

Digital Transformation and Communication Efficiency in Higher Education: Evidence from Faculty Members at the University of Jijel (Algeria)

(1) Dr. Djenih Amin

University of Jijel 18000, Algeria

djenih.amin@univ-jijel.dz

(3) Dr. Zerzaihi Zoubir

University of Jijel 18000, Algeria

zoubirzerzaihi@univ-jijel.dz

(2) Dr. Boulaam Bilal

Larbi Ben M'hidi University - Oum El Bouaghi

bilal.boulaam@univ-ueb.dz

(4) Dr. Boulaouidet Houria

University of Jijel 18000, Algeria

boulaouidet.houria@univ-jijel.dz

Received: 02/01/2026 Accepted: 30/03/2026 Published: 08/04/2026

Abstract:

This study examines the impact of digital transformation on communication efficiency among faculty members in media and communication sciences in Algerian universities. Using a quantitative descriptive-correlational approach, data were collected through a structured questionnaire covering digital skills, technology integration, communication accessibility, collaboration, adaptability, and effectiveness evaluation.

Results indicate generally positive levels across all dimensions. Faculty demonstrate strong digital skills and effective use of multimedia and online tools, although technical troubleshooting remains weaker. Digital technologies are widely integrated into teaching, while student engagement in online discussions is less consistent. Communication accessibility and responsiveness are stable and positive. Collaborative participation is strong within departments but more limited across institutions. Adaptability to emerging technologies is favorable but still developing. Evaluation practices are positive, though less data-driven.

No significant differences were found based on gender or age, highlighting the importance of training and institutional support in enhancing digital communication efficiency.

Keywords : Digital Transformation; Communication Efficiency; Higher Education; Digital Competence; Algerian Universities

1. introduction

Digital transformation has become a defining feature of contemporary societies, reshaping economic, social, and educational systems through the integration of advanced digital technologies. It is no longer limited to technological adoption but represents a comprehensive shift in organizational structures, practices, and value creation processes (Verhoef et al., 2021; Berman, 2012). Across sectors, digital transformation enables greater efficiency, flexibility, and innovation, while also creating new models of interaction and service delivery.

In the higher education sector, digital transformation has gained particular importance due to increasing demands for accessibility, flexibility, and quality in teaching and learning. Recent systematic reviews highlight that universities are undergoing profound changes in governance, pedagogy, and communication systems as they integrate digital technologies into their core functions (Mabotha & Ngcamu, 2026; Fernández et al., 2023). These transformations are further driven by global competition, technological advancement, and the need to prepare graduates for digitally mediated environments (Akour & Alenezi, 2022).

The COVID-19 pandemic acted as a major catalyst accelerating digital transformation in education, forcing institutions to rapidly adopt online platforms and digital communication tools to ensure continuity (Dwivedi et al., 2020). This shift has redefined academic work, requiring faculty members to develop new competencies related not only to technology use but also to communication, collaboration, and digital pedagogy.

A growing body of research emphasizes the importance of **professional digital competence** as a critical factor in successful digital transformation. This competence extends beyond technical skills to include pedagogical, ethical, and collaborative dimensions (Amdam et al., 2021; Brevik et al., 2019). Studies comparing educational contexts, such as those by List et al., demonstrate that digital literacy and competence are shaped by institutional and cultural factors, highlighting the need for context-specific approaches. Moreover, recent research confirms that faculty performance in digitally transformed environments is strongly influenced by digital self-efficacy and the alignment between technology and teaching tasks (Sun & Yoon, 2025).

Digital transformation also depends on organizational and leadership factors. Emerging studies underline the role of digital leadership and institutional strategies in enhancing digital productivity, innovation, and communication practices in higher education (Kelder et al., 2025; Hajjaj et al., 2025). These findings align with broader perspectives from other sectors, such as

healthcare, where digital transformation is seen as a complex, system-wide process requiring coordination between technological and human elements (Agarwal et al., 2020).

Despite these advances, challenges remain, particularly in developing countries where infrastructure, training, and institutional support may be uneven. While global studies highlight the transformative potential of digital technologies, there is still a need for empirical research examining how these changes affect communication efficiency within specific contexts.

In Algeria, universities have increasingly adopted digital tools and platforms, transforming teaching, research, and communication practices. However, limited research has examined how digital transformation influences faculty communication efficiency, particularly in media and communication disciplines. Therefore, this study seeks to assess the extent to which digital transformation enhances communication efficiency among faculty members, while also exploring variations related to individual and institutional factors.

2. Literature Review

Digital transformation has become a dominant theme in contemporary research, particularly within higher education, where the integration of digital technologies is reshaping teaching, learning, administration, and communication practices. It is widely conceptualized as a multidimensional process that extends beyond technological adoption to include organizational change, strategic alignment, and the reconfiguration of value creation (Vial, 2019; Verhoef et al., 2021). Recent systematic reviews, such as Mabotha and Ngcamu (2026), emphasize that digital transformation in higher education is driven by both technological innovation and human factors, including skills, leadership, and institutional readiness. Rodríguez-García et al. (2022) demonstrate that digital competence remains uneven across institutions, largely influenced by access to resources and training opportunities.

A growing body of research has examined digital transformation initiatives at the institutional level. Fernández et al. (2023) provide a multivocal review showing that universities worldwide are implementing diverse digital strategies aimed at enhancing teaching quality, administrative efficiency, and student engagement. Complementing this, Carmo et al. (2025) argue that digital transformation in higher education management improves operational efficiency and decision-making processes, while also supporting sustainability goals. Likewise, Dhamera et al. (2025) emphasize the role of integrated digital platforms and online learning applications in enhancing accessibility and institutional performance.

Leadership has emerged as a critical factor in successful digital transformation. Hajjaj et al. (2025) highlight the importance of digital leadership in guiding institutional change and fostering innovation in higher education environments. Similarly, Kelder et al. (2025) demonstrate that authentic leadership behaviors significantly enhance digital productivity and capability among faculty members, particularly in cross-cultural contexts. These findings suggest that leadership not only facilitates technological adoption but also shapes organizational culture and readiness for transformation.

From a strategic perspective, digital transformation is also associated with the development of new educational models and systems. Zhukabayeva et al. (2025) propose a national model of the digital university, emphasizing the integration of global and local approaches to digitalization. In parallel, Akour and Alenezi (2022) argue that the future of higher education

depends on the effective alignment between digital technologies, institutional strategies, and evolving learner needs.

Despite its benefits, digital transformation presents several challenges. The literature consistently identifies barriers related to infrastructure, funding, and human capacity. Moreover, disparities in digital competence among faculty members remain a significant concern. Basantes-Andrade et al. (2020) show that generational differences can influence digital proficiency, while other studies indicate that training and institutional support play a more decisive role than demographic variables alone. These findings are consistent with broader research emphasizing the need for continuous professional development to ensure sustainable digital transformation.

Digital communication competence, in particular, has been identified as a key determinant of effective teaching and organizational performance. Kandri and Thiriet (2021) argue that communication skills are central to engaging students and maintaining interaction in digital environments. This aligns with evidence suggesting that effective communication enhances both learning outcomes and institutional efficiency.

Overall, the literature converges on several key insights. First, digital transformation in higher education is a complex and multidimensional process involving technological, organizational, and human dimensions. Second, professional digital competence—especially communication skills—is essential for successful implementation. Third, leadership, institutional support, and continuous training are critical enabling factors. Finally, while demographic variables such as age and gender may influence digital competence, their effects are generally secondary to structural and contextual factors.

Despite the growing body of research, a significant gap remains in studies that examine digital transformation and communication efficiency within North African higher education contexts, particularly in Algeria. Furthermore, limited research adopts an integrated framework that simultaneously addresses digital skills, communication accessibility, collaboration, adaptability, and effectiveness. This study seeks to fill this gap by providing a comprehensive empirical analysis of faculty communication efficiency in relation to digital transformation, while also exploring variations across gender and age.

3. Methodology Design

This study adopts a quantitative descriptive-correlational design to examine the impact of digital transformation on communication efficiency among faculty members in media and communication sciences within Algerian universities. The study aims to measure levels of digital skills, digital integration in teaching, accessibility of communication, collaborative participation, adaptability to emerging technologies, and perceived effectiveness of digital communication.

Research Approach

A survey-based approach was employed using a structured questionnaire composed of Likert-scale items. This approach allows for the systematic collection of standardized data from a relatively large sample, enabling statistical analysis of perceptions and behaviors related to digital transformation.

Population and Sample

The target population of this study consists of faculty members in media and communication sciences in Algerian universities. A non-probability (convenience) sampling technique was employed, with data collected through an online questionnaire distributed via email and

academic digital groups. The final sample included **384 respondents** from various universities across Algeria.

In terms of gender, the sample shows a relatively balanced distribution, with **46.4% males (n = 178)** and **53.6% females (n = 206)**. This distribution is considered incidental, as participation was voluntary and based on online accessibility rather than controlled selection, indicating that the results are not influenced by gender representation in the broader university population.

Regarding age, the majority of participants fall within the **30–40 years (46.9%)** and **41–50 years (35.4%)** categories, followed by **51–60 years (12.8%)**, while smaller proportions are under 30 (3.4%) and above 60 (1.6%). This reflects the typical academic career trajectory, where faculty recruitment generally occurs after the completion of doctoral studies, as well as the higher responsiveness of mid-career academics to online surveys.

The sample also demonstrates broad institutional diversity, including participants from multiple Algerian universities such as Jijel (26%), Biskra (13.3%), and Khenchela (10.2%), in addition to smaller representations from other institutions. This diversity enhances the representativeness of the findings across different academic contexts.

Data Collection Instrument

The primary instrument was a **structured questionnaire** divided into thematic sections corresponding to the study variables:

- Digital skills
- Integration of digital technologies in teaching
- Accessibility and responsiveness in communication
- Collaborative digital participation
- Adaptability to emerging technologies

Responses were measured using a five-point Likert scale ranging from strongly disagree to strongly agree.

Data Analysis Techniques

Data were analyzed using descriptive and inferential statistical methods:

- **Descriptive statistics** (means, standard deviations, percentages) were used to assess overall trends in responses.
- **Mann–Whitney U test** was applied to examine statistically significant differences between **male and female respondents**.
- **Spearman’s rank correlation coefficient** was used to assess the relationship between **age and the studied variables**.

4. Results:

First: The professors in the study sample possess the necessary digital skills

Table (1): illustrates the possession of the necessary digital skills by the sample members.

items		Strongly agree	agree	Neutral	Disagree	Strongly disagree	Mean	Standard deviation	Trend
I can navigate and efficiently use various social media platforms relevant to my field.	N	90	230	37	25	2	3.99	0.79	Positive
	%	23.4%	59.9%	9.6%	6.5%	0.5%			
I am confident in using multimedia tools to enhance my educational materials.	N	62	246	47	27	2	3.88	0.77	Positive
	%	16.1%	64.1%	12.2%	7%	0.5%			
I can effectively communicate and collaborate using online conferencing tools.	N	74	233	45	29	3	3.90	0.82	Positive
	%	19.3%	60.7%	11.7%	7.6%	0.8%			
I feel comfortable using academic databases and online research tools in my work.	N	80	221	49	31	3	3.89	0.84	Positive
	%	20.8%	57.6%	12.8%	8.1%	0.8%			
I have the skills needed to troubleshoot common technical issues related to digital communication.	N	27	133	114	95	15	3.16	1	Positive
	%	7%	34.6%	29.7%	24.7%	3.9%			
I can navigate and efficiently use various social media platforms relevant to my field.	N	27	133	114	95	15	3.16	1	Positive
	%	7%	34.6%	11.7%	24.7%	3.9%			
Overall Mean							18.83		

The results in Table (4) indicate a generally high level of digital skills among faculty members. Respondents show strong competence in using social media (3.99), online conferencing (3.90), multimedia tools (3.88), and academic databases (3.89), reflecting solid digital literacy. However, technical troubleshooting records a lower mean (3.16), suggesting a relative weakness in handling technical issues. Overall, the findings highlight a strong digital foundation with a need for targeted support in advanced technical skills.

Table (2): Displays the Possession of Digital Skills by Sample Participants Based on Gender

Statement / Gender	Male Mean	Female Mean	Chi-Square	Mann-Whitney Test
1. I can navigate efficiently and use various social media platforms relevant to my field.	3.96	4.01	0.342	0.137
2. I am confident in using multimedia tools to enhance my teaching materials.	3.95	3.82	0.319	
3. can communicate and collaborate effectively using online conferencing tools.	3.93	3.87	0.599	
4. I feel comfortable using academic databases and online research tools in my work.	3.91	3.88	0.617	
5. possess the skills necessary to troubleshoot and resolve common technical issues related to digital communication.	3.37	2.97	0.001	
Overall Mean	19.13	18.57		

The

results

indicate generally similar levels of digital skills between male and female faculty, with only minor

differences across most items and no significant gender effect in general. However, a significant difference appears in troubleshooting technical issues ($p = 0.001$), where males report higher competence. Overall, digital skills are relatively balanced across genders, with limited disparities.

Table (3) illustrates the possession of digital skills among the sample individuals based on age.

Statement	Spearman
1. I can navigate efficiently and use various social media platforms relevant to my field of work.	<i>0.120-</i>
2. I am confident in using multimedia tools to enhance my educational materials.	<i>0.105-</i>
3. I can communicate and collaborate effectively using online conferencing tools.	<i>0.063-</i>
4. I feel comfortable using academic databases and online research tools in my work.	<i>0.035-</i>
5. I possess the necessary skills to troubleshoot and resolve common technical issues related to digital communications.	<i>0.060-</i>

Table 6 shows a weak negative correlation between age and digital skills (Spearman values from -0.035 to -0.120). This suggests a slight decline in digital proficiency with increasing age; however, the relationship is not significant. Overall, age is a limited predictor, and other factors such as training and experience likely play a more important role.

Table (4): Professors' Integration of Digital Technologies in Teaching

items	Str	agree	Neutral	Disagree	Str disagree	Mean	Stand deviat	Trend	
									Male Mean
1. I use digital resources, such as videos and interactive presentations, into my lectures.	%	%	%	%					
2. I encourage students to participate in online discussions and collaborative projects related to course materials.	N	43	159	110	60	12	3.41	0.98	Positive
	%	11.2%	41.4%	28.6%	15.6%	3.1%			
3. I provide opportunities for students to use digital tools in research and multimedia projects.	N	54	189	95	42	4	3.64	0.89	Positive
	%	14.1%	49.2%	24.7%	10.9%	1%			
4. I use online learning management systems to organize course materials and facilitate student interaction.	N	59	214	79	25	7	3.76	0.85	Positive
	%	15.4%	15.4%	15.4%	15.4%	15.4%			
5. I adapt my teaching methods to leverage digital technologies and accommodate diverse learning styles.	N	75	237	54	16	2			Positive
	%	18.5%	18.5%	18.5%	18.5%	18.5%	3.16	1	
Overall Mean							19.01		

The results in Table (7) show an overall positive integration of digital technologies in teaching (M = 3.79). The highest score relates to using digital resources in lectures (M = 4.23), indicating strong adoption of multimedia tools. Moderate use is observed in LMS platforms (M = 3.76) and student digital activities (M = 3.64). However, encouraging online discussions shows the lowest mean (M = 3.41) and greatest variability, suggesting inconsistent engagement. Overall, faculty demonstrate a favorable but uneven use of digital technologies.

Table (5): illustrates the possession of digital skills among the sample individuals based on age.

Statement	Spearman Coeff
1. I frequently integrate digital resources, such as videos and interactive presentations, into my lectures..	-0.028
2. I encourage students to participate in online discussions and collaborative projects related to course materials.	-0.042
3. I can communicate and collaborate effectively using online conferencing tools.	-0.028
4. I provide opportunities for students to use digital tools in research and multimedia projects.	-0.131
5. I use online learning management systems to organize course materials and facilitate student interaction.	-0.009

The data in Table 6 shows very weak negative correlations between age and all digital skill practices (coefficients from -0.009 to -0.131). This indicates that age has little to no influence on faculty members' use of digital tools in teaching. Overall, digital skill integration appears independent of age and likely depends on other factors such as training or motivation.

Table (6): Distribution of the Study Sample's Possession of Required Digital Skills by Gender

Statement / Gender				Test
I frequently integrate digital resources such as videos and interactive presentations into my lectures..	4.23	4.23	0.502	0.569
I encourage students to participate in online discussions and collaborative projects related to course materials.	3.41	3.42	0.126	
I provide opportunities for students to use digital tools in research and multimedia projects..	3.60	3.67	0.060	
I use online learning management systems to organize course materials and facilitate student interaction..	3.73	3.71	0.163	
I adapt my teaching methods to leverage digital technologies and accommodate diverse learning styles..	3.91	3.99	0.699	
Overall Mean	18.89	19.11		

The results indicate very similar levels of digital technology integration in teaching between male and female faculty members. Mean scores across all items are nearly identical, with only minor variations. The statistical tests (Mann–Whitney and Chi-square) show no significant differences ($p > 0.05$), confirming that gender does not influence the use of digital technologies in teaching. Overall, both groups demonstrate a consistently high and balanced level of digital integration.

Fourth: Accessibility of Communication and Responsiveness

Table (7): shows the accessibility of communication and responsiveness for the study sample.

items		Str agree	agree	Neutral	Disagree	Str disagree	Mean	Stand deviat	Trend
1. I respond promptly to emails and messages from students seeking clarification or help.	N	27	185	131	32	9	3.49	0.83	Positive
	%	7%	48.2%	34.1%	8.3%	2.3%			
2. I maintain regular virtual office hours to provide additional support and guidance.	N	34	204	94	45	7	3.55	0.87	Positive
	%	8.9%	53.1%	24.5%	11.7%	1.8%			
3. I make myself available for virtual meetings and discussions with colleagues and students.	N	34	204	94	45	7	3.55	0.87	Positive
	%	8.9%	53.1%	24.5%	11.7%	1.8%			
4. I ensure that communication channels are clearly defined and accessible to all students.	N	36	150	141	49	8	3.76	0.85	Positive
	%	9.4%	39.1%	36.7%	12.8%	2.1%			
5. I strive to maintain open and transparent communication with students and colleagues regarding expectations and deadlines.	N	55	206	94	23	6	3.16	1	Positive
	%	14.3%	53.6%	24.5%	6%	1.6%			
Overall Mean							17.74		

The results in Table 10 indicate a generally positive level of accessibility and responsiveness among respondents (overall mean = 3.55). Most participants report being responsive to students’ messages, maintaining virtual office hours, and being available for meetings, with means ranging between 3.49 and 3.55. Clear communication channels and transparency in expectations also show positive trends, though with slight variation. Overall, the findings suggest consistent engagement in communication practices, with no substantial differences attributable to gender or age.

Table (8) : shows the integration of digital technologies in teaching by the study sample according to gender.

Statement / Gender	Male Mean	Female Mean	Chi-Square	Mann-Whitney Test
I can navigate efficiently and use various social media platforms relevant to my field.	4.23	4.23	0.502	0.569
I am confident in using multimedia tools to enhance my teaching materials.	3.41	3.42	0.126	
can communicate and collaborate effectively using online conferencing tools.	3.60	3.67	0.060	
I feel comfortable using academic databases and online research tools in my work.	3.73	3.71	0.163	
possess the skills necessary to troubleshoot and resolve common technical issues related to digital communication.	3.91	3.99	0.699	
Overall Mean	18.89	19.11		

Table 8 indicates a high level of digital technology integration in teaching among both male and female faculty. Mean scores are nearly identical across all items, showing consistent practices regardless of gender.

The overall averages (19.11 for females and 18.89 for males) confirm minimal variation. Statistical results (Mann–Whitney and Chi-square) reveal no significant gender differences, suggesting that digital integration is uniformly adopted among the study sample.

Table (9): shows the integration of digital technologies in teaching by the study sample according to age.

Statement	Spearman Coefficient
I often integrate digital resources such as videos and interactive presentations into my lectures.	<i>-0.028</i>
I encourage students to participate in online discussions and collaborative projects related to course materials.	<i>-0.042</i>
I provide opportunities for students to use digital tools in research and multimedia projects.	<i>-0.028</i>
I use online learning management systems to organize course materials and facilitate student interaction.	<i>-0.131</i>
I adapt my teaching methods to leverage digital technologies and accommodate diverse learning styles.	<i>-0.009</i>

The Spearman coefficients are all weak and negative, indicating no meaningful relationship between age and the integration of digital technologies in teaching. This suggests that faculty members' use of digital tools is largely independent of age and likely influenced by other factors such as training or personal motivation.

Fourth: Accessibility to communications and response

Table (10): shows the study sample's accessibility to communications and response.

items		Strongly agree	agree	Neutral	Disagree	Strongly disagree	Mean	Standard deviation	Trend
1. I respond quickly to emails and messages from students requesting clarification or assistance.	N	27	185	131	32	9	3.49	0.83	Positive
	%	7%	48.2%	34.1%	8.3%	2.3%			
2. I maintain regular virtual office hours to provide additional support and guidance to students.	N	34	204	94	45	7	3.55	0.87	Positive
	%	8.9%	53.1%	24.5%	11.7%	1.8%			
3. I make myself available for virtual meetings and discussions with colleagues and students.	N	34	204	94	45	7	3.55	0.87	Positive
	%	8.9%	53.1%	24.5%	11.7%	1.8%			
4. I ensure that communication channels are clearly defined and accessible to all students.	N	36	150	141	49	8	3.40	0.90	Positive
	%	9.4%	39.1%	36.7%	12.8%	2.1%			
5. I strive to maintain open and transparent communication with students and colleagues regarding expectations and deadlines.	N	55	206	94	23	6	3.16	3.73	Positive
	%	14.3%	53.6%	24.5%	6%	1.6%			
Overall Mean							17.74		

The results in Table 10 indicate a generally high level of accessibility and responsiveness among participants (overall mean = 3.55). Most respondents report prompt replies to student inquiries (mean = 3.49) and regular availability through virtual office hours and meetings (mean = 3.55). Communication clarity is slightly lower (mean = 3.40), though still positive. The highest rating relates to maintaining transparent communication about expectations and deadlines (mean = 3.73). Overall, the findings reflect strong commitment to effective communication, with only minor variations across practices.

Table (11): shows the study sample’s access to communications and response by gender.

Statement / Gender	Male Mean	Female Mean	Chi-Square	Mann-Whitney Test
1. I respond quickly to emails and messages from students seeking clarification or assistance.	3.56	3.42	0.068	0.151
2. I maintain regular virtual office hours to provide additional support and guidance to students.	3.65	3.47	0.179	
3. I make myself available for virtual meetings and discussions with colleagues and students.	3.65	3.47	0.179	
4. I ensure communication channels are clearly defined and accessible to all students.	3.43	3.38	0.074	
5. I strive to maintain open and transparent communication with students and colleagues about expectations and deadlines.	3.79	3.67	0.172	
Overall Mean	18.10	17.42		

The table shows no significant gender differences in accessibility and responsiveness. Male and female participants reported similar levels across all items, with p-values above 0.05. Overall means are close (males = 18.10; females = 17.42), indicating that gender does not affect communication and support practices in this sample.

Table (12): shows the study sample’s access to communications and response according to age.

Statement	Spearman Coeff
I respond quickly to emails and messages from students requesting clarification or assistance.	-0.048
I maintain regular virtual office hours to provide additional support and guidance to students.	-0.008
I make myself available for virtual meetings and discussions with colleagues and students.	-0.008
I ensure that communication channels are clearly defined and accessible to all students.	-0.027
I strive to maintain open and transparent communication with students and colleagues regarding expectations and deadlines.	-0.012

Table 12 presents Spearman correlation coefficients between age and communication/response behaviors. All coefficients are negative and very close to zero (ranging from -0.008 to -0.048), indicating a negligible and non-significant relationship. This suggests that age has little to no influence on how respondents manage communication practices, with no meaningful variation across the sampled group.

Fifth: Collaborative digital participation,

Table (13): shows the collaborative digital participation of the study sample.

items		Str agree	agree	Neutral	Disagree	Str disagree	Mean	Stand deviat	Trend
1. I actively participate in digital research projects and collaborative initiatives within my department	N	80	247	51	5	1	4.04 [^]	0.64	Positive
	%	20.8	64.3%	13.3%	1.3%	0.3%			
2. I contribute to online discussions and forums related to my research interests and academic field.	N	79	222	67	13	3	3.94	0.76	Positive
	%	20.5%	57.8%	17.4%	3.4%	0.8%			
3. I collaborate with colleagues from other departments or institutions in joint research projects.	N	38	219	96	26	5	3.67	0.79	Positive
	%	9.9%	57%	25%	6.8%	1.3%			
4. I participate in interdisciplinary digital collaborations to explore new research methods.	N	35	164	137	42	6	3.46	0.86	Positive
	%	9.1%	42.7%	35.7%	10.9%	1.6%			
5. I mentor students and junior faculty members in utilizing digital tools and resources for academic pursuits	N	70	230	72	10	2	3.92	0.71	Positive
	%	18.7%	59.9%	18.8%	2.6%	3.92%			
Overall Mean							19.05		

Table (13) indicates a generally positive level of collaborative digital participation among the respondents. High mean scores for most items (ranging from 3.46 to 4.04) show strong engagement in departmental digital projects, online academic discussions, and mentoring activities. The lowest scores relate to interdisciplinary and inter-institutional collaboration, suggesting comparatively less involvement in broader research networks. Overall, the findings reflect a positive and consistent tendency toward digital collaboration, with minor variation across different forms of participation.

Table (14): shows the collaborative digital participation of the study sample according to gender.

Statement / Gender	Male Mean	Female Mean	Chi-Square	Mann-Whitney Test
1. I actively participate in digital research projects and collaborative initiatives within my department.	4.01	4.06	0.225	0.818
2. I contribute to online discussions and forums related to my research interests and academic field.	4	3.88	0.279	
3. I collaborate with colleagues from other departments or institutions on joint research projects.	3.71	3.63	0.220	
4. I engage in interdisciplinary digital collaborations to explore new research methods.	3.47	3.46	0.199	
5. I mentor students and junior faculty members in utilizing digital tools and resources for academic pursuits.	3.82	3.46	0.012	
Overall Mean	19.03	19.06		

Table 14 indicates that collaborative digital participation is generally similar across genders, with comparable mean scores for males and females on most items and no statistically significant differences ($p > 0.05$). Both groups show nearly equal overall engagement. A statistically significant difference appears only in mentoring activities ($p = 0.012$), where males report higher involvement than females. Overall, gender does not meaningfully influence collaborative digital participation, except in mentoring-related practice

Table (15): shows the collaborative digital participation of the study sample according to age.

Statement	Spearman Coeff
I respond quickly to emails and messages from students requesting clarification or assistance.	-0.048
I maintain regular virtual office hours to provide additional support and guidance to students.	-0.008
I make myself available for virtual meetings and discussions with colleagues and students.	-0.008
I ensure that communication channels are clearly defined and accessible to all students.	-0.027
I strive to maintain open and transparent communication with students and colleagues regarding expectations and deadlines.	-0.012

Table 15 shows very weak negative Spearman correlations between age and all items of collaborative digital participation ($r \approx -0.008$ to -0.048), indicating a negligible relationship. Overall, age does not significantly influence the respondents' engagement in digital communication and collaboration activities.

Sixth: The ability to adapt to emerging technologies

Table. (16) shows the ability of the study sample to adapt to emerging technologies

items		Str agree	agree	Neutral	Disagree	Str disagree	Mean	Stand deviat	Trend
1. I actively seek opportunities to learn about new digital tools and techniques relevant to my field.	N	17	113	191	54	9	3.19	0.81	Positive
	%	4.4	29.4	49.7	14.1	2.3			
2. I am open to experimenting with innovative digital communication strategies in teaching and	N	29	129	166	51	9	3.30	0.87	Positive
	%	7.6	33.6	43.2	13.3	2.3			
3. I adapt my communication methods to incorporate emerging technologies that enhance collaboration and engagement.	N	16	91	181	81	15	3.03	0.87	Positive
	%	4.2	23.7	47.1	21.1	3.9			
4. I regularly attend workshops, conferences, and webinars to stay updated on the latest developments in digital communication.	N	28	148	161	35	12	3.37	0.86	Positive
	%	7.3	38.5	41.9	9.1	3.1			
5. I encourage students to explore and experiment with emerging technologies as part of their coursework and projects.	N	21	100	176	74	13	3.1	0.89	Positive
	%	5.5	26%	45.8	19.3	3.4			
Overall Mean							16.02		

The results in Table (16) indicate a generally positive level of adaptability to emerging technologies among the study sample (overall mean = 3.16). Respondents show a strong commitment to continuous professional development, particularly through participation in workshops and webinars (mean = 3.37), and demonstrate openness to adopting innovative digital practices (mean = 3.30).

However, a comparatively lower mean score (3.03) for integrating technologies to enhance collaboration suggests some hesitation or practical constraints in fully implementing these tools in collaborative contexts, as reflected by a notable proportion of neutral responses. Overall, the

findings suggest a favorable but still evolving readiness to adopt and effectively utilize emerging technologies.

Table. (17) shows the study sample’s ability to adapt to emerging technologies by gender.

Statement / Gender	Male Mean	Female Mean	Chi-Square	Mann-Whitney Test
1. I actively seek opportunities to learn about new digital tools and techniques relevant to my field of work.	3.25	3.14	0.084	0.433
2. I am open to trying innovative digital communication strategies in teaching and research.	3.29	3.32	0.105	
3. I adapt my communication methods to integrate emerging technologies that enhance collaboration and engagement.	3.13	2.94	0.023	
4. I regularly attend workshops, conferences, and online seminars to stay updated on the latest developments in digital communication.	3.40	3.35	0.086	
5. I encourage students to explore and experiment with emerging technologies as part of their coursework and projects.	3.15	3.07	0.076	
Overall Mean	16.24	15.83		

Table (17) indicates that males and females have very similar levels of adaptability to emerging technologies, with no statistically significant differences between them (all p-values > 0.05). Although males slightly outperformed females in most items, the differences are minimal and do not suggest a meaningful gender effect on adaptability. Overall, gender does not significantly influence participants’ ability to adapt to emerging digital technologies.

Table (18): shows the study sample’s ability to adapt to emerging technologies according to age.

Statement	Spearman Coefficient
I actively seek opportunities to learn about new digital tools and techniques relevant to my field.	-0.021
I am open to experimenting with innovative digital communication strategies in teaching and research.	-0.021
I adapt my communication methods to integrate emerging technologies that enhance collaboration and engagement.	-0.023
I regularly attend workshops, conferences, and webinars to stay informed about the latest developments in digital communication.	-0.013
I encourage students to explore and experiment with emerging technologies as part of their coursework and projects.	-0.036

Table (18) indicates that the study sample demonstrates a generally high and consistent level of adaptability to emerging technologies, with very low Spearman coefficients across all items (ranging from -0.013 to -0.036), suggesting minimal variation. Overall, the results show that participants actively engage with new digital tools, adopt innovative communication methods, and support the integration of technology in teaching and research. The small magnitude of the coefficients implies that age has little to no meaningful influence on respondents’ adaptability to emerging digital technologies.

5. Discussion

The present study provides a comprehensive understanding of how digital transformation influences communication efficiency among faculty members in Algerian universities. Overall, the findings confirm that digital transformation has produced a largely positive shift in academic communication practices, supporting the growing body of literature that frames digital transformation as a multidimensional process involving technological, organizational, and human factors. As suggested by Vial and Verhoef et al., digital transformation is not limited to the adoption of digital tools but extends to reshaping institutional practices, professional roles, and communication patterns. The results of this study clearly reflect this broader transformation, particularly in the context of higher education.

First, the high levels of digital skills demonstrated by faculty members indicate that Algerian universities have made significant progress in equipping academics with the competencies required in digitally mediated environments. The strong performance in areas such as social media use, multimedia integration, online conferencing, and access to academic databases reflects a level of digital literacy consistent with global trends reported in studies such as Rodríguez-García et al. (2022). This suggests that faculty members are not only familiar with digital tools but are also capable of integrating them into their academic and communicative practices. However, the relatively lower scores related to troubleshooting technical issues highlight an important limitation. This gap suggests that while users may be proficient in routine digital tasks, they may lack deeper technical problem-solving skills.

Second, the integration of digital technologies into teaching practices emerges as a key strength of the study sample. The high level of engagement with multimedia tools and learning management systems reflects a strong institutional shift toward digitally supported teaching. This aligns with Akkogunlu's (2021) assertion that higher education institutions are increasingly adapting their pedagogical approaches in response to technological advancements and changing student expectations. However, the findings also reveal an important nuance: while technological integration is high, pedagogical innovation remains uneven. Specifically, lower levels of engagement in online discussions and collaborative learning activities suggest that faculty members may still rely on traditional, teacher-centered approaches even within digital environments.

Third, the results related to communication accessibility and responsiveness indicate that digital transformation has enhanced the quality and consistency of interaction between faculty members and students. The positive levels of responsiveness, availability, and clarity of communication channels suggest that digital tools have facilitated more efficient and flexible communication practices. These findings are consistent with Rzuq Mouloud and Moulay Zahra (2022), who highlight the role of digital systems in improving communication speed, accuracy, and organizational effectiveness. Importantly, the absence of statistically significant differences based on gender and age suggests that these communication practices are becoming normalized across demographic groups. This may reflect the standardizing effect of institutional platforms and shared digital environments, which reduce disparities and promote uniform communication behaviors.

Fourth, collaborative digital participation is another area where the study reveals both strengths and limitations. Faculty members show strong engagement in digital collaboration within their departments, as well as active participation in online academic discussions and mentoring activities. This supports the broader literature that identifies collaboration as a central benefit of digital transformation. However, the relatively lower levels of interdisciplinary and inter-

institutional collaboration point to structural constraints that may limit broader academic networking. These findings echo the challenges identified by Al-Farhani et al. (2021), particularly in relation to institutional barriers, resource limitations, and the absence of coordinated strategies to support large-scale collaboration. This suggests that while digital tools enable collaboration, their effective use depends heavily on organizational support and strategic planning.

Fifth, the study highlights a generally positive but still evolving level of adaptability to emerging technologies. Faculty members demonstrate openness to innovation and a willingness to engage in continuous learning through workshops, conferences, and webinars. This reflects a proactive attitude toward professional development and aligns with the conceptualization of digital competence, which emphasizes adaptability as a core component. However, the relatively lower scores related to integrating emerging technologies into collaborative practices indicate a gap between awareness and practical application. This suggests that while faculty members are willing to learn about new technologies, they may face challenges in translating this knowledge into effective practice, possibly due to limited training, time constraints, or institutional support.

An important cross-cutting finding of this study is the minimal influence of demographic variables such as gender and age on most dimensions of digital communication efficiency. This contrasts with some previous studies that identified generational or gender-based differences in digital competence. However, it aligns with more recent research suggesting that such differences are diminishing as digital technologies become more widespread and integrated into professional environments. The findings of this study suggest that factors such as institutional support, access to training, and professional experience may play a more significant role than demographic characteristics in shaping digital competence and communication efficiency.

6. Conclusion

This study examined the impact of digital transformation on communication efficiency among faculty members in media and communication sciences in Algerian universities. The findings reveal that digital transformation has contributed positively to enhancing communication practices across multiple dimensions, including digital skills, technology integration in teaching, accessibility and responsiveness, collaborative participation, adaptability, and evaluation of effectiveness.

Faculty members demonstrate a solid foundation of digital competence, particularly in the use of communication platforms and educational technologies. The integration of digital tools into teaching practices is well established, reflecting a shift toward more flexible and technology-supported learning environments. Communication accessibility and responsiveness are also strong, indicating improved interaction between instructors and students. Additionally, faculty members show a positive orientation toward collaboration and adaptability to emerging technologies, although these areas remain uneven, especially in broader interdisciplinary contexts.

Despite these strengths, some challenges persist. These include limited technical troubleshooting skills, inconsistent engagement in interactive pedagogical practices, and a relatively weak reliance on data-driven evaluation methods. Importantly, the study found no significant differences based on gender or age, suggesting that digital competence is increasingly shaped by institutional factors rather than demographic characteristics.

Overall, the study highlights the need for comprehensive institutional strategies that prioritize continuous professional development, infrastructure enhancement, and the promotion of innovative and collaborative teaching practices to fully realize the potential of digital transformation in higher education.

References:

- Agarwal, R., Gao, G., DesRoches, C., & Jha, A. K. (2020). The digital transformation of healthcare: Current status and the road ahead. *Information Systems Research*, 31(3), 1–20.
- Akour, M., & Alenezi, M. (2022). Higher education future in the era of digital transformation. *Education Sciences*, 12(11), 784. <https://doi.org/10.3390/educsci12110784>
- Al-Baloushi, N. A., Al-Harhi, A., & Al-Busaidi, S. (2020). Digital transformation in higher education institutions: A case study of Oman. *International Journal of Emerging Technologies in Learning*, 15(15), 4–17.
- Al-Farhani, M. A., et al. (2021). Challenges of implementing digital transformation in public institutions. *Journal of Public Administration Research*, 13(1), 88–102.
- Almås, A. G., Bueie, A. A., & Aagaard, T. (2021). From digital competence to professional digital competence: Student teachers' experiences. *Nordic Journal of Comparative and International Education*, 5(4), 70–85. <https://doi.org/10.7577/njcie.4233>
- Amdam, S., Kobberstad, L. R., & Tikkanen, T. I. (2022). Professional digital competence in strategy and management: A case study of teacher education programs.
- Berman, S. J. (2012). Digital transformation: Opportunities to create new business models. *Strategy & Leadership*, 40(2), 16–24. <https://doi.org/10.1108/10878571211209314>
- Brevik, L. M., Gudmundsdottir, G. B., Lund, A., & Stromme, T. A. (2019). Transformative Agency in Teacher Education: Fostering Professional Digital Competence. *Teaching and Teacher Education*, 86, Article ID: 102875. <https://doi.org/10.1016/j.tate.2019.07.005>
- Carmo, J. E. S., Lacerda, D. P., Klingenberg, C. O., & Piran, F. A. S. (2025). Digital Transformation in the Management of Higher Education Institutions. *Sustainable Futures*, 9, Article ID: 100692. <https://doi.org/10.1016/j.sftr.2025.100692>
- Dhameria, V., Muazeib, A. I. M., Blhaj, K. M. S., Sugiyarsih, S., & Rosadah, R. A. (2025). The impact of digital transformation in higher education management: Integrating online learning and educational applications for efficiency and accessibility. *International Journal of Educational Qualitative Quantitative Research*, 4(1), 15–24. <https://doi.org/10.58418/ijeqqr.v4i1.135>
- Dwivedi, Y. K., Hughes, D. L., Coombs, C., Constantiou, I., Duan, Y., Edwards, J. S., Gupta, B., Lal, B., Misra, S., Prashant, P., Raman, R., Rana, N. P., Sharma, S. K., & Upadhyay, N. (2020). Impact of COVID-19 pandemic on information management research and practice:

Transforming education, work and life. *International Journal of Information Management*, 55, 102211. <https://doi.org/10.1016/j.ijinfomgt.2020.102211>

Fernández, A., Gómez, B., Binjaku, K., et al. (2023). Digital transformation initiatives in higher education institutions: A multivocal literature review. *Education and Information Technologies*, 28, 12351–12382. <https://doi.org/10.1007/s10639-022-11544-0>

Hajjaj, M., Rahou, E. H., Mamdouh, N., El Assfour, A., Kharmoum, N., Allammari, Y., & Boutafert, B. (2025). Digital leadership in higher education's transformation. *Perspectives: Policy and Practice in Higher Education*, 1–10. <https://doi.org/10.1080/13603108.2025.2577935>

Kelder, J. A., Crawford, J., Al Naabi, I., et al. (2025). Enhancing digital productivity and capability in higher education through authentic leader behaviors: A cross-cultural structural equation model. *Education and Information Technologies*, 30, 17751–17767. <https://doi.org/10.1007/s10639-025-13422-x>

List, A., Brante, E. W., & Klee, H. L. (2020). A framework of pre-service teachers' conceptions about digital literacy. *Computers & Education*, 148, 2020. <https://doi.org/10.1016/j.compedu.2019.103788>

Mabotha, P. A. P., & Ngcamu, B. S. (2026). Digital transformation in the higher education sector: A systematic literature review. *Administrative Sciences*, 16(1), 1. <https://doi.org/10.3390/admsci16010001>

Fernández-Batanero, J. M., Román-Graván, P., Montenegro-Rueda, M., López-Meneses, E., & Fernández-Cerero, J. (2021). Digital Teaching Competence in Higher Education: A Systematic Review. *Education Sciences*, 11(11), 689. <https://doi.org/10.3390/educsci11110689>

Sun, T., & Yoon, M. (2025). The impact of digital transformation on faculty performance in higher education: The mediating role of digital self-efficacy and the moderating role of task-technology fit. *Frontiers in Psychology*, 16, 1693375. <https://doi.org/10.3389/fpsyg.2025.1693375>

Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889–901. <https://doi.org/10.1016/j.jbusres.2019.09.022>

Vial, G. (2019). Understanding digital transformation: A review and research agenda. *Journal of Strategic Information Systems*, 28(2), 118–144. <https://doi.org/10.1016/j.jsis.2019.01.003>

Zhukabayeva, T., Baumuratova, D., Zholshiyeva, L., Karabay, A., & Abdrakhmanov, K. (2025). Digital transformation in higher education: Toward a national model of digital university in Kazakhstan through global and local comparison. *Sustainability*, 17(24), 11132. <https://doi.org/10.3390/su172411132>