convertirse*. Comisión Internacional sobre los Futuros de la Educación UNESCO.

- UNESCO (2021b). *Reimaginar juntos nuestros futuros. Un nuevo contrato social para la educación*. UNESCO.
- United Nations. (2015). *Transformar nuestro mundo: la Agenda 2030 para el Desarrollo Sostenible*. United Nations.
- Urán-Jiménez, E., & García-Espinosa, A.D. (2021). *¿Cómo la revolución 4.0 reinventará las organizaciones?* [Bachelor's thesis]. Universidad Católica de Oriente.
- World Economic Forum (2016). *Global Challenge Insight Report. The Future of Jobs. Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution*. World Economic Forum.
- Westfall, P. H., & Henning, K. S. S. (2013). *Texts in statistical science: Understanding advanced statistical methods*. Taylor & Francis.
- Xia, Y., & Yang, Y. (2019). RMSEA, CFI, and TLI in structural equation modeling with ordered categorical data: The story they tell depends on the estimation methods. *Behavior research methods*, 51(1), 409-428. <https://doi.org/10.3758/s13428-018-1055-2>