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ONLINE COMMUNICATION AND COLLABORATION: THE KEY TO FUTURE EDUCATION

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ABSTRACT

Introduction: In an increasingly digitalized world, online communication and collaboration is not just a tool; it is an essential skill. This competence facilitates the establishment of connections that transcend physical boundaries, thereby dismantling the conventional barriers of the traditional classroom and fostering authentic global learning. In this study, online communication and collaboration are explored as potential agents of transformation in the educational experience. A central question is whether these phenomena directly impact students' academic success. The present study will analyze the impact of competence in online communication and collaboration on the motivation, engagement, and academic performance of university students in a digitalized environment. In a setting where interactions are increasingly digital, what role does this skill play in preparing students for the future? **Methodology:** In order to respond to this inquiry, a comprehensive investigation was undertaken at a private university where students were enrolled in the Global Marketing Management degree program. A rigorous approach was employed, grounded in structural equation modeling (SEM), to elucidate the relationships between online communication and collaboration competence (CYC) and academic performance. This approach also measured the impact on students' motivation and engagement. **Results:** The findings were revealing. Online communication and collaboration are not only linked to increased motivation but also enhance student engagement, resulting in better academic outcomes. Online collaboration enables students to interact more fluidly, share ideas, work on projects, and receive instant feedback, which strengthens their learning. This study confirmed that students who feel comfortable collaborating online are more likely to be motivated and perform better in their studies. **Discussion:** Online

communication and collaboration is much more than just a simple skill; it is the key that unlocks the door to success in the digital era. This study underscores the importance of integrating this competence into educational programs to create a richer, more interactive, and effective learning experience. Students who master this skill not only communicate better but also collaborate more productively, resulting in superior academic performance. **Conclusions:** In summary, the key to a bright educational future lies in fostering digital connection and collaboration, transforming the classroom into a limitless space.

Keywords: motivation, engagement, digital learning, collaboration, academic performance.

1. INTRODUCTION

Online communication and collaboration are fundamental digital competences in modern higher education. These skills allow students to interact and actively participate in digital communities and networks, facilitating collaborative and barrier-free learning. Through various digital tools, such as chat, email, and videoconferencing, students can share ideas, build knowledge, and receive feedback in real-time, which enriches their academic experience.

Competence in online communication and collaboration plays a crucial role in academic performance. Based on the social learning theory by Bandura (1977), a positive correlation is observed between participation in collaborative activities and students' academic achievement. This type of communication fosters active participation and collaboration in knowledge development. According to Wenger (1988), online communication helps create learning communities, promoting participation and knowledge transfer.

Furthermore, according to Puentedura's SAMR model (2006), integrating technology into learning must go beyond the simple replacement of tools. In this sense, online communication allows for the redefinition of learning activities, making students assume a more active and autonomous role. The use of online tools, such as forums and social networks, increases engagement and facilitates the dynamic acquisition of knowledge (Realyvázquez-Vargas et al., 2020).

Studies by Mehrvarz et al. (2021) have shown that online communication and collaboration improve the quality of learning and academic performance. Online interactions allow students to discuss topics, solve problems, and build meaningful relationships, which reinforces their engagement and motivation in learning (Zhang et al., 2021).

Motivation also plays an important role: Pérez-Navío et al. (2023) describe how intrinsic and extrinsic motivation are key in the learning process. While intrinsic motivation is enhanced by feeling more connected and supported, extrinsic motivation is reinforced by external achievements such as grades (Hartnett, 2020). According to Bubaš et al. (2008), online communication and collaboration not only allow for greater integration

into the learning community but also provide feedback, which increases the sense of competence and self-efficacy.

On the other hand, studies such as those by Richardson and Swan (2003) and Rovai and Jordan (2004) indicate that online communication allows students to express ideas and collaborate on projects, developing leadership and teamwork skills, and creating useful professional networks.

2. OBJECTIVES

The objectives of the thesis study on online communication and collaboration include:

1. To identify the relationship between competence in online communication and collaboration and the motivation of university students.
2. To determine the extent to which online communication and collaboration skills influence student engagement levels.
3. To analyze the impact of online communication and collaboration on academic performance.
4. To evaluate the most effective digital tools in promoting online communication and collaboration in the university environment.

3. METHODOLOGY

A study was designed to explore how digital communication and collaboration skills (CYC) impact the academic performance of university students, especially those in business management and marketing programs, focusing on the methodology centered on digital communication and collaboration skills and their relationship with the dependent variables of motivation, performance, and commitment.

3.1. Measurement Methodology

To measure the digital competence of online communication and collaboration (CYC), 38 specific items were used that inquire about the use of digital tools in academic contexts. The question format and scales used varied depending on the variable under study. For indirect questions and evaluation of the model variables, most items were measured by using a 5-point Likert scale, offering response options ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The questionnaire was designed in Google Forms, allowing students to respond remotely.

Moreover, it is recommended to utilize Google Forms, as it is a cost-free and unrestricted option that offers a plethora of configuration and design possibilities for questionnaires. These items include the use of email, social networks, messaging platforms, videoconferencing, and collaborative documents (Table 1), which allows for evaluating both the frequency and effectiveness of online communication in academic activities. Focus was placed on evaluating whether students use these tools on a daily basis, in activities such as class discussions, group projects, and discussion forums, assessing the perception of the skill and its application in learning environments.

3.2. Research Design

The study was conducted with students from a private university in programs related to marketing and administration. Information was collected through questionnaires between July 20 and September 30, ensuring that the sample included students from different academic levels and programs.

The analysis used was exploratory and descriptive; each item of the variables was examined to evaluate measures of central tendency (mean) and dispersion (standard deviation).

3.3. Measurement of Dependent Variables

Below is a description of how the dependent variables were measured in this study. For each one, the same structure is followed: the definition of the variable is presented, as well as the items used based on previous research, and the reliability of the measurement. The three dependent variables in this study are linked to academic performance: motivation, engagement, and academic achievements:

Table 1.

Measurement of the online communication and collaboration variable.

Variables	Items
CYC 1	I use the email on a daily basis to communicate with my teachers and classmates through platforms like Gmail and Outlook.
CYC 2	I communicate with teachers and classmates through social networks like Instagram and TikTok.
CYC 3	I use instant messaging applications to interact with my classmates and teachers, such as WhatsApp and Instagram Direct.
CYC 4	I participate in virtual classes and meetings with my teachers and classmates using videoconferencing tools like Zoom and Teams.
CYC 5	I collaborate in the creation and editing of online documents with my classmates for group projects using Google Docs and Microsoft Office Online.
CYC 6	I work in teams on online projects using digital tools like Trello and Google Drive.
CYC 7	I share files and information with my classmates online using platforms that facilitate exchange, such as Google Drive and CANVAS.
CYC 8	I actively participate in digital debates and forums to collaborate with my classmates and teachers, through platforms like Canvas and Moodle.
CYC 9	I use online collaboration tools to work effectively with my colleagues on group projects and tasks, such as Google Drive, Microsoft Teams and Zoom.

Source: Elaborated by the authors, 2024.

3.3.1. Motivation

Atkinson (1957; 1964), Hamilton (1974), and Atkinson and Feather (1966) underpin the expectancy-value theory, where the achievement motive depends on the approach to success and the avoidance of failure. Dweck and Elliot (1983), Farrell and Dweck (1985), and Dweck and Leggett (1988) posit the existence of two distinct categories of goals in the context of academic achievement activities: learning goals (oriented towards new skills) and performance goals (oriented towards obtaining positive judgments or avoiding negative ones). In the attributional theory of Weiner (1974, 1979, 1985, 1986, 1992), individuals seek to understand the causes of significant events. Bandura (1977; 1997) introduces perceived self-efficacy, highlighting efficacy expectations and outcome expectations as crucial for performance, being essential in the educational field (Bandura, 1997; Bandura et al., 2001). Motivation, in this context, reflects the desire to acquire knowledge and skills, influenced by factors such as curiosity and the perceived usefulness of knowledge (see Table 2).

To measure motivation, a 5-point Likert scale (1=Strongly Disagree to 5=Strongly Agree) was used on items designed to assess the student's confidence in their abilities, the relevance of the task, and interest (Cenić et al., 2019).

Table 2.

Measurement of the motivation variable.

Variables	Items
MOT 1	I am confident in my ability to perform a task effectively.
MOT 2	I find the task engaging and motivating.
MOT 3	I believe it is essential to complete this task with good results.
MOT 4	I feel that I have the necessary skills to perform this task successfully.
MOT 5	I am confident that I can complete a task, as I have achieved success in similar tasks before.
MOT 6	I am more interested in subjects where I apply this knowledge.
MOT 7	I work with greater dedication when I have clear and defined goals.
MOT 8	I learn better in a positive and stimulating environment.
MOT 9	I perceive that what I learn is useful and applicable.
MOT 10	I relate my tasks to relate this task to my personal or professional interests.
MOT 11	I share or pass on what I learn from this assignment to others.
MOT 12	I spend more time and effort to complete a task successfully.

Source: Elaborated by the authors.

3.3.2. Engagement

In the educational context, engagement is reflected through regular attendance, participation in tasks and activities, and collaboration in discussions (Furrer & Skinner, 2003). Motivation to learn also plays an important role in engagement. A similar scale was used to measure this variable, assessing the level of engagement in various educational activities (see Table 3).

Table 3.

Measurement of the commitment variable.

Variables	Items
COMP 1	I complete the tasks and activities assigned to me at university.
COMP 2	I get involved in extracurricular activities and events related to my university career
COMP 3	I attend my classes on time.
COMP 4	I feel identified with the values and objectives of my university and my career.
COMP 5	I care about the well-being of my university and my career, and I am willing to do whatever it takes to help improve them.
COMP 6	I am aware that I need to learn and apply new knowledge and skills in my university career.
COMP 7	I strive to understand the concepts and topics presented in my classes.
COMP 8	I look for opportunities to apply what I learn in college to real-world situations.
COMP 9	I collaborate with my classmates in teamwork and contribute to the achievement of our objectives.
COMP 10	I take full advantage of the resources that the institution offers me, such as libraries and laboratories, to enrich my learning.

Source: Elaborated by the authors.

3.3.3. Academic Achievement

Academic achievement encompasses objectives such as completing the course, obtaining good grades, and applying knowledge in real-world situations (Pintrich, 2000). These objectives have been shown to facilitate students' focus on their academic endeavors. Measurement was conducted using a similar Likert scale (see Table 4).

Table 4.

Measurement of the academic achievement variable.

Variables	Items
LOGR 1	I have successfully completed all my subjects
LOGR 2	I am satisfied with the grades I have obtained on my exams and assignments.
LOGR 3	I am proud that I have met the learning objectives of the course.
LOGR 4	My goal is to obtain a degree or certificate of completion upon completion of this course.
LOGR 5	It is rewarding to be recognized by the teacher or peers for my exceptional academic performance.
LOGR 6	I would like to obtain recommendations or references from professors or employers based on my academic performance.
LOGR 7	I feel confident in my ability to apply the concepts I have learned in real-life situations.

Source: Elaborated by the authors, 2024.

4. RESULTS

Adjustments were made to the database in order to improve the accuracy and clarity of the studied variables. To group the items for each variable, such as CYC (Online Communication and Collaboration), MOT (Motivation), COMP (Engagement), and LOGR (Academic Achievement), classification criteria into three groups were employed: Low, Medium, and High. These groups allowed for observing how participants were distributed within each variable, facilitating a comparative analysis. The scores were organized into intervals of equal size, thereby facilitating the categorization and statistical analysis of the respondents' profiles.

In the exploratory and descriptive analysis, each item of the variables was examined to evaluate measures of central tendency (mean) and dispersion (standard deviation). This approach revealed the range of scores observed for each item, allowing for the identification of the minimum and maximum values in the participants' responses. Thus, the variability in the responses was understood, and an overview of the consistency in the perception of the items was obtained. This analysis helped establish a baseline before performing the confirmatory factor analysis.

A correlation matrix was developed to analyze the relationships between the study variables (CYC, MOT, COMP, and LOGR). Using the Pearson correlation coefficient, associations between items were evaluated, highlighting positive and negative correlations that offered a clear view of how the dimensions of the variables interacted. This analysis allowed for the identification of items with low correlation, which were removed to improve the consistency of each variable.

Items with high means reflected the participants' positive perception of this variable, with significant correlations between items like CYC01 and CYC02. However, some items like CYC07 were removed due to their lack of significant contribution.

- **MOT (Motivation):** The items showed high internal consistency, with a Cronbach's alpha close to 0.9, indicating that the items are suitable for measuring this variable.
- **COMP (Engagement):** Some items showed weak correlations, suggesting that certain aspects of engagement were not as strongly aligned as in other variables, leading to the removal of items such as COMP02 and COMP03.
- **LOGR (Academic Achievement):** Most items maintained high internal consistency, reflecting the participants' positive perception of their academic achievements.

The Cronbach's Alpha values varied among the different variables: CYC presented low values, indicating lower internal consistency; MOT obtained an "Excellent" rating with high consistency; and COMP and LOGR showed acceptable consistencies. The interpretation of Cronbach's alpha facilitated the identification of relevant and less relevant items within each variable, improving the precision of the measurement tool and ensuring that each variable contributed significant value to the overall analysis.

4.1. Hypothesis 1: The perception of one's own competence in online communication and collaboration (CYC) impacts the level of motivation (MOT)

Hypothesis H4 posits that there is a positive relationship between the variables "CYC" (Online Communication and Collaboration) and "MOT" (Motivation). The results support this hypothesis, showing a regression coefficient (β) of 0.894, which suggests a significant positive relationship between both variables, validated at a level of $p < 0.01$. This indicates that the relationship has statistical support.

4.2. Hypothesis 2: The perception of one's own competence in online communication and collaboration (CYC) affects the level of engagement (COMP)

Hypothesis H5 suggests a negative relationship between "CYC" (Online Communication and Collaboration) and "COMP" (Engagement). The results show a regression coefficient (β) of -0.735, which supports a negative relationship between the two variables. This coefficient is significant at a level of $p < 0.05$, indicating a statistically supported relationship.

The confidence interval, between -0.836 and -0.729, delimits the range where the real value of the coefficient lies in the population. Although it includes values close to zero, the negative coefficient confirms the inverse relationship between "CYC" and "COMP". The t-value, calculated via bootstrap, is 2.497 with $p = 0.013$, verifying the statistical significance of the relationship.

The effect size (f^2) is 1.296, which indicates a medium effect and suggests that the impact of CYC on COMP has moderate relevance. In summary, the results validate hypothesis H5, indicating that the perception of competence in Online Communication and Collaboration ("CYC") maintains a significant negative relationship with Engagement ("COMP"), and that this medium-sized effect has significant implications for how online interactions can influence a person's level of engagement.

4.3. Hypothesis 3: The perception of one's own competence in online communication and collaboration (CYC) impacts academic achievements (LOGR)

Hypothesis H6 postulates that there is a positive relationship between "CYC" (Online Communication and Collaboration) and "LOGR" (Academic Achievement). The results show a regression coefficient (β) of 1.018, supporting this positive relationship between the two variables, with a significance level of $p < 0.01$, which guarantees statistical support.

The confidence interval, between 0.935 and 1.165, indicates the probable range of the real coefficient value in the population. The absence of values close to zero in this interval supports the positive relationship between "CYC" and "LOGR". Furthermore, the t-value obtained through bootstrap is 17.286, with $p < 0.001$, confirming the statistical significance of the relationship.

The effect size (f^2) is 2.783, a value that represents a considerable effect, suggesting a strong relationship between CYC and academic achievements. Therefore, these results support hypothesis H6, showing that Online Communication and Collaboration ("CYC") has a positive and significant relationship with Academic Achievement ("LOGR") and that the effect size is large. These findings highlight the importance of CYC in the context of academic achievement, pointing to the positive impact of online interaction on student performance.

5. CONCLUSIONS AND DISCUSSION

To answer the research question, "What are the digital competencies that influence academic performance in higher education?" the goal is to investigate how certain digital competencies relate to students' academic performance in university settings. This chapter presents the main contributions of this study, both theoretical and practical, as well as its limitations and suggestions for future research.

5.1. Conclusions and implications

A fundamental contribution to the literature on digital competencies applied to active learning is the developed theoretical framework, which explores how these competencies are linked to academic performance. This framework has allowed for the categorization of key aspects addressed in previous studies on digital competencies in the educational field. Among the most relevant findings, it is confirmed that student motivation increases when they possess online communication and collaboration skills, establishing a positive relationship between both variables. However, student engagement shows an inverse relationship with digital competence, suggesting that the use of digital tools can lead to a disconnection from the physical learning environment. Finally, it is highlighted that a greater mastery of online communication and collaboration contributes significantly to the improvement of students' academic performance. In this context, and considering the characteristics of Generation Z, which is currently the majority of the university students, a specific focus on their motivations and learning styles has been chosen, differentiating them from previous generations. This innovative approach, which focuses on the student's perspective rather than the teacher's, examines the reasons and benefits of the learning methods that this generation values.

The second key contribution is the identification of determining elements for academic success, such as motivation, engagement, and academic achievements, offering a valuable theoretical contribution to higher education. The main findings derived from the theoretical model in this article are presented below (see Table 5).

This research focuses on a single private university and students from a specific degree program, which may limit the generalization of the results to other educational contexts and disciplines. It is recommended to explore the influence of online communication and collaboration competence at other educational levels and in different areas of study to obtain a broader view of the phenomenon.

Table 5.

Summary of hypothesis testing.

Hypothesis	Verification
H1. Perception of one's own competence in online communication and collaboration (CYC) impacts the level of motivation (MOT).	✓
H2. The perception of one's own competence in online communication and collaboration (CYC) affects the level of commitment (COMP).	✗
H3. The perception of one's own competence in online communication and collaboration (CYC) impacts academic achievement (LOGR).	✓

Source: Elaborated by the authors, 2024.

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