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E-LEARNING AND SOCIAL MEDIA IN LOGISTICS TRAINING: An Analysis of Professional Use

VICTOR CHAVIGNÉ JORBA [1]
vchavignej@uao.es
CARMEN RUIZ-VIÑALS[1]
cruizv@uao.es
NURIA GOMEZ LLAUGER[2]
n.gomez@salle.url.edu
[1] Abat Oliba CEU University, Spain
[2] La Salle-Ramon Llull University, Spain

KEYWORDS

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ABSTRACT

This research investigates the use of social media in e-learning for logistics professionals. The findings indicate that social media is highly valued for its capacity to foster professional networks, facilitate access to educational content, and support the development of digital skills. WhatsApp, LinkedIn, and YouTube are identified as the most prominent platforms due to their effectiveness in communication. Participants regard the use of these tools in their professional practice as a positive contribution to academic contexts, as they enhance both communication and learning within e-learning environments. This study offers an innovative perspective, as training in logistics has received limited scholarly attention. It highlights the importance of investigating and harnessing these tools within a sector that is vital to the global economy.

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1. Introduction

Over the last decade, e-learning has significantly transformed education and professional training, offering accessible and flexible tools for knowledge acquisition. Rapid digitisation and the expansion of technological platforms, including social media, have driven this evolution. Social media has evolved from a space primarily for social interaction to a key educational tool, facilitating communication, collaboration and the real-time exchange of information.

The logistics sector in Spain has experienced remarkable growth, establishing itself as a fundamental pillar of the national economy. In 2024, employment in this sector reached a record level, with 1,085,868 Social Security affiliates in October, representing a year-on-year increase of 6.14% (Infobae, 2024). The surge in e-commerce, which accelerated during the COVID-19 pandemic, has increased demand for logistics services and emphasised the need to integrate advanced technologies and enhance resilience in the supply chain (JLL, 2024). Numerous studies, including that of Zenezini et al. (2023), corroborate these findings.

All of this, combined with the growing complexity of the sector, has generated significant demand for skilled professionals, particularly in areas related to digitalisation and automation. According to the *Report on Logistics Competitiveness in Spain* presented by UNO (the logistics sector's employers' association) in 2024, a series of key skills have been identified as essential for the effective development of logistics and supply chains. Among the most important are the management of advanced storage, automation and digitisation technologies in warehousing, as well as the integration of e-commerce into logistics services (Todo Transporte, 2024). The report also emphasises the need to implement inclusive and up-to-date training strategies to address an increasingly ageing workforce with low female representation, with women accounting for only 22% of employees.

As noted above, the COVID-19 pandemic accelerated the adoption of e-learning tools in both professional and educational contexts. Hohenstein (2022) highlights the pivotal role of digitalisation and online platform-based learning in optimising logistics training. Jámbor et al. (2020) examines the transition to an online training model in Operations and Supply Chain Management during the COVID-19 period at Corvinus University in Budapest, using MS Teams and Moodle. He concludes that online training is equivalent in value to traditional methods and yields comparable satisfaction levels. He also emphasises the critical role of the teacher, who must not only deliver content but also engage personally with students, attending to their emotional wellbeing.

These experiences underscore the effectiveness of e-learning in logistics training. Such training is not confined to university education but should extend throughout the professional careers of individuals working in this sector.

E-learning integrates multiple communication tools that facilitate social interaction and collaborative learning, resembling in many respects the functioning of social networks. The following tools are particularly noteworthy:

- Forums: Spaces where participants ask questions, discuss topics and share ideas, similar to discussion groups on platforms such as Facebook (Ouariach et al., 2024).
- Chats: Instant messaging tools that enable rapid communication, comparable to WhatsApp (Zahra et al., 2023).
- Blogs: Platforms for publishing articles and ideas, promoting reflection and the exchange of opinions, similar to Medium or Blogger. LinkedIn also offers blogging tools for long-form posts, facilitating professional learning and the creation of educational networks.
- Wikis: Collaborative platforms for joint content creation and editing, comparable to tools such as Google Docs.

These tools not only encourage interaction and teamwork but also foster the creation of learning communities, supporting the development of communication and collaboration skills that are essential in today's logistics environment (Ramirez-Montoya et al., 2024).

The role of social media in e-learning is becoming increasingly significant (Ruiz-Viñals et al., 2024). Prihatini et al. (2023) highlight the use of platforms such as WhatsApp and YouTube to strengthen technical and linguistic skills in digital learning environments. Crum and Özçelik (2024) emphasise the role of Facebook and WhatsApp in promoting real-time communication and collaboration, while Singh (2024) examines the effectiveness of Facebook Live and Zoom in connecting students and teachers in training programmes.

Various authors have examined the most significant aspects of social media use in e-learning, leading to the identification of a series of assessment criteria:

- Improved communication and collaboration: social media enables students and teachers to communicate and collaborate effectively, reinforcing peer interactions and group problem-solving (Ohara, 2023).
- Access to educational content: platforms such as YouTube and Facebook provide access to a wide variety of learning resources, facilitating the discovery of material and the asynchronous review of concepts (Catalano, 2022; Sanwal et al., 2023).
- Development of digital competencies and social skills: the use of social media supports the development of digital skills and encourages collaborative learning in online environments, enhancing competence in educational technologies (Trinova et al., 2022).
- Facilitation of synchronous and asynchronous interaction: social media offers synchronous modes for real-time discussion and asynchronous modes for students to engage with materials at their own pace, accommodating diverse learning styles (Mavuso et al., 2022; Sobaih et al., 2020).
- Creation of professional networks: platforms such as LinkedIn allow students to build professional relationships and expand their network of contacts, which is advantageous for their future careers (Sasikala, 2021).
- Strengthening student engagement: the integration of social media into education fosters active participation and engagement among students, enhancing motivation and connection with academic content (Dragseth, 2020).
- Emotional and social support: students, particularly in distance learning environments, use social media to meet emotional and social needs, contributing to a more holistic and less isolated learning experience (Greenhow & Galvin, 2020).
- Support for interactive learning activities: platforms such as Twitter and Facebook facilitate the creation of educational activities, including debates and simulations, increasing interactivity in online learning (Dragseth, 2020).

Considering this framework, the research presented here is novel in that it combines two key aspects of modern professional training: e-learning and the use of social networks as tools for communication and collaborative learning, with a particular focus on the logistics sector. Although previous studies have examined the use of social networks in educational contexts, few have specifically addressed logistics, an industry undergoing rapid transformation that necessitates the continuous updating of digital knowledge and skills.

This study adopts a practical approach aimed at optimising communication strategies in e-learning for logistics training. Its originality lies in its direct application to working professionals, analysing social networks as integrated within their work environment and adapting them to support academic development. By providing empirical data and concrete recommendations, the research contributes to enhancing communication through social media in e-learning programmes within the logistics field, thereby aligning training with the current needs of the labour market.

2. Objectives

The main objective of this research is to identify and analyse the use of social networks in e-learning by professionals in the logistics sector and to evaluate their effectiveness. In this way, it is possible to determine whether social networks contribute positively to enhancing e-learning for this profile of learners and to identify those platforms that are most favourably perceived by this group.

Based on these objectives, several research questions have been formulated as the foundation of this study:

R1: Which communication tools, from both training platforms and social networks, have participants used to facilitate interaction in online logistics training?

R2: How do participants in logistics training perceive the effectiveness of social networks as communication tools in virtual learning environments?

R3: Which social networks are the most widely used and best rated for training logistics professionals?

3. Methodology

The methodological approach adopted for this research is the case study, which is considered particularly suitable for examining phenomena within their real-world context, as it allows for the collection of rich and in-depth information on the dynamics and practices that emerge in a specific environment (Stake, 2020). In this study, the case selected is the analysis of online courses offered by a renowned training centre specialising in logistics, ICIL (Institute for Careers, Innovation in Logistics & Supply Chain), targeted at working professionals. This focus allows an in-depth examination of the particularities of this group. The institution uses Moodle as its online learning platform (LMS, Learning Management System), whose collaboration and communication features include forums, chats, wikis and group activities. The use of these tools facilitates effective communication between students and teachers (Abdelghani, 2021).

This research is both descriptive and exploratory in nature. It employs a quantitative methodology based on surveys as the primary instrument, complemented by a qualitative approach through semi-structured interviews. A communication assessment questionnaire was developed, comprising 15 questions for students and structured into four blocks: (1) social communication tools used during training; (2) assessment of social network use in online training; (3) use of social networks in personal and professional contexts; and (4) assessment of social networks with regard to communication. The questionnaire also included initial items on demographic variables, such as age and gender, level of education, professional category, and size of the company where students are currently employed.

To complement and contextualise the survey results, semi-structured interviews were conducted with six teachers, representing a sample of the centre's teaching staff. The primary objectives of these interviews were to gather their perceptions of the student survey findings, to further evaluate the use of social media in education from the teachers' perspective, and to analyse their experience in integrating these tools into training.

The student survey was designed based on the model developed by Fernández et al. (2021), the current SEPE survey models, and the selection of key criteria for assessing the use of social networks in e-learning, as established in the theoretical framework of this study.

The following working hypotheses were proposed:

- Hypothesis 1: During online training in logistics, in the absence of a clear strategy for using social media, its use will not be as highly valued as other social tools specific to the platform.
- Hypothesis 2: Students perceive the use of social networks in e-learning for logistics positively.
- Hypothesis 3: The social networks most used by students at a professional level are also those most highly valued by them in their e-learning experience.

The study population comprised all students enrolled in the various online courses offered by the training centre in logistics management. The survey was sent to all participants, and responses were entirely voluntary and anonymous. Only those individuals who responded voluntarily and on their own initiative were included in the study.

The sample consisted of individuals who, after receiving the invitation to participate, chose to complete the survey. This procedure, known as voluntary response sampling, allows participants to opt into the study without additional intervention by the researchers to ensure the representativeness of the sample (Murairwa, 2015). This method is particularly suitable in contexts where access to the entire population is possible, but participation depends on the subjects themselves.

The sampling approach used was non-probability sampling, specifically voluntary sampling. This implies that the data obtained may be biased towards individuals more willing to participate, which could limit the generalisability of the results to the entire target population (Cheung et al., 2017). Despite this limitation, the method enables the collection of valuable data from those most motivated to share their opinions and experiences. Similar sampling approaches have been employed in studies of communication in digital environments, such as that by Cebrián et al. (2020), entitled *Communication and Scientific Collaboration in Academic Social Networks*, which examined university teachers' behaviour in academic social networks using voluntary participation methods.

In research on communication in digital environments, such as social networks or online learning platforms, voluntary response sampling is effective for obtaining data from active users. Omar et al. (2012) analysed communication strategies in online discussions on Facebook and found that this voluntary approach enabled the identification of the most active and engaged participants.

Data collection was conducted over a two-year period, from 2023 to 2024. A total of 121 responses were obtained from a population of 229 students, representing 53% of the population. The population was defined based on the number of students who had participated in one of the institution's online courses in logistics.

The assessment of social media was measured using a five-category scale of "very good", "good", "moderate", "low" and "very low or none", corresponding to a Likert ordinal scale. According to Likert's original proposal (1932), this format is used to quantify attitudes or perceptions while maintaining a hierarchical order among the options (Boone & Boone, 2012), without assuming that the distances between points are equal (Carifio & Perla, 2007). This approach facilitates data collection, as it is intuitive for respondents and provides sufficient information to explore response variability (Allen & Seaman, 2007). As this is an ordinal scale, it is recommended to apply statistical procedures appropriate to its nature, such as non-parametric tests, or to use parametric analyses with caution (Díaz de Rada, 2012).

To analyse the value of social media in communication, each category was assigned a numerical value (5 for "very good", 4 for "good", 3 for "moderate", 2 for "low" and 1 for "very low or none"). The scores obtained for each social network were then summed and compared with the maximum possible score (the number of participants who rated that network multiplied by 5), allowing the results to be expressed as a percentage and the social networks to be classified according to this indicator. This method represents a descriptive analysis of ordinal data, in which the values of the Likert scale are transformed to create a composite index or score, facilitating comparison of the average rating for each social network (Boone & Boone, 2012). Although the original scale is ordinal, assigning numerical values and calculating percentages is useful for interpreting results and identifying trends (Carifio & Perla, 2007). It is important, however, to recognise that the distance between categories is not necessarily equal; thus, this procedure supports description and comparison but should be interpreted with caution when making conclusions beyond the descriptive level (Likert, 1932).

Questions allowing participants to select multiple options (for example, tools used during online training) were also included. In this type of question, respondents could select more than one option. The frequency of each response was then counted and compared with the total number of students, allowing the percentage use of each tool to be calculated. This procedure forms part of a descriptive analysis, focusing on the frequency and percentage of responses for each category (Fowler, 2013). This approach is widely employed in quantitative research and survey studies, as it facilitates clear presentation of results and aids understanding of the adoption or popularity of each resource among participants (Babbie, 2020).

To examine the relationship between the assessment of social media use to enhance communication and interaction and the use of social media at a professional level, a non-parametric correlation analysis was conducted using Spearman's coefficient (ρ). This method was chosen for two main reasons. First, the nature of the data, which are ordinal and do not necessarily follow a normal distribution (Boone & Boone, 2012; Carifio & Perla, 2007). Second, the small sample size. When analysing 13 social networks, a robust statistical approach that does not rely on parametric assumptions, such as normality, is preferable (Gibbons & Chakraborti, 2011; Siegel & Castellan, 1988).

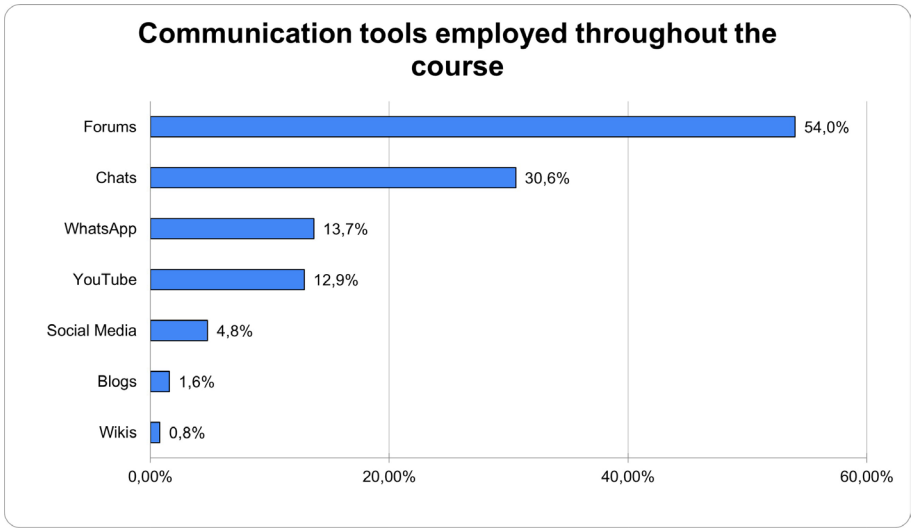
The analysis involved converting the percentages into ranges and calculating the Spearman coefficient for each pair of variables under study. A value of ρ close to +1 indicates a strong positive correlation, a value near 0 indicates no association, and a value close to -1 represents a strong negative correlation. Statistical significance (ρ-value) was evaluated to determine the strength of the observed relationship. The use of Spearman's coefficient is appropriate because it relies on the ordering of data, which is particularly suitable when the distribution of variables is uncertain or when only a limited number of observations are available.

4. Results

4.1. Tools Used to Communicate During the Course

Figure 1 presents the results regarding the tools used by students to communicate during the course. The most frequently used tools were forums and chats, followed by WhatsApp and YouTube.

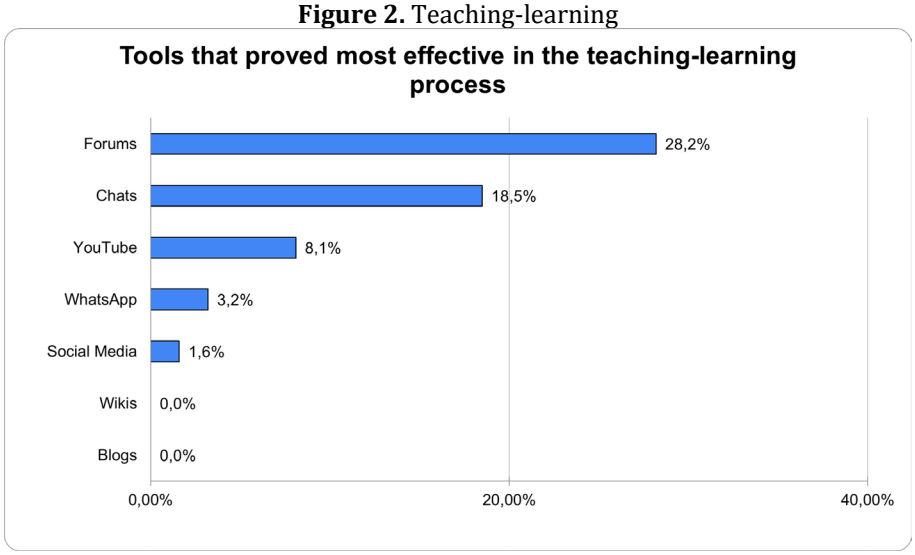
Figure 1. Communication during the course



Source: Authors elaboration, 2025.

With regard to the tools that students perceived as most beneficial to the teaching–learning process, Figure 2 shows that forums, chats and YouTube were rated most highly by participants. These tools proved effective in facilitating communication, enabling the exchange of ideas, and providing access to educational content, thereby contributing significantly to learning within the course environment.

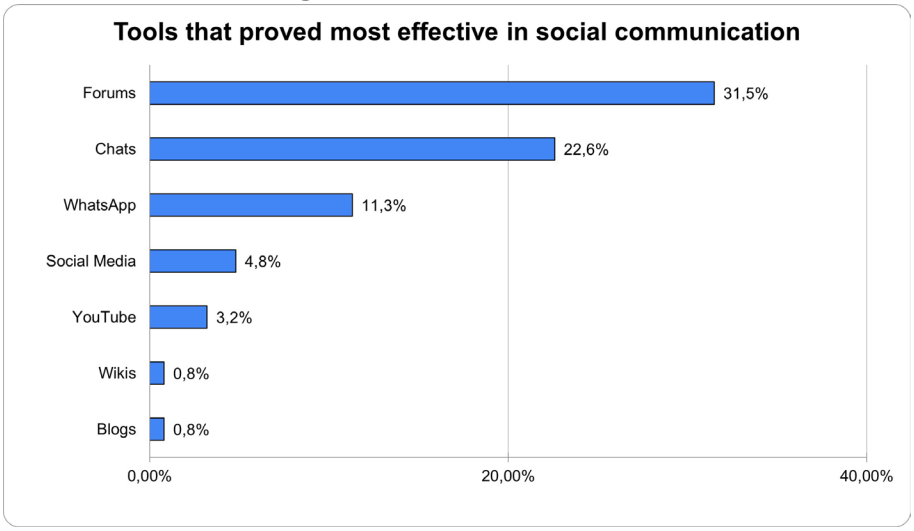
Figure 2. Teaching-learning



Source: Authors elaboration, 2025.

Finally, Figure 3 shows that forums, chats and WhatsApp were again the tools most effective for social communication during the course. These platforms facilitated continuous interaction between students, enabling the exchange of ideas, resolution of queries, and real-time collaboration, thereby contributing significantly to the enhancement of both the social and academic dynamics of the group.

Figure 3. Social communication



Source: Authors elaboration, 2025.

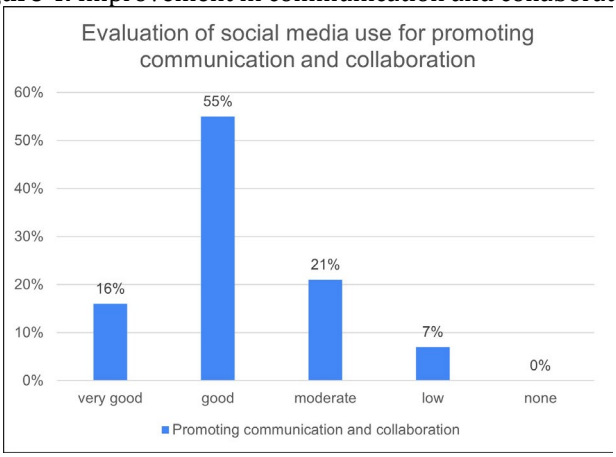
The results indicate that the tools most effective for communication, both social and academic, are those native to the Moodle platform, specifically forums and chats. These tools are highly effective due to their structured integration into the academic environment. In contrast, the use of social networks in the learning process is not consistently established and depends largely on the individual preferences of each teacher, resulting in greater variability in their application. By comparison, forums and chats are more regulated, formalised, and systematic, which explains their higher frequency of use and their prominent role within the training environment.

4.2. Evaluation of Social Network Use in E-Learning

The results of students' assessments of the use of social networks across various areas of online training are presented below. These evaluations provide detailed insight into students' perceptions of the effectiveness of social networks within the academic context.

As shown in Figure 4, approximately 71% of respondents rated social media as "very good" or "good" for promoting communication and collaboration, emphasising their value as key tools in the learning environment. In contrast, fewer than 7% considered social media to have a low or very low impact, indicating a generally positive perception of its usefulness in online training. This trend underscores the importance of integrating these platforms into educational processes to foster interaction and collaborative work among students.

Figure 4. Improvement in communication and collaboration

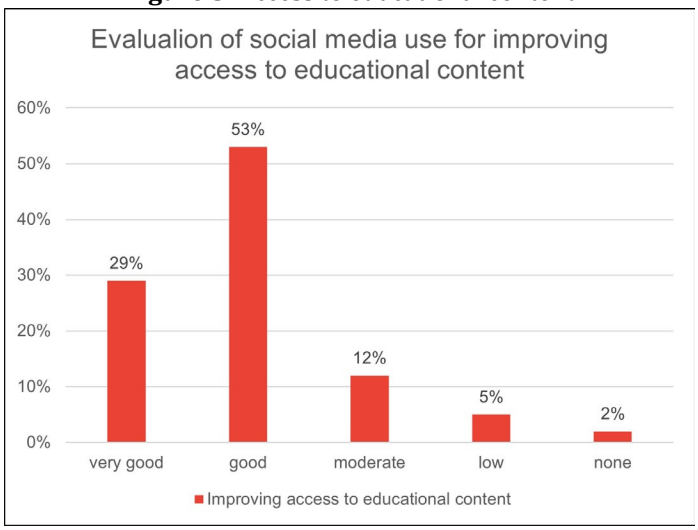


Source: Authors elaboration, 2025.

With regard to the assessment of social media use in improving access to educational content, Figure 5 shows that over 80% of students rated these platforms as "very good" or "good". This indicates that

students perceive social media as effective in facilitating access to educational resources and enhancing their learning experience. In contrast, fewer than 7% rated their usefulness as "low" or "none", suggesting that students generally value the integration of these tools in education. These findings reinforce the notion that social media can serve as a useful and accessible complement to the educational experience, particularly in online learning environments.

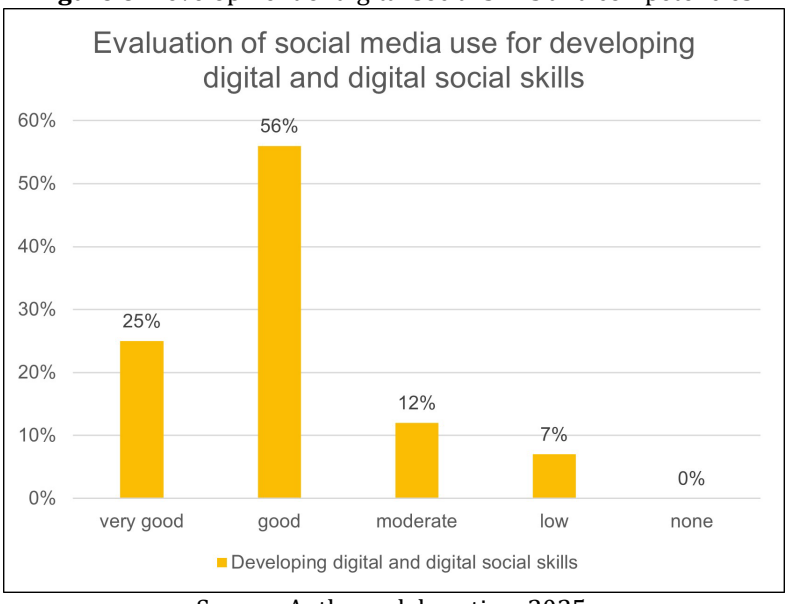
Figure 5. Access to educational content



Source: Authors elaboration, 2025.

Figure 6 shows that students value the use of social media for developing digital and digital social skills. 81% of respondents rated social media as "very good" or "good" for this purpose, reflecting a strong perception of their effectiveness in enhancing these essential skills in the digital environment. By contrast, only 7% perceived a low or very low impact, underscoring the general recognition of social media as effective tools for developing competencies required in the digital age. These findings emphasise the importance of integrating such platforms into education to prepare students for an increasingly interconnected and technological world.

Figure 6. Development of digital social skills and competencies

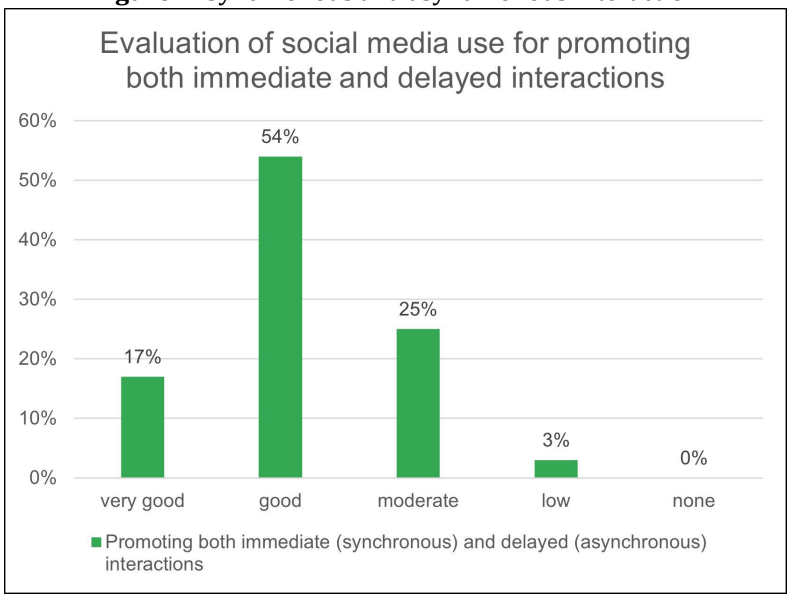


Source: Authors elaboration, 2025.

Figure 7 shows that 71% of students consider social media to be useful for promoting both immediate (synchronous) and delayed (asynchronous) interactions, highlighting a positive perception of their capacity to facilitate real-time and non-real-time communication. This high percentage suggests that students recognise the value of social media as versatile tools, enabling a continuous flow of interaction

that adapts to participants' needs and schedules. However, 25% of respondents rated the impact of social media as moderate, indicating that, while generally useful, its effectiveness may depend on factors such as the type of interaction, the platform employed, and the educational context.

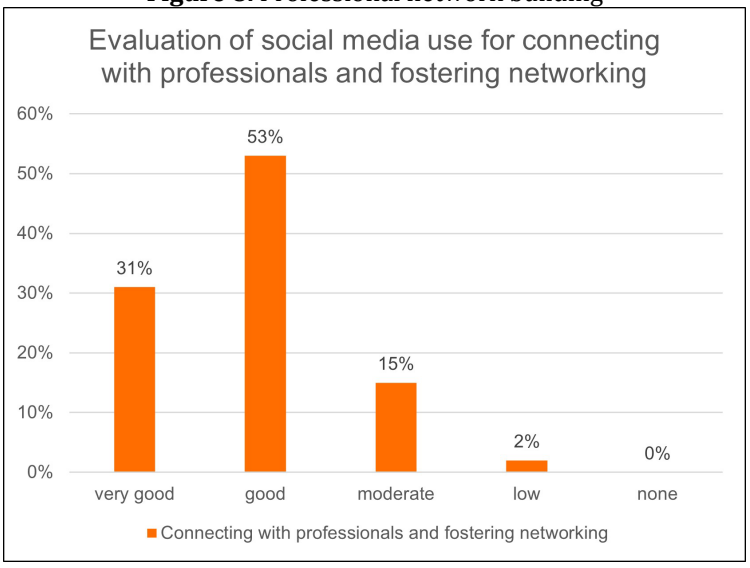
Figure 7. Synchronous and asynchronous interaction



Source: Authors elaboration, 2025.

As shown in Figure 8, 84% of students rated social media as "very good" or "good" for connecting with professionals and fostering networking. This high percentage reflects students' recognition of the value of social media in expanding career opportunities, establishing meaningful contacts, and participating in learning communities. Social media not only facilitates interaction between peers and teachers, but also provides direct access to a broader network of professionals and industry experts, thereby enriching the academic experience and supporting the development of a strong professional career.

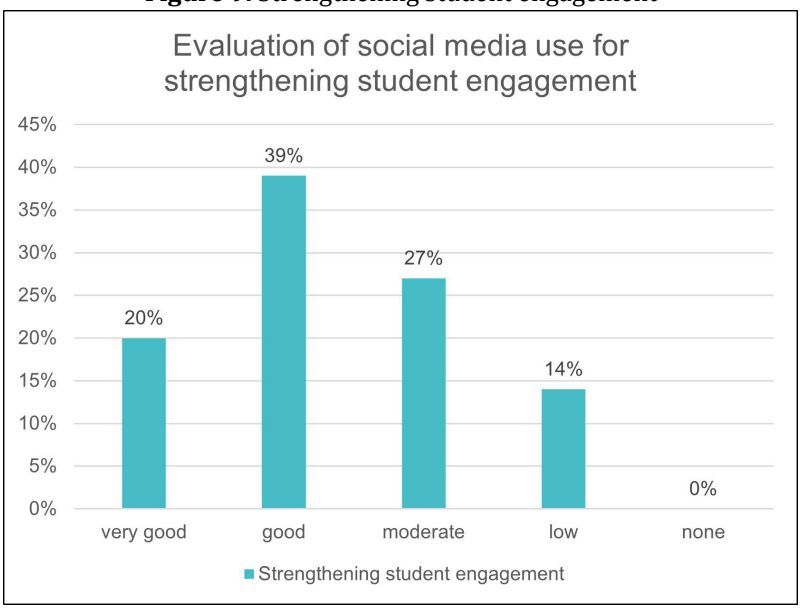
Figure 8. Professional network building



Source: Authors elaboration, 2025.

With regard to student engagement, 59% of students perceived a positive impact, while 41% considered that social media had a moderate or low effect in this area (Figure 9).

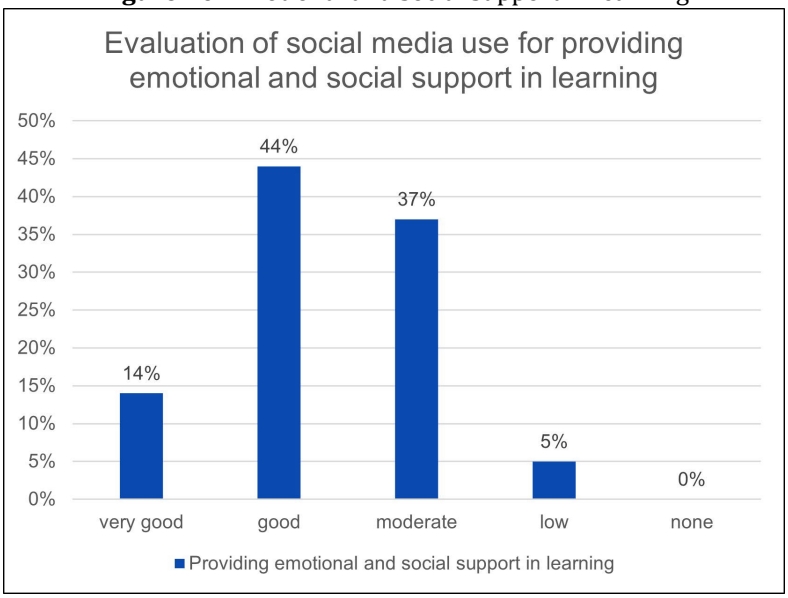
Figure 9. Strengthening student engagement



Source: Authors elaboration, 2025.

Although 58% of students rated the use of social media for providing emotional and social support in learning positively, 42% considered its impact to be "moderate" or "low" (Figure 10). This finding suggests that, while a majority of students perceive social media as an effective tool for fostering an emotionally and socially supportive environment, a significant proportion do not experience a substantial impact. This variation may be influenced by factors such as the quality of online interactions, the lack of personalisation in the use of platforms, or some students' preference for other forms of support, such as face-to-face or more direct channels.

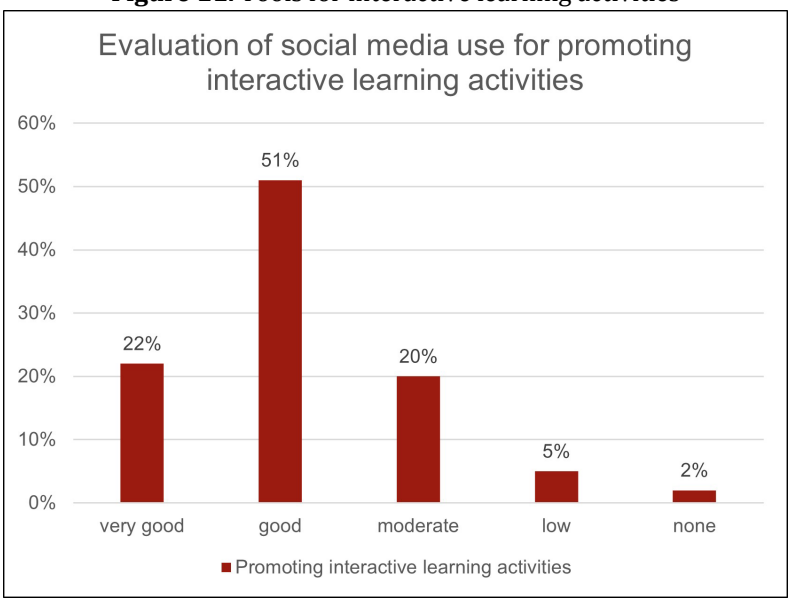
Figure 10. Emotional and social support in learning



Source: Authors elaboration, 2025.

More than 73% of students rated the use of social media for interactive learning activities positively, emphasising its effectiveness in promoting active participation and knowledge sharing. However, around 27% considered its impact to be "moderate" or "low" (Figure 11). This suggests that, while social media is generally perceived as a valuable tool for interactive learning, a segment of students does not experience the same level of effectiveness. This may be due to factors such as insufficient integration into the educational process or the nature of the activities proposed on these platforms.

Figure 11. Tools for interactive learning activities

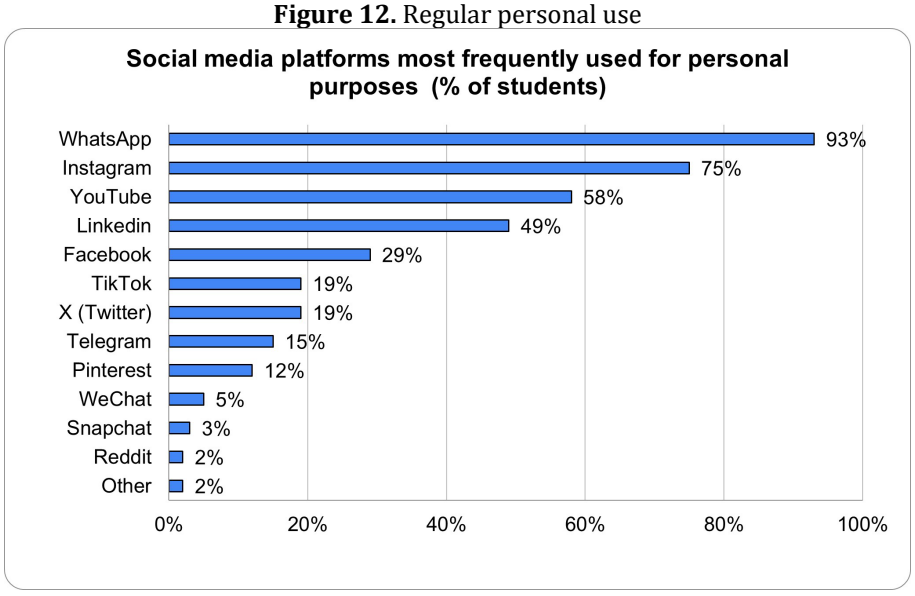


Source: Authors elaboration, 2025.

4.3. Use of Social Media

The number of social networks regularly used by students on a personal level is high, with WhatsApp (93%), Instagram (75%), YouTube (58%) and LinkedIn (49%) emerging as the most frequently used platforms (Figure 12).

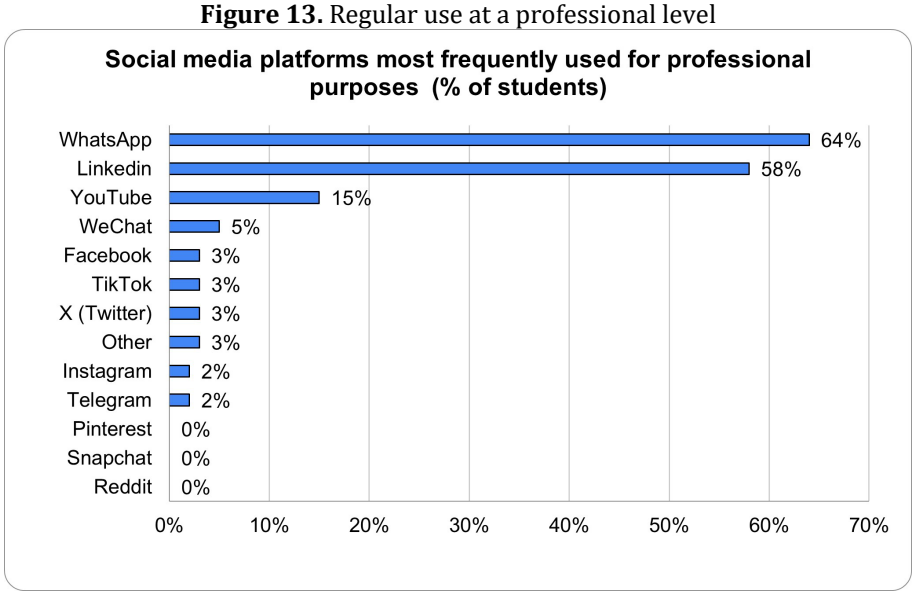
Figure 12. Regular personal use



Source: Authors elaboration, 2025.

With regard to social networks used regularly for professional purposes, WhatsApp is the most widely used (64%), followed by LinkedIn (58%), while YouTube is less frequently used (15%). This pattern indicates that messaging platforms and professional networks are preferred by students for maintaining contact and developing their professional network, whereas YouTube, although valuable, serves a more secondary role in daily professional interactions (Figure 13).

Figure 13. Regular use at a professional level



Source: Authors elaboration, 2025.

The use of social media at a professional level is essential for logistics students' development and preparation for the workplace. Platforms such as LinkedIn enable students to establish valuable connections with professionals in the sector, access job opportunities, and stay informed about trends and developments in their field (Davis et al., 2020).

Messaging tools such as WhatsApp facilitate the creation of collaborative networks and instant communication between peers, teachers, and experts, promoting shared learning and real-time problem solving (Guiñez-Cabrera & Mansilla-Obando, 2021). YouTube has emerged as a valuable resource for logistics students, offering accessible and visual educational content. Through tutorials, explanatory videos, lectures, and case studies, students can deepen their understanding of key logistics concepts, such as supply chain management, transport, distribution, and emerging sector technologies. YouTube also supports self-paced learning, enabling students to acquire new skills and reinforce prior knowledge. Its visual format promotes comprehension of complex processes through graphics, animations, and practical demonstrations, making learning more dynamic and interactive (Shoufan & Mohamed, 2022).

YouTube's wide array of resources complements formal academic training, helping logistics students remain up to date and develop a more comprehensive perspective of the field. Similarly, X (formerly Twitter) is valuable for logistics students, allowing them to follow experts and organisations that regularly post relevant sector content. Through threads, students can access concise and current information, participate in discussions, and expand their professional networks. This platform also provides updates on events, conferences, and webinars, which is crucial for staying informed (Marcelo-Martinez & Marcelo, 2022).

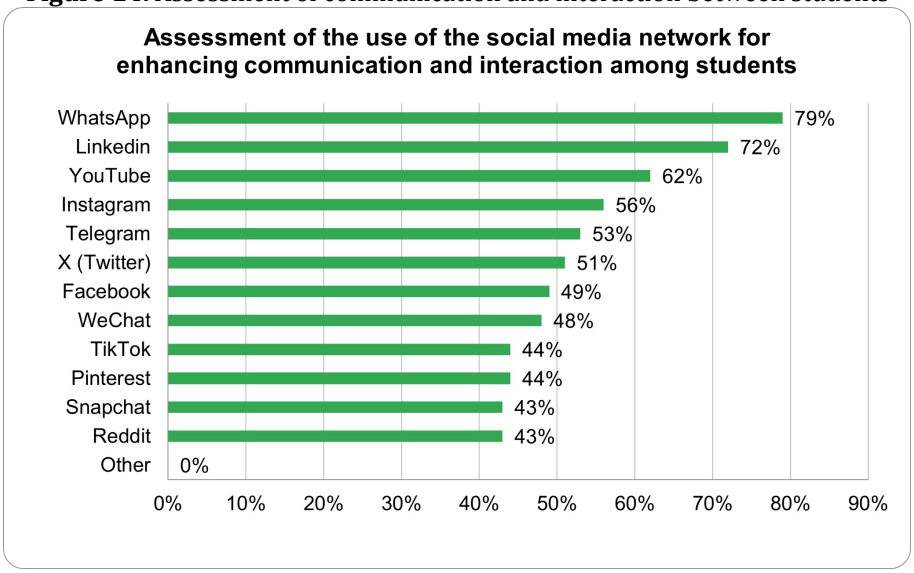
Other social media platforms also play a significant role in the training and professional development of logistics students. Collectively, these networks create a digital ecosystem that complements academic learning, fosters professional collaboration, and provides continuous access to up-to-date resources within the logistics industry.

The integration of social media into the professional sphere also promotes the development of essential digital skills, enabling students to adapt to an increasingly interconnected and technological work environment and enhancing their competitiveness in the global job market.

4.4. Evaluation of Communication Effectiveness by Social Network

With regard to students' assessment of the use of each social network to enhance communication and interaction, three platforms were rated most highly: WhatsApp (79%), LinkedIn (72%) and YouTube (62%) (Figure 14).

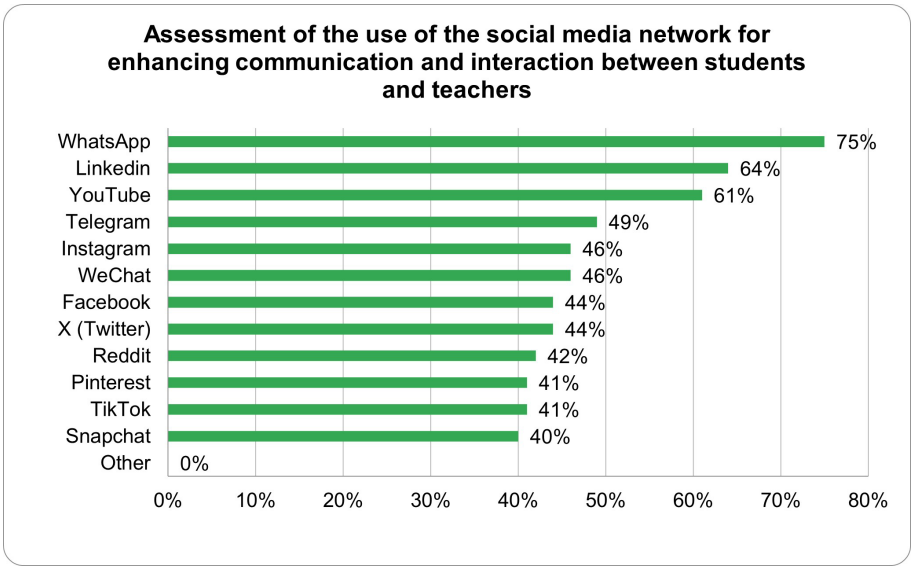
Figure 14. Assessment of communication and interaction between students



Source: Authors elaboration, 2025.

Similar results were observed regarding the assessment of social networks for enhancing communication and interaction between students and teachers. WhatsApp (75%), LinkedIn (64%) and YouTube (61%) were again the three most highly rated platforms (Figure 15).

Figure 15. Assessment of communication and interaction between students and teachers



Source: Authors elaboration, 2025.

4.5. Correlation Between Academic and Professional Use of Social Media

The purpose of this analysis is to examine whether there is a correlation between students' assessment of social media for enhancing communication and interaction in the academic environment and their professional use of these platforms. The aim is to determine whether students who perceive a positive impact on communication and learning through platforms such as WhatsApp, LinkedIn, or YouTube also tend to use these tools in their professions. This analysis provides insight into how academic experiences with social networks may influence their adoption in the workplace and whether these tools facilitate logistics students' transition into the professional market.

The analysis considers two aspects: the correlation between student-teacher and student-student communication, and the correlation between these forms of academic communication and professional use. To perform Spearman's correlation, percentages were converted into ranks (1 = lowest value, 13 = highest value), and Spearman's coefficients (ρ) were calculated for each pair of variables.

Table 1 presents the variables used to calculate Spearman's coefficient, indicating whether there is a correlation between the assessment of different networks for improving communication and interaction between teachers and students, and among students themselves.

Table 1. Correlation between social networks for student-teacher and student-student communication

Social media platforms	Assessment of the use of the social media network for enhancing communication and interaction between students and teachers (CAP)	Assessment of the use of the social media network for enhancing communication and interaction among students (CAA)	Order (CAP)	Order (CAA)	d	d2
WhatsApp	78,6%	75,3%	13,0	13,0	0,0	0,0
LinkedIn	72,2%	64,4%	12,0	12,0	0,0	0,0
YouTube	62,4%	60,7%	11,0	11,0	0,0	0,0
Instagram	55,6%	46,4%	10,0	9,0	-1,0	1,0
Telegram	52,5%	48,8%	9,0	10,0	1,0	1,0
X (Twitter)	50,8%	43,7%	8,0	6,0	-2,0	4,0
Facebook	49,5%	44,1%	7,0	7,0	0,0	0,0
WeChat	48,5%	46,1%	6,0	8,0	2,0	4,0
TikTok	44,4%	40,7%	4,5	3,0	-1,5	2,3
Pinterest	44,4%	41,4%	4,5	4,0	-0,5	0,3
Snapchat	43,4%	40,0%	3,0	2,0	-1,0	1,0
Reddit	43,1%	42,4%	2,0	5,0	3,0	9,0
Other	0,0%	0,0%	1,0	1,0	0,0	0,0

Source: Authors elaboration, 2025.

The assessment of social networks for enhancing communication and interaction between students and teachers (CAP) and among students (CAA) is strongly correlated ($\rho = 0.94$). This indicates that when a social network is highly rated by students for teacher interaction, it is also highly rated for peer interaction.

Table 2 presents the variables used to calculate Spearman's coefficient, showing the correlation between the assessment of different networks for improving communication and interaction between students and teachers and the professional use of social networks.

Table 2. Correlation between social networks, student-teacher communication, and professional use

Social media platforms	Assessment of the use of the social media network for enhancing communication and interaction between students and teachers (CAP)	Social media platforms most frequently used for professional purposes (UP)	Order (CAP)	Order (UP)	d	d2
WhatsApp	78,6%	64,4%	13,0	13,0	0,0	0,0
LinkedIn	72,2%	57,6%	12,0	12,0	0,0	0,0
YouTube	62,4%	15,3%	11,0	11,0	0,0	0,0
Instagram	55,6%	1,7%	10,0	4,5	-5,5	30,3
Telegram	52,5%	1,7%	9,0	4,5	-4,5	20,3
X (Twitter)	50,8%	3,4%	8,0	7,5	-0,5	0,3
Facebook	49,5%	3,4%	7,0	7,5	0,5	0,3
WeChat	48,5%	5,1%	6,0	10,0	4,0	16,0
TikTok	44,4%	3,4%	4,5	7,5	3,0	9,0
Pinterest	44,4%	0,0%	4,5	2,0	-2,5	6,3
Snapchat	43,4%	0,0%	3,0	2,0	-1,0	1,0
Reddit	43,1%	0,0%	2,0	2,0	0,0	0,0
Other	0,0%	3,4%	1,0	7,5	6,5	42,3
Coeficiente de Spearman (ρ)		**0,66**				

Source: Authors elaboration, 2025.

The assessment of social networks for enhancing communication and interaction between students and teachers (CAP) and their professional use exhibits a moderate-to-high positive correlation ($\rho = 0.66$). This indicates a statistically significant association between the two assessments, suggesting that, in general, the networks most highly rated by logistics students for teacher interaction are also those most frequently used in a professional context.

Table 3 presents the variables used to calculate Spearman's coefficient, illustrating the correlation between the assessment of different networks for student-student communication and interaction and their professional use.

Table 3. Correlation between social networks, student-student communication and professional use

Social media platforms	Assessment of the use of the social media network for enhancing communication and interaction among students (CAA)	Social media platforms most frequently used for professional purposes (UP)	Order (CAA)	Order (UP)	d	d2
WhatsApp	75,3%	64,4%	13,0	13,0	0,0	0,0
LinkedIn	64,4%	57,6%	12,0	12,0	0,0	0,0
YouTube	60,7%	15,3%	11,0	11,0	0,0	0,0
Telegram	48,8%	1,7%	10,0	4,5	-5,5	30,3
Instagram	46,4%	1,7%	9,0	4,5	-4,5	20,3
WeChat	46,1%	5,1%	8,0	10,0	2,0	4,0
Facebook	44,1%	3,4%	7,0	7,5	0,5	0,3
X (Twitter)	43,7%	3,4%	6,0	7,5	1,5	2,3
Reddit	42,4%	0,0%	5,0	2,0	-3,0	9,0
Pinterest	41,4%	0,0%	4,0	2,0	-2,0	4,0
TikTok	40,7%	3,4%	3,0	7,5	4,5	20,3
Snapchat	40,0%	0,0%	2,0	2,0	0,0	0,0
Otra	0,0%	3,4%	1,0	7,5	6,5	42,3
Coeficiente de Spearman (ρ)		**0,64**				

Source: Authors elaboration, 2025.

The assessment of social networks for enhancing communication and interaction among students (CAA) and their professional use shows a moderate-to-high positive correlation (ρ = 0.64). This indicates a statistically significant association between the two assessments, suggesting that, in general, the networks most highly rated by students for peer interaction are also those most frequently used in a professional context.

5. Discussion and Conclusions

This research focused on analysing the use of communication tools that facilitate interaction in e-learning training in logistics, as well as evaluating the use of social networks. The objectives were, first, to identify the communication tools that facilitate interaction between participants in this type of training; second, to examine students' evaluations of the use of social networks in training; and third, to compare students' personal and professional use of social networks with their assessment of their use for improving communication during online training.

The social communication tools provided by the e-learning training platform were used more frequently than social media. Forums and chats were the primary tools employed by students and were rated as the most effective in both the teaching–learning process and social communication. Among social networks, YouTube and WhatsApp were the most widely used. The findings suggest that, without a clear strategy for the use of social networks in e-learning training, students are unlikely to actively promote their use during the course.

Students evaluated the use of social networks in e-learning training in logistics positively. Although all aspects analysed received favourable evaluations, the most highly valued networks were those that support the development of professional networks, improve access to educational content, and foster digital skills. These were followed by tools that facilitate interactive learning and both synchronous and asynchronous interaction. Finally, networks that enhance emotional and social support, strengthen student engagement, and improve communication and collaboration were rated comparatively lower.

We observed that students use a wide range of social networks at a personal level, although the most commonly used are WhatsApp, Instagram, YouTube, LinkedIn and Facebook. At a professional level, the number of networks used is considerably smaller, with most activity concentrated on three platforms: WhatsApp, LinkedIn and YouTube. These same networks are also the most highly valued by logistics students for improving communication between students and between students and teachers.

The analysis further allowed us to identify a series of recommendations from teachers regarding the implementation of social media in e-learning training in logistics. In general, it is advisable to establish guidelines for teachers on the use of the online learning platform's own communication tools and social media, particularly WhatsApp, LinkedIn and YouTube. This would enable the integration of these networks as part of the communication process during training.

Regarding social media use, teachers propose creating a WhatsApp group to facilitate teacher–student communication and to encourage student–student interaction. For LinkedIn, as a professional networking platform, they recommend sharing and promoting LinkedIn profiles, as well as disseminating a curated list of profiles relevant to each course. With respect to YouTube, teachers suggest that students actively participate in identifying content that may be of interest to their peers, thereby promoting knowledge sharing.

Limitations of the study include the subjective interpretation often inherent in case studies, which introduces the risk of bias in the analysis. The narrow focus on a single context may restrict understanding of how social media is implemented across different institutions or disciplines, as noted by Alraja and A-Khassawneh (2021). The study is also limited by the representativeness of the sample, as voluntary response sampling introduces self-selection bias. This method lacks statistical representativeness, as the results reflect the characteristics of participants who choose to engage rather than the wider population, consistent with Erdogan's (1985) observation that such sampling is more suitable for exploratory research than for studies seeking to generalise results.

The use of social media in e-learning training for logistics professionals also presents several challenges and limitations. The use of WhatsApp as a communication tool may result in a lack of formality, distractions, and difficulty in separating academic and personal activities (Zulkanain et al., 2020). Establishing clear guidelines and strategies, alongside training for both teachers and students, should help mitigate these risks. Another limitation, particularly on platforms such as YouTube, is information overload and variable content quality. Not all available content is reliable or produced by experts, which can make it challenging to select appropriate resources (Marçal et al., 2020). In this context, the role of the teacher as an expert is essential to ensure content quality, particularly when assessing student contributions, which may entail a substantial additional teaching workload.

As a future line of research, we propose conducting a broader study involving other logistics training centres in Spain and internationally. This would allow the generalisation of results and an assessment of whether teachers' proposals to ensure and enhance the effective use of social media for logistics professionals are effective and positively perceived by students.

The conclusions of this study indicate that students in the case study value the use of social networks in e-learning training, but a clear implementation strategy is necessary. Furthermore, for professional students, the preferred social networks for online training are those regularly used at a professional level, namely WhatsApp, LinkedIn and YouTube in this case study. Social networks not only improve communication but also enrich the learning experience by fostering collaboration and facilitating access to valuable resources.

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