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Promoting social and blue entrepreneurship and sustainability skills in higher education by transversal competencies

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ABSTRACT

This study examines the presence of “Effective Communication” (EC) and “Teamwork/Cooperative Learning” (TW&CL) competencies in undergraduate university programmes using a blue entrepreneurship approach, within the framework of a social and sustainable economy. As seen in previous studies, these two competencies are highly relevant to promote sustainable and blue entrepreneurship in undergraduate programmes. Eighty-one curricula were collected in nine Spanish public universities in southern Spain. QUAN (qual)→QUAL mixed methodology was used, which included a qualitative analysis and a quantitative comparative analysis form, aiming to build theoretical frameworks through explanatory diagrams to understand how EC and TW&CL are promoted in university programmes. The study found that EC and TW&CL competencies are highly valued and widely incorporated in university curricula. The qualitative analysis revealed the components and interconnections of these competencies, highlighting the importance of effective communication, critical thinking, and interdisciplinary teamwork. The survey shows the complementary nature of EC and TW&CL and suggests their integration in educational contexts. This study therefore contributes to the recognition of these specific competences in university degrees by providing data on their presence, type and relationships, so that educational institutions can better prepare students for future careers.

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1. Introduction

Over the past decade, sustainability has emerged as a new and determinant paradigm in many areas of Higher Education (CRUE, 2011; UNESCO, 2015; United Nations, 2015a). This ‘new paradigm’ offers an alternative approach to address complex, global and long-term problems, such as those caused by humans in ecosystems, which should be analysed from different perspectives such as the social, economic and environmental pillars, known as the triple bottom line (TBL). When the problems to be analysed relate to the promotion of social and more sustainable entrepreneurship, the TBL is often mentioned (Elkington, 2020; Henriques & Richardson, 2004; Honeyman & Jana, 2019). In addition, TBL is also considered in other approaches such as the B Corp movement and other economies (Felber, 2012; Honeyman & Jana, 2022) related to corporate social responsibility and good practice criteria in investor decision-making (Badía et al., 2022). Various social and environmental threats, such as the acceleration of climate change and the transformation of ecosystems, need profound attention, as established in the Paris Agreement, the international treaty on climate change drafted in 2015, COP 21-2015 (United Nations, 2015b) and adopted by 196 countries.

Therefore, the notion of sustainability implies working transversally on key social and environmental issues in the university curriculum (either in general or transversal competencies). It also includes the

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output of essential relevance such as ethical behaviour, the fight against poverty, gender equality, health promotion, human rights, cultural diversity, peace, responsible production and consumption, and equal access to Information and Communication Technologies (ICT). The aforementioned are all intrinsically related to the 2030 Agenda and the Sustainable Development Goals (SDGs) (UNESCO, 2015; United Nations, 2015a). Although entrepreneurship tends to be associated with business, it has recently become a necessity for changes in human behaviour such as the creation of viable (socio)economic structures and practices that are socially beneficial to society, giving rise to social entrepreneurship and civic innovation (Badía et al., 2022; Fowler, 2000). Moreover, the concepts of entrepreneurship and sustainability come together in social entrepreneurship, and in the specific field of blue entrepreneurship (Pauli, 2017; Smith-Godfrey, 2016). The blue economy offers the opportunity to design new ways to approach economic relations in a more equitable and sustainable way (Bennett et al., 2019).

Universities are a breeding grounds for entrepreneurs. They provide training, guidance, and support to students so that they can put their knowledge, skills, and tools to the service of society (Barroso et al., 2022; Kusumojanto et al., 2021; Montes-Martínez & Ramírez-Montoya, 2023; Mukhtar et al., 2021; Salinas & Osorio, 2012). Furthermore, it fosters the idea of the University 'Third Mission' (García-Gutiérrez & Corrales-Gaitero, 2020; García-Peñalvo, 2016; Touriñán, 2020; Vilalta, 2013), which is associated with co-creation for sustainability (Díaz-Sarachaga & Longo-Sarachaga, 2023; Trencher et al., 2014) and the Sustainable Development Goals (Díaz-Sarachaga & Ariza-Montes, 2022; Díaz-Sarachaga & Longo-Sarachaga, 2023; Leal-Filho et al., 2019).

One of the quality indicators proposed by UNESCO is the promotion of entrepreneurial culture in Higher Education (HE) (Tojar-Hurtado & Estrada-Vidal, 2019; UNESCO, 2009) through the commitment of universities to prepare students for the acquisition of knowledge, skills and attitudes needed to respond to the demands of the current labour market (Espíritu et al., 2012; O'Neill & McMahon, 2005). One of the challenges facing HE is that of meeting the needs created by the changes taking place in our society. Thus, it is necessary to train students to face the challenges and adversities arising in the practice of their profession. It is also necessary to train them to cope with intense workplace pressure and demands. Strengthening the sense of social responsibility and collective awareness is called for, as is active participation in democratic issues based on fundamental principles such as equality and social justice (Anderson et al., 2022; Lake et al., 2016; UNESCO, 2015; United Nations, 2015a; Urias et al., 2020). Additionally, sustainable approaches contribute to rebuilding a healthy relationship between society and the environment (Hartman, 2021; Kusumojanto et al., 2021; UNESCO, 2017; United Nations, 2022), as proposed by the eco-social strategy (Albelda-Raga & Sgaramella, 2017; González-Reyes, 2020; González-Reyes & Gómez-Chuliá, 2022; Herrero, 2021; Poza-Vilches et al., 2023).

In this context, the Spanish Ministry for the Ecological Transition and the Demographic Challenge (MITECO, 2023) identified employment opportunities and new professional skills necessary for the ecological transition in Spain, and both EC and TW&CL are recognized as essential competencies to address the climate emergency, preserve biodiversity, and promote an ecological transition. The MITECO report underscores the importance of social communication, mediation skills, and interactive abilities to enhance education across various occupations and contribute to meeting the challenges of the 2030 Agenda and the Sustainable Development Goals (SDGs) (United Nations, 2015a).

Furthermore, it is recognized that governments, HE institutions, and other stakeholders collaboratively shape the HE landscape, having a shared commitment to address major social changes, enhance employment opportunities, and foster active citizenship in democratic societies (EHEA Budapest-Vienna Declaration, 2010; EHEA Paris Declaration, 2018). The assessment of competencies, such as EC and TW&CL, play a fundamental role in raising awareness of blue and sustainable entrepreneurship (CRUE, 2019) and establishing connections between university education and the use of educational methodologies for conflict resolution (Tójar-Hurtado et al., 2018). These efforts further stimulate professional interest in emerging areas of employability and green and blue entrepreneurship, guided by internationally recognized frameworks such as SDGs.

Based on these premises, the main objective of this research is to analyse the presence of 'Effective Communication' (EC) and 'Teamwork/Cooperative Learning' (TW&CL) competencies in university degree programmes from a blue entrepreneurship approach, which refers to social and sustainable entrepreneurship. This is in line with the importance of the promotion of sustainable and blue entrepreneurship

in university education highlighted in previous studies. The objectives include assessing the prevalence of EC and TW&CL competences in university degree programmes, determining their typologies within programmes, exploring variations between different fields of knowledge, creating effective category systems for analysis and investigating the relationships between categories. The ultimate aim is to construct theoretical frameworks, through explanatory diagrams, to understand how EC and TW&CL competences are promoted in university programmes.

The structure of the manuscript includes four additional sections. After reviewing the literature in the field, the third section describes the methodology used in the research. The results and discussions are presented in the next section. Finally, the main conclusions, limitations and future research directions are summarised.

2. Literature review

This second section begins with a review of the international framework literature, particularly the European context, which frames the study. Next, the literature is reviewed to justify the relevance of the competences on which the research focuses: effective communication (EC) and teamwork for cooperative learning (TW&CL). Finally, a literature review is carried out on the concepts of sustainability and social and blue entrepreneurship, which, within the theoretical framework, give meaning to the competences of EC and TW&CL.

2.1. International framework: the European context

The Bologna Declaration (EHEA Bologna Declaration, 1999) introduces a training programme having the main aim of developing a set of skills in the higher education system to carry out specialised professional activities, which are an indisputable part of study plans and curricula. In European curricula, a distinction is made between general and basic competencies, depending on the different branches of knowledge (Observatorio de Emprendimiento Universitario, 2016). Basic and general competencies are common to all degrees included within the same level of the Spanish Qualifications Framework for Higher Education (MECES, 2006) (Royal Decree 1027/2011, of July 15); they are specifically adapted to the different degrees, and in a differentiated manner, to bachelor's and master's degrees.

Therefore, within the context of higher education, contributions to the implementation of competencies/skills such as EC and TW&CL have several objectives, which are also promoted by facilitating internationalisation and academic exchanges, achieved through the homologation of studies between European bachelor's, master's and doctoral degrees (EHEA Bologna Declaration, 1999).

In this regard, specific competencies are the abilities and expertise unique to a given field or degree and intended to provide a unique graduate profile. Generic or transversal competencies refer to skills that, while not strictly required for a particular activity, add value to its execution or performance in any profession or context. These competencies, such as effective communication, teamwork, problem-solving, and independent learning, are versatile abilities that can be applied across different situations, contributing to success in various professional domains (Brundiens & Wiek, 2017; Redman & Wiek, 2021). While specific competencies, like those with measurable and objective criteria, are easier to evaluate and certify, transversal competencies pose a greater challenge for assessment and demonstration due to their reliance on subjective and environmental factors. Acquired through formal and structured training, specific competencies often demonstrate greater longevity and stability.

Furthermore, transversal skills are more flexible and dynamic since they are learned from reflection and experience. Moreover, specific competencies tend to be in great demand and are valued in the labour market since they are customised to the distinct requirements of each industry or profession (Sá & Serpa, 2018). Specialised and transversal competencies are two categories of talents that complement one another and are essential to the student's holistic growth. Therefore, both should be considered when developing a curriculum and teaching approach, carefully assessing their unique qualities and means of evaluation (Cimatti, 2016).

From the perspective of blue entrepreneurship, specific and transversal competencies have differentiated importance. On the one hand, specific competencies play a key role in identifying opportunities

and challenges, and in designing and implementing innovative and sustainable solutions that generate economic, social and environmental value (Lans et al., 2014). An example of a specific competency in blue entrepreneurship is the mastery of the principles of circular economy applied to the maritime field, which would permit the use of waste generated by fishing or aquaculture for the creation of new products or services. On the other hand, transversal skills are essential to blue entrepreneurship. These competencies facilitate adaptation to change and the resolution of complex problems arising in the blue entrepreneurship environment. They also foster effective collaboration with other actors and clear communication of the results and impacts of the projects developed. Transversal competencies in blue entrepreneurship include adaptability, resilience, critical thinking, creativity and communication skills (Rekalde-Rodríguez et al., 2021).

2.2. Relevance of EC and TW&CL competencies

In a recent report, the Ministry for the Ecological Transition and the Demographic Challenge (MITECO, 2023) identified employment opportunities and new professional competencies needed for ecological transition in Spain. Communication, although still more technically and operationally focused rather than strategic, stands out as one of the 40 priority occupations to address the climate emergency and conserve biodiversity. Furthermore, 'social communication and mediation skills' and 'interaction capabilities,' including EC and TW&CL, were identified as strategic cross-cutting content and competencies to improve education across all occupations and contribute to the challenges of the 2030 Agenda.

As for communication education, Álvarez-Nobell et al. (2022) state that the higher education offering in Spain has increased over the past 30 years in distinct geographical locations and degree programmes: 161 bachelor's degrees, 96 double degrees, 114 official master's degrees, and 34 doctorate programmes. However, research on professional competencies in communication management is not yet substantially linked to the field of sustainability (Gregory & Fawkes, 2019; Macnamara, 2018). This is important since communication is a strategic and managerial tool that helps achieve purposes and objectives, especially in companies embracing the triple bottom line perspective (Elkington, 2020; Henriques & Richardson, 2004; Honeyman & Jana, 2022), sustainability, or social/blue economy (Barroso et al., 2022). In addition to strengthening sustainability competencies in communication professionals, the MITECO study (2023) highlights the need to develop communication and teamwork competencies in other academic fields to accelerate the transformation towards a sustainable economy. Research by Barroso et al. (2022) has shown that competencies in EC and TW&CL are cross-cutting and appear in most of the Andalusian university programmes. In short, integrating competencies in communication and teamwork requires an effort to accelerate the transformation of the economy towards sustainability.

2.3. Sustainability, social and blue entrepreneurship

The literature on social and blue entrepreneurship coincides in highlighting three key concepts: (1) the entrepreneur, (2) social enterprise and (3) the blue economy. The first term refers to an individual who innovates on the basis of new creations, acting as an agent of change for society, while improving the existing system by adapting resources. Regarding the second concept, although discrepancies exist in its definition, it refers to both the market characteristics and those of non-governmental organisations, whose objectives are mainly based on social interest, prioritising job creation and maintenance while providing services to local communities. Therefore, profits are reinvested in the company or community itself, rather than going to owners or shareholders (Wronka-Pośpiech, 2016), where decision-making, human capital and social capital at an individual level come into play (Jiao, 2011). All of this implies introducing a high degree of flexibility to simultaneously achieve economic and social objectives (Wronka-Pośpiech, 2016). In the third approach, it cannot be ignored that there are two approaches. One that selfishly relegates sustainability, identified by the European Union as an inseparable element of the blue economy (European Commission, 2017), to second place and emphasises economic activities related to the seas and oceans. The second one identifies the blue economy with a green and circular economy, capable of generating resources and innovatively sustaining itself through nature-based solutions (Pauli, 2017), making the blue economy green (Golden et al., 2017), sustainable and equitable

(Bennett et al., 2019; Spalding, 2016). Moreover, entrepreneurship is where economic, psychological, and sociological theoretical perspectives meet and overlap. Thus, aspects such as the economic behaviour of entrepreneurs, their motivations, attitudes, values or cognitive processes are involved in deciding to choose and develop employment, as well as in self-employment (Sánchez et al., 2017).

3. Material and methodology

On the basis of the above premises, the present research aims to analyse the presence of EC and TW&CL in university degree programmes. As demonstrated in previous studies (Barroso et al., 2022; Tójar-Hurtado et al., 2021), these two competencies are highly relevant for the promotion of sustainable and blue entrepreneurship in undergraduate programmes.

The following specific objectives and corresponding research questions (RQ) are derived from this general objective:

1. To value the presence of EC and TW&CL amongst the university degree competencies.
RQ1: What is the presence of EC and TW&CL competencies in undergraduate programmes?
2. To determine the type of competencies (general/cross-cutting or specific), where the presence of EC and TW&CL is found.
RQ2: Are EC and TW&CL competences presented as general, transversal or specific?
3. To analyse differences in the consideration of EC and TW&CL by branches of knowledge.
RQ3: Are there significant differences in the consideration of EC and TW&CL competences between different branches of knowledge?
4. To construct category systems that enable the analysis of EC and TW&CL competencies based on university curricula and programmes.
RQ4: How can EC and TW&CL competences be effectively categorised and analysed in university curricula and programmes?
5. To analyse the relationships between categories and develop theoretical frameworks, through explanatory diagrams, and to understand how EC and TW&CL are promoted in university curricula and programmes.
RQ5: How do these categories relate to each other and what theoretical frameworks emerge when examining the presence of EC and TW&CL competences in university programmes?

To carry out this research, 81 curricula were collected (during the first quarter of 2023, academic year 2022/2023) from 9 public universities in the south of Spain. They are all public universities that offer degrees in the region of Andalusia, the most populated community in Spain. The universities in this region are all generalist (they offer degrees in all fields of knowledge) and represent the three types of Spanish universities in terms of age (Table 1). Among the universities considered, there are two historic institutions: the University of Seville (US) and the University of Granada (UGR), which are more than five centuries old. There are three universities with more than 40 years of history: the University of Malaga (UMA), the University of Cordoba (UCO) and the University of Cádiz (UCA); and 4 younger institutions, between 25 and 30 years old: the University of Almería (UAL), the University of Huelva (UHU), the University of Jaén (UJA) and the University Pablo de Olavide (UPO). Of the 9 universities considered, 3 have a large number of students (more than 40,000): US, UGR and UMA. The other 5 universities (UCA, UCO, UJA, UAL, UHU and UPO) have an average number of students between 10,000 and 21,000 (Spanish Institute of Statistics/Instituto Andaluz de Estadística y Cartografía, 2023; Spanish Ministry of Universities, 2023).

All branches of knowledge are found in the 81 curricula collected and analysed. In the Spanish university system, all undergraduate degrees are classified into 5 main branches covering all branches of knowledge. These branches are: (1) Arts and Humanities (AH), (2) Social and Legal Sciences (SLS), (3) Sciences (SC), (4) Health Sciences (HS) and (5) Engineering and Architecture (EA) (Spanish Ministry of Universities, 2023).

Table 1. Characteristics of the participating universities and sample.

Participating universities	Year of foundation	Number of undergraduate students academic year 22/23	Sample
Almeria	1,993	11,086	5
Cadiz	1,979	18,564	8
Cordoba	1,972	14,052	6
Granada	1,531	42,990	17
Huelva	1,993	8,502	3
Jaén	1,993	11,494	5
Málaga	1,992	30,513	12
Pablo de Olavide	1,997	10,262	4
Seville	1,505	51,913	21
		199,376	81

Source: Own elaboration.

3.1. Mixed methodology

The research presented here is part of a broader project that examines blue and sustainable entrepreneurship competencies at the university. The project uses a mixed methodology QUAN (qual)→QUAL. The work and results presented here refer to a part of this project. Qualitative and quantitative data revealing the presence of two relevant constructs in higher education have been extracted from this project. All the data was collected through applying a form called 'Record of comparative analysis of Graduate Competencies and Blue Entrepreneurship/Sustainability Competencies' (Tójar-Hurtado & Estrada-Vidal, 2023; Poza-Vilches et al., 2023).

First, a descriptive study (analysis of frequencies and percentages) was performed using the quantitative data collected, including cross-comparisons applying Pearson's χ^2 tests with the frequencies of occurrence of the EC and TW&CL variables, and the branches of knowledge. These tests allow us to check whether there are significant relationships between the competences analysed and the branches of knowledge. All quantitative analyses were carried out using the SPSS v.24 statistical package.

Secondly, qualitative analysis was performed using the literal competencies appearing in the curricula. Initially, information reduction and category construction tasks were carried out through induction and theorisation processes (Proudfoot, 2023). A hierarchical category system (categories and families of categories or macro-categories) was developed to analyse the qualitative information and find relationships and patterns among the competencies. The qualitative analysis, which followed the steps established in other qualitative methodology works (Eugenio-Gozalbo et al., 2020; Miles et al., 2014), culminated in the creation of explanatory diagrams which, acting as theoretical frameworks, facilitated the understanding and explanation of the relationships between categories for each of the competences examined (EC and TW&CL). ATLAS.ti v.8 was used for the qualitative data analysis.

4. Results & discussion

This section provides answers to the research questions (RQs) derived from the specific objectives of the study, combining quantitative and qualitative perspectives to provide a comprehensive understanding of EC and TW&CL competencies in undergraduate programmes. The quantitative findings, presented in Tables 1–6, shed light on the prevalence of these competences in different academic disciplines, while the qualitative findings, presented in Tables 7–10, offer a nuanced exploration of the nature and inter-relationship of EC and TW&CL.

4.1. Quantitative results

This first part presents the quantitative results of the descriptive study (analysis of frequencies and percentages), and cross-comparisons.

4.1.1. Regarding the presence of competencies EC and TW&CL (RQ1 & RQ3)

As seen in Table 2, EC is very well represented in the competencies of the grades. It is included in one or several competencies in almost 26% of the grades and it is represented, as seen in the cumulative percentage, in almost 62% of the grades. The same column shows that competencies related to EC are found in over 80% of the cases. In only 7.4% of the university degrees, no reference of any type is found.

Table 2. EC in the competencies of the grades.

Effective communication (EC)	Frequency	Percentage	Cumulative percentage
Identical in one or more	21	25.9	25.9
Well represented in one or more	29	35.8	61.7
Some relationship in one or more	15	18.5	80.2
Some small reference in one	10	12.3	92.5
No reference	6	7.4	100
	81	100	

Source: Author's own creation.

Table 3. Types of competencies in which EC is found.

Type of competency	Frequency	Percentage	Cumulative percentage
Generic or transversal	44	60.3	60.3
Specifics	10	13.7	74.0
Both types	19	26.0	100
	73	100	

Source: Author's own creation.

Table 4. Types of competencies by branches of knowledge and EC.

Types/Areas		AH	SC	HS	SLS	EA	Total
Generic or transversal	<i>f</i>	9	14	2	11	8	44
	%	69.2	77.8	18.2	61.1	61.5	60.3
Specific	<i>f</i>	1	0	2	5	2	10
	%	7.7	0.0	18.2	27.8	15.4	13.7
Both types	<i>f</i>	3	4	7	2	3	19
	%	23.1	22.2	63.6	11.1	23.1	26.0
	<i>f</i>	13	18	11	18	13	73
	%	100	100	100	100	100	100

Source: Author's own creation.

Table 5. Presence of TW&CL across grades.

TW&CL	Frequency	Percentage	Cumulative percentage
Identical in one or more	33	40.7	40.7
Well represented in one or more	22	27.2	67.9
Some relationship in one or more	11	13.6	81.5
Some small reference in one	9	11.1	92.6
No reference	6	7.4	100
	81	100	

Source: Author's own creation.

Table 6. Types of competencies in which TW&CL are found.

Type of competency	Frequency	Percentage	Cumulative percentage
Generic or transversal	57	77.0	77.0
Specific	1	1.4	78.4
Both types	18	21.6	100
	74	100	

Source: Author's own creation.

EC tends to appear as a generic or transversal competency in most of the examined curricula (60.3%, or 86.3% in all curricula reviewed). Only in 13.7% of the curricula reviewed does EC appear exclusively as a specific competency (Table 3).

When the type of competency is analysed by branch of knowledge, it is observed that the highest percentage of EC is found as a generic or transversal competency, exclusively in the Sciences area (78.8%) followed by the AH area (69.2%). On the other hand, the highest percentage of effective communication is found as a specific competency, exclusively in the SLS area (27.8%), followed by the HS area (18.2%). In the HS area, adding the two categories where specific competencies are found (exclusively and in both types), the percentage rises to 81.8% (Table 4). These differences in percentages are significant when applying Pearson's χ^2 ($\chi^2 = 17.63$, 8 df. and $p = 0.024$). No significant differences were found between the type of competencies and the participating universities (RQ3).

Table 7. Types of competencies by branches of knowledge and TW&CL.

Types/Areas		AH	SC	HS	SLS	EA	Total
Generic or transversal	<i>f</i>	11	16	4	16	10	57
	%	100	84.2	36.4	80.0	76.9	77.0
Specific	<i>f</i>	0	0	0	1	0	1
	%	0	0	0	50	0	1.4
Both types	<i>f</i>	0	3	7	3	3	16
	%	0	15.8	63.6	15.0	23.1	21.6
	<i>f</i>	11	19	11	20	13	74
	%	100	100	100	100	100	100

Source: Author's own creation.

Table 8. Category system of the EC competency.

Code	Categories	Families
ACFL	Ability to communicate in a foreign language	Oral and written communication skills
ACOWMT	Ability to communicate orally and in writing in the mother tongue	Oral and written communication skills
CISNSA	Conveying information, ideas, problems and solutions to a specialised and non-specialised audience	Information management
		Communication to specialised and non-specialised audiences
DCSA	Development of communication skills and abilities	Oral and written communication skills
ELCE	Interpersonal skills such as empathetic listening and clear expression	Interpersonal skills
IRTS	Interpersonal relations and teamwork skills	Interpersonal skills
KACTIS	Knowledge and application of communication theory and Interpersonal skills	Interpersonal skills
UICT	Use of information and communication technologies to enhance learning and selectively discern information	Information management
ICEOADC	Integration and communication with experts from other areas and in different contexts	Communication to specialised and non-specialised audiences
		Communication in different contexts and disciplines

Source: Author's own creation.

Table 9. Families of EC competency categories, codes and definition.

Families	Family codes	Definition of families
Oral and written communication skills	OWCS	Skills in expressing and understanding ideas, concepts and feelings, both orally and in writing, in the mother tongue and in a foreign language are mentioned. The importance of communication in the professional and health fields is also highlighted.
Interpersonal skills	IS	The ability to relate positively to others through empathetic listening and the clear and assertive expression of thoughts and feelings, both verbally and non-verbally. The ability to work in a team and collaborate with others.
Information management	IM	The ability to effectively manage and use information in communication. This includes the ability to integrate and communicate with experts from other areas, as well as the use of information resources and communication technologies.
Communication to specialised and non-specialised audiences	CSNSA	The ability to convey information, ideas, problems and solutions clearly and effectively to both specialist and non-specialist audiences. This involves tailoring the message and using appropriate communication strategies for different audiences.
Communication in different contexts and disciplines	CDCD	The importance of communication in different contexts, such as academic, professional, health, artistic, etc. The ability to communicate in different disciplines and work with students from other areas.

Source: Author's own creation.

If the EC variable is only recoded into two (dichotomous) the first being, no reference or a small reference, and the second being, there is a relationship, it is well represented or identical, it was observed that no significant differences existed with regard to the different branches of knowledge (RQ3).

Table 5 shows that Teamwork and Cooperative Learning (TW&CL) are very well represented in the competencies of the grades. They are as such in one or several competencies in almost 41% of the degrees (more than EC), and they are well represented, as seen in the cumulative percentage, in almost 68% of the degrees. The same column shows that in more than 81% of the cases, there are competencies related to TW&CL. Only 7.4% of the university degrees have no references to TW&CL.

Table 10. Category system of the dual competency TW&CL.

Code	Categories	Families
SSCL	Skills necessary for social and cooperative learning, such as teamwork, arguing one's own thesis, sharing ideas and knowledge, admitting different ideas, managing time and coordinating activities	Ability to share ideas and knowledge Flexibility and openness to different ideas Time management and organisation
MT	Ability to work in multidisciplinary teams in the exercising of future professional work	Ability to work in a multidisciplinary team
CTIS	Knowledge and development of communication theory and Interpersonal skills	Development of social and communication skills
IF	Identification of the factors involved in teamwork and leadership situations	Time management and organisation
CCSC	Capacity for criticism and self-criticism	Capacity for criticism and self-criticism
CI	Ability to convey information, ideas, problems and solutions to specialised and non-specialised audiences	Ability to share ideas and knowledge
RDM	Recognition of and respect for diversity and multiculturalism to promote coexistence without distinctions	Flexibility and openness to different ideas
DLMC	Development of leadership, management and coordination skills in teams, organisations and socio-educational institutions	Time management and organisation
CESOD	Ability to integrate and communicate with experts from other fields and to work with students from other disciplines	Ability to work in a multidisciplinary team
PTAE	Promotion of teamwork, autonomy and ethical commitment	Ability to share ideas and knowledge

Source: Author's own creation.

As for TW&CL, this binomial tends to appear as a generic or transversal competency in most of the examined curricula (77.0 or 98.6% added together in all that appear). Only in one examined curriculum (1.4%) does TW&CL appear exclusively as a specific competency (Table 6).

4.1.2. Regarding types of competencies (RQ2)

When the type of competency is analysed by branch of knowledge, it can be seen that, on the one hand, the highest percentage of TW&CL appears exclusively as generic or transversal competencies in the area of AH (100%), followed by SC (84.2%). On the other hand, the only branch in which TW&CL are found exclusively as specific competencies is the SLS area (5%). In all branches (with the exception of SLS), when adding the two categories where specific competencies are found (exclusively and in both types), the percentage increases to 100% (Table 7). These percentage differences are significant when applying Pearson's χ^2 ($\chi^2 = 18.04$, 8 df. and $p = 0.021$). As for the type of competency and the participating universities, no significant differences were found for TW&CL.

If, as was done above for EC, the TW&CL competency is recorded into only two (dichotomous) values: on the one hand, no reference and a small reference, and on the other hand, there is a relationship, it is well represented or identical, it was observed that, with regard to the different branches of knowledge, once again, there were no significant differences.

4.2. Qualitative results

This section presents the results of the qualitative analyses performed with the ATLAS.ti tool. First, the results for the EC competency are presented, and second, those corresponding to the TW&CL competency binomial. The results of the analyses are shown in tables, which summarise the categories and families of categories or macro-categories, and in explanatory diagrams, which represent the theoretical frameworks from which the functioning of the competencies analysed can be narrated in relation to the categories that have been constructed.

4.2.1. Proposed category systems and theoretical framework for a comprehensive understanding of the components and interrelationships between EC and TW&CL (RQ4/5)

The system of categories reflected in Table 8 was constructed based on the literal expression of the competencies in the EC-related curricula. As seen in this table, 9 categories were created and organised into 5 families. As is often the case with qualitative categories, some of them belong to several families.

Table 9 includes the families constructed from the categories, as well as their corresponding codes and definitions. The families of categories (or macro-categories) reflect the importance of developing communication skills and abilities for EC in different settings and with different audiences.

Based on the data analysed, and once the corresponding category system has been constructed, EC can be defined as the ability to convey information, ideas, problems and solutions clearly and effectively to both specialised and non-specialised audiences. It involves mastering Oral and Written communication skills in the native language, as well as in a foreign language when necessary. It also involves the ability to work in a team and relate positively to others, demonstrating Interpersonal Skills such as empathetic listening and clear and assertive expression. EC also relates to Information Management, the ability to integrate oneself in different contexts and collaborate with others, and the use of Information and Communication Technologies (ICT) in the learning process and when presenting projects.

EC is dynamically related to the families of categories created. With the data, it is possible to construct an explanatory diagram (or comprehensive theoretical framework) from this perspective that helps to understand the functioning of Effective Communication competency in relation to its components. The explanatory diagram is shown in Figure 1.

According to the explanatory diagram shown in Figure 1, EC competency is based on Interpersonal Skills (IS) and Information Management (IM) to relate (whom) to any type of audience (specialised or not) (CSNSA) and collaborate (where) in different contexts (professional, academic, informative...) (CDCD), with different specialists and in any field of knowledge, through (how) oral and written communication in the mother tongue or foreign language (CWCS).

Regarding the binomial competencies of Teamwork and Cooperative Learning (TW&CL), Table 10 below presents the categories and macro-categories created.

Table 11 includes the families constructed from the categories, as well as their corresponding codes and definitions. The category (or macro-category) families reflect that TW&CL involve developing and acquiring skills and capacities to work together and collaboratively with others.

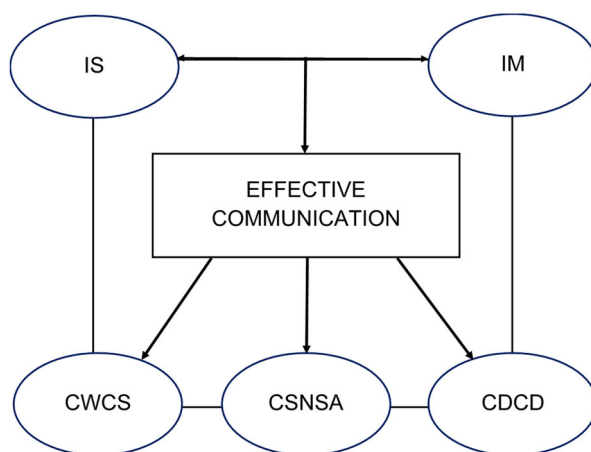


Figure 1. Explanatory diagram of the effective communication (EC) competency.

Table 11. TW&CL competency category families, codes and definition.

Family (Macro-category)	Family codes	Definition of families
Development of social and communication skills	DSCS	The relevance of knowing and developing communication theory and Interpersonal skills to effectively interact in a team.
Ability to work in multidisciplinary teams	AWMT	The relevance of being able to work in an integrated and coordinated way in teams of individuals with different skills and disciplines.
Ability to share ideas and knowledge	ASIK	The relevance of being able to share ideas and knowledge with other team members.
Flexibility and openness to different ideas	FODI	The relevance of being flexible and open to ideas distinct from one's own is emphasised, implying the ability to listen to and consider different perspectives.
Time management and organisation	TMO	The ability to manage time and organise, distribute and coordinate activities within the team.
Capacity for criticism and self-criticism	CCSC	The relevance of having the capacity for constructive criticism and self-criticism to improve teamwork and learning.

Source: Author's own creation.

Based on the data analysed, and once the corresponding system of categories has been constructed, TW&CL refer to the ability to work jointly and collaboratively with others, sharing ideas and knowledge, being flexible, managing time and organising activities. It also implies having communication skills, being critical and self-critical, and working in multidisciplinary teams. These skills are valued in distinct professional fields and contribute to personal and collective development.

The binomial TW&CL is dynamically related to the families of categories created. From this perspective, it is possible to construct an explanatory diagram (or comprehensive theoretical framework) from the data, to promote the understanding of the functioning of the Teamwork and Collaborative Learning competency with regard to its components. The explanatory diagram is shown in Figure 2.

According to the explanatory diagram shown in Figure 2, the binomial competency TW&CL is based on the Development of Social and Communication Skills (DSCS), which in turn integrates other skills, which operate in combination, namely: the Ability to Work in a Multidisciplinary Team (AWMT), the Ability to Share Ideas and Knowledge (ASIK), Flexibility and Openness to Different Ideas (FODI), Time Management and Organisation (TMO) and Critical and Self-Critical skills (CCSC).

In a joint analysis of both competencies (EC and TW&CL), it is observed that they share several categories and macro-categories. Thus, at the level of EC and TW&CL categories (Tables 8 and 10), the EC category Integration and communication with experts from other areas and in different contexts is closely related to the TW&CL category Ability to work in a multidisciplinary team (AWMT) in the exercising of future professional work. The EC Interpersonal skills category would be within the category of TW&CA Knowledge and development of communication theory and Interpersonal skills. Furthermore, the category of EC Knowledge and application of communication theory and Interpersonal skills correlates perfectly with the category of TW&CA Knowledge and development of communication theory and Interpersonal skills.

Between the EC categories and the TW&CL macro-categories (comparing Tables 8 and 10), it is observed that the EC category Development of communication skills and abilities may be within the TW&CL macro-category Development of social and communication skills. It is also observed that the EC category Interpersonal relations and teamwork skills specifically names a part of the TE&CA competency.

Between the EC macro-categories and the TW&CL categories (comparing Tables 9 and 11), it is observed that the TW&CA competencies necessary for the social and cooperative learning category may be within two EC macro-categories, Communication to specialised and non-specialised audiences and Communication in different contexts and disciplines. The category of TW&CL competencies necessary for social and cooperative learning may fall under the EC macro-category Information management. Finally, the macro-category of EC Interpersonal skills is connected to the TW&CL category Knowledge and development of communication theory and Interpersonal skills (IS).

Relationships also exist between the macro-categories or families of categories of both competencies. Comparing Tables 8 and 10, it is evident that the macro-categories of EC Oral and written communication skills and Communication to specialised and non-specialised audiences may be respectively within the TW&CL macro-categories Development of social and communication skills and Ability to work in a multidisciplinary team (AWMT).

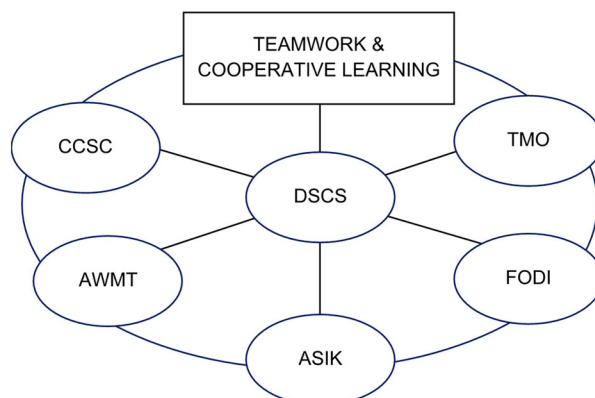


Figure 2. Explanatory diagram of the teamwork and cooperative learning (TW&CL) competency.

5. Conclusions

This study aimed to assess the presence and type of Effective Communication and Teamwork/Cooperative Learning competencies in the degrees of 9 public universities in southern Spain, to determine their location as general/cross-cutting or specific competencies, to analyse differences by branches of knowledge, and to build category systems and theoretical frameworks to understand how these competencies are interconnected. Main conclusions of the study are as follows:

- As previous studies have shown (Barroso et al., 2022; PAIDI, 2020; Poza-Vilches et al., 2023), EC and TW&CL are transversal competencies found in many Spanish university programmes. In this research, the quantitative results corroborate that these competencies are highly valued and are included in a large majority of programmes.
- EC was predominantly a generic or cross-cutting competency, while TW&CA appeared in both generic and specific forms.
- The distribution of EC and TW&CL varies according to the branches of knowledge, with EC being more generic in Science and Arts and Humanities, and more specific in Social and Legal Sciences and Health Sciences. Similarly, TW&CL are predominantly generic in Arts and Humanities and Sciences, with a specific focus on Social and Legal Sciences.

These findings are even more relevant given that these transversal competencies are transferable to contexts, may help individuals succeed in a variety of professional settings, and are essential competencies for coping with the climate emergency, conserving biodiversity and promoting ecological transition (MITECO, 2023).

- *How can EC and TW&CL competencies be effectively categorised and analysed in university curricula and programmes?* Regarding the EC competence, nine categories were identified and organised into five families, emphasising the importance of communication skills for EC in diverse settings. EC involves conveying information effectively, mastering oral and written communication in native and foreign languages, teamwork, positive interpersonal relations, information management, and the use of ICT. In relation to Teamwork and Cooperative Learning (TW&CL): Categories and macro-categories were identified for TW&CL, emphasising skills for collaborative work. TW&CL involves working jointly, sharing ideas and knowledge, flexibility, time management, organisational skills, communication skills, critical thinking, and working in multidisciplinary teams.
- *How do these categories relate, and what theoretical frameworks emerge when examining the presence of EC and TW&CL in university programs?* Category systems and theoretical frameworks were built to provide a comprehensive understanding of the components and interconnections of EC and TW&CL. The identified categories and macro-categories highlighted various aspects of communication, collaboration and skills development, emphasising the importance of effective information transfer, critical thinking and interdisciplinary teamwork. They are all key competencies in blue entrepreneurship, as Rekalde-Rodríguez et al. (2021) concluded.

The joint analysis of EC and TW&CL revealed shared categories and macro-categories, indicating their complementary nature and interconnectedness. This underlines the importance of integrating these competencies in educational contexts, where EC supports Multidisciplinary teamwork and Interpersonal skills contribute to the Development of the communication theory. These findings complement the results obtained by Badía et al. (2022) who insisted on the need for changes such as the creation of viable (socio)economic structures and practices that are socially beneficial to society (social entrepreneurship and civic innovation).

From a blue economy perspective, the curricular inclusion of the transversal competencies analysed in this paper had already demonstrated their relevance in previous works (Poza-Vilches et al., 2023; Tójar-Hurtado & Estrada-Vidal, 2023), from the point of view of project transfer (Gutiérrez et al., 2016; Tójar-Hurtado et al., 2017) and the analysis of competencies to assess entrepreneurs (Palos-Sánchez & Casablanca-Peña, 2019). Educators and curriculum developers can use these findings to improve their pedagogical approaches to foster effective communication and teamwork skills amongst students. The

constructed category systems and theoretical frameworks provide a valuable foundation for designing curricular content and instructional strategies that promote these competencies.

This study contributes to the recognition and examination of EC and TW&CL in university degrees by providing data on their presence, type and relationships. By recognising the importance of these competencies and tailoring their development to specific disciplinary contexts, educational institutions can better prepare students for success in their future careers. Future research could explore discipline-specific approaches to further enhance these competencies and their integration into curricula.

Overall, this study advocates for the adoption of a social and blue entrepreneurship and sustainability approach, recognising the need for urgent awareness and the importance of lifelong learning in educational and social environments. By incorporating the competencies of EC and TW&CL into the curriculum, universities can empower students to actively serve as catalysts for positive change. This integrative educational approach fosters a culture of social responsibility and equips students with the skills and mindset to address critical social and environmental challenges. Ultimately, this holistic educational strategy aligns with the goals of sustainability awareness and social and blue entrepreneurship, paving the way for innovative and sustainable practices in various sectors of society.

5.1. Limitations and future research

The study has certain limitations, such as a limited sample size, which may limit the generalisability of the results. Future lines of research could include longitudinal studies to help understand the development and impact of EC and TW&CL competencies over time. Comparative studies across countries or education systems may shed light on the cultural and contextual factors influencing their integration. Exploring the perspectives of stakeholders such as students, teachers and employers can provide a comprehensive understanding of the relevance of these competencies in real-life settings. It is important to develop adapted assessment methodologies and research effective pedagogical approaches to improve the assessment and promotion of EC and TW&CL competencies.

The study's implications extend to research, assessment, policy, and practice. Further research is needed to explore discipline-specific approaches to develop these competencies. Creating reliable and valid assessment methods is crucial for evaluating the acquisition and application of these competencies. Policies should recognize and integrate EC and TW&CL competencies into educational frameworks. Educators and curriculum developers can utilise the findings to enhance their approaches, fostering collaborative learning environments and incorporating innovative pedagogical strategies.

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