




Communication tools and social media usage: Assessing self-perceived communication competence

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ABSTRACT

Communication skills, such as listening, open-mindedness, empathy, and confidence, are essential for personal and professional development and play a significant role in many disciplines, including education, health, and business. Social media, a widely used communication channel, has revolutionized how people interact, and its effects on education and overall social development are significant. The purpose of this study was to determine the level of communication skills possessed by university students and to determine whether these levels are affected by the social media applications that the students use. In this study, there were 407 participants in the sample, with 55.8% (227) female and 44.2% (180) male. Communication skills scale was used to assess the students' communication skills. Exploratory statistics (mean and standard deviation) were used to determine the participants' communication skill levels. Bayesian statistics were used to determine how well the data supported the differentiation of communication skill levels based on independent variables. The study revealed that most college students possessed moderate communication skills and disclosed disparities between academic departments, underscoring the need to assess curricula and teaching methods. It also suggested that most social media platforms have little effect on communication skills, with some gender differences observed, emphasizing the significance of addressing these differences to enhance the development of communication skills.

Keywords: communication skills, social media usage, university students, Bayesian statistics

INTRODUCTION

Communication is a multifaceted concept that incorporates numerous facets of interpersonal interaction and information exchange. It involves the exchange of thoughts, feelings, and information between

individuals or groups. As the degree to which the responses of a generator and perceiver are systematically correlated to a referent stimulus, "communication" is defined as the exchange of experience (Goyer, 1970). This definition emphasizes the significance of comprehending the complex relationship between the sender and the receiver, as well as the crucial role that context and stimuli play in determining the effectiveness of communication. Communication skills refer to the capacity to effectively transmit and receive information, ideas, and emotions via a variety of channels. These skills are defined as the art of listening and conveying oneself clearly and positively in both oral and written formats (Komba, 2014; Stephenson et al., 2015). The set of skills that includes communication skills also includes crucial soft skills such as listening, open-mindedness, empathy, and confidence, which are regarded as essential for recent graduates entering the workforce (Rahman et al., 2019). These interdependent skills allow individuals to establish meaningful relationships and collaborate effectively in a variety of personal and professional contexts.

In many different fields, such as education (Alshalawi, 2022; Malik et al., 2018; Muste, 2016), health (Alhadabi & Karpinski, 2020; Khamis & Geng, 2021; Kondo et al., 2020; Leal-Costa et al., 2020), and business (Krishnan et al., 2019; Ulas & Akinci Vural, 2019), the significance of having strong communication skills is readily apparent. There is a correlation between developing and maintaining excellent communication skills and higher academic success (Mohammed, 2015), greater employability (Clokie & Fourie, 2016), and enhanced leadership abilities (Yuningsih & Mulyana, 2017), all of which contribute to an individual's personal development and professional progression. Additionally, efficient communication has a significant role in establishing mutual understanding and respect in diverse communities (Mamzer, 2018), hence increasing social cohesiveness (Troth et al., 2012), and decreasing conflicts (Tavakolizadeh et al., 2015). This may be done in a way that promotes social cohesion and reduces conflicts.

Social media refers to digital platforms and technologies through which individuals and communities interact by communicating, sharing information, and collaborating online (Hansen et al., 2010). Boyd and Ellison (2007) define social media as "web-based services that allow their users to create profiles, connect with other users, and access and browse the profiles of other users".

Social media tools can be classified in different ways according to the technology used, their intended use, and the network structures they create (Aichner et al., 2021). In this study, social media applications are discussed in the context of effective communication skills. Social media plays a vital role in communication and interaction by enabling users to share their thoughts, experiences, and content in various channels (Wong et al., 2017). Social media platforms greatly contribute to understanding social and cultural issues (Zaw, 2018) such as the exchange of ideas, and the formation of communities and social movements (Brünker et al., 2020) in today's world.

Effective communication requires selecting the most appropriate communication channel for a given objective, having the necessary expertise to make effective use of that channel, delivering information in a format that is tailored to the specific needs of the audience, and having the capacity to comprehend both the messages sent by others and the responses they send back, among other skills (Komba, 2014). The widely utilized communication channel of social media is used for a variety of reasons, including the gathering and dissemination of information, the sharing of engaging images and videos, and the establishment of personal and social connections. Despite this, several studies have shown evidence that social media has an effect on human behavior and decision-making (Wong et al., 2017). People's actions can be influenced by something as innocuous as a single post or status update, as well as by the comments or criticism they receive on social media. As a result of this, it is extremely important to take into consideration the repercussions of millions of people contributing and receiving feedback, as well as influencing and being affected by others through the usage of social media platforms.

A considerable proportion of individuals engage with social media platforms, such as Twitter, Instagram, LinkedIn, and Facebook, which facilitate the sharing of diverse ideas, content, and information, thereby exerting a substantial influence on education (Shahbaznezhad et al., 2021; Skoric et al., 2016). Furthermore, social media plays a crucial role for students, as it enables them to remain connected with academic activities and fosters the exchange of information (Hussain et al., 2018). Academics also rely on these platforms for various purposes, including hosting lectures, personal branding, and providing pertinent feedback to their students (Alqahtani, 2019).

In the past two decades, social media have become an increasingly prevalent form of communication and have revolutionized how people interact and communicate with one another (Wong et al., 2017). Therefore, it is essential to comprehend how social media use affects communication skills and overall social development. The connection between social media use and communication abilities is intricate and multifaceted (Jimenez & Morreale, 2015).

Some studies have demonstrated that social media use can result in the emergence of new language forms and abbreviations, such as emoticons and acronyms (Alshenqeeti, 2016; Veytia-Bucheli et al., 2020). Even though these shortcuts can facilitate quicker communication, it has been argued that they can also result in a decline in traditional grammar and spelling skills. However, Datta and Ghosh's (2020) research indicates that texting has no effect on the language skills of youthful generations.

Nonverbal communication is an essential component of human interaction, and it includes elements such as body language, facial expressions, and gestures. However, these cues are frequently absent or altered in digital communications, leading to misinterpretations and misunderstandings. Ruben et al. (2021) suggest that it may not be technology use itself that facilitates or inhibits nonverbal decoding skills, but rather how actively or passively users engage with technology.

Social media is a platform that enables users to communicate with and develop relationships with others (Zaw, 2018). However, research indicates that excessive use may reduce the quality of interpersonal relationships, and users may prioritize online connections over face-to-face interactions (Bouffard et al., 2022). This can result in a decline in interpersonal communication skills like active listening, empathy, and conflict resolution. However, the study revealed a feeble and inverse correlation between communication skills and social media addiction among college students (Aliusta et al., 2019).

The study aimed to examine whether the communication skills of university students change according to the social media applications they use. In this context, the following research questions were created:

1. What are the levels of communication skills among the participants in the study?
2. To what extent do the data support a differentiation in participants' communication skills levels based on gender, WhatsApp usage, Telegram usage, Instagram usage, TikTok usage, YouTube usage, and Pinterest usage?

METHOD

A cross-sectional study approach (Pandis, 2014) was used to answer these research issues. To guarantee a representative sample of university students, participants were chosen using a random sampling technique. An online survey that included a demographic question, a social media use question, and communication skills scale was used to gather the data. The degree to which the evidence supports categorizing communication skill levels according to the above characteristics was then determined by analyzing the obtained data using Bayesian statistical methods (Dienes, 2014; Kass & Raftery, 1995). This analytical technique made it possible to thoroughly examine the connections between social media usage and communication abilities while considering any confounding factors. The study used Bayesian statistics to offer more nuanced insights into the relationships between the relevant factors, thus advancing knowledge of how social media affects university students' communication abilities.

Sample

In this study, the sample group consisted of 407 participants, with 55.8% (227) being female and 44.2% (180) being male. The majority of the participants belonged to Faculty of Engineering, representing 60.0% (244) of the sample, followed by Institute of Psychology and Education at 13.3% (54), IT-Department at 10.6% (43), Faculty of Economic and Humanitarian at 5.4% (22), Faculty of Social Sciences and Mass Communications at 4.4% (18), and Faculty of Foreign Languages at 6.4% (26) (**Table 1**).

In terms of age, 30.5% (124) of the participants were 19 years old, while 22.4% (91) were 18, 20.9% (85) were 21, 14.0% (57) were 20, and 12.3% (50) were 22 years or older. Regarding social media usage, 48.6% (198) were WhatsApp users, 92.1% (375) were Telegram users, 57.2% (233) were Instagram users, 45.9% (187) were TikTok users, 86.2% (351) were YouTube users, and 36.1% (147) were Pinterest users. On the other hand,

Table 1. Participants' demographic variable

Variable	Category or value	Counts	Total percentage (%)
Gender	Female	227	55.8
	Male	180	44.2
Department code	Faculty of foreign languages	26	6.4
	Faculty of Engineering	244	60.0
	Faculty of Social Sciences & Mass Communications	18	4.4
	IT-Department	43	10.6
	Institute of Psychology & Education	54	13.3
	Faculty of Economic & Humanitarian	22	5.4
Age code	18	91	22.4
	19	124	30.5
	20	57	14.0
	21	85	20.9
	22 and older	50	12.3
WhatsApp	Non-users	209	51.4
	Users	198	48.6
Telegram	Non-users	32	7.9
	Users	375	92.1
Instagram	Non-users	174	42.8
	Users	233	57.2
TikTok	Non-users	220	54.1
	Users	187	45.9
YouTube	Non-users	56	13.8
	Users	351	86.2
Pinterest	Non-users	260	63.9
	Users	147	36.1

51.4% (209) were non-users of WhatsApp, 7.9% (32) were non-users of Telegram, 42.8% (174) were non-users of Instagram, 54.1% (220) were non-users of TikTok, 13.8% (56) were non-users of YouTube, and 63.9% (260) were non-users of Pinterest.

Data Collection Tools

"Communication skills scale" developed by Akkuzu and Akkaya (2014) was used in the study. For the adaptation of the scale, first a translation from English to Russian and then a comparison from Russian to English by another expert were made. An exploratory factor analysis (EFA) was then conducted on a sample of 192 individuals. Before analysis negative items were reverse coded. According to EFA results, Bartlett's test of sphericity was significant ($\chi^2=5255$, $df=630$, $p<.001$), and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .887, indicating that the sample data were suitable for EFA. A parallel analysis with varimax rotation was conducted to determine the number of factors, resulting in a four-factor structure. The first factor, "competence" (items 1-12), had factor loadings ranging from .816 to .424, with a sum of squared loadings (SS loading) of 6.72, and accounting for 18.7% of the total variance. This factor includes examples such as the belief in understanding what people say clearly and correctly. Cronbach's α is calculated .929. The second factor, "listening-speaking" (items 27-30, 32-36), had factor loadings ranging from .823 to .409, with an SS loading of 5.42, and accounting for 15.1% of the total variance. Second factor includes examples such as "while listening to someone I keep the eye contact". Cronbach's α is calculated .901. The third factor, "social communication challenges" (items 19-25, 31), had factor loadings ranging from .809 to .567, with an SS loading of 5.01, and accounting for 13.9% of the total variance. The factor includes examples such as "I am worrying about choosing correct word". Cronbach's α is calculated .926. Lastly, the fourth factor, "self-esteem" (items 13-18), had factor loadings ranging from .762 to .568, with an SS loading of 4.04, and accounting for 11.2% of the total variance. The factor includes examples such as "I fail at communication of my thoughts and feelings to people". Cronbach's α is calculated .902. Together, these four factors explained 58.9% of the total variance. Cronbach's α is calculated .922 for total scale.

In the third stage, confirmatory factor analysis (CFA) was performed for different groups. The sample of 207 individuals. CFA was conducted to assess the fit of a predefined model with four factors: competence, listening-speaking, social communication challenges, and self-esteem. The initial model (model 1) demonstrated a poor fit, with a significant Chi-square value ($\chi^2=1,369$, $df=554$, $p<.001$) and suboptimal fit

Table 2. Criteria for low, moderate, & high level

Factor	n	Low	Moderate	High
Competence	12	<36.23	36.23-52.17	>52.17
Listening-speaking	9	<25.65	25.65-36.15	>36.15
Social communication challenges	8	<23.09	23.09-33.71	>33.71
Self-esteem	6	<15.88	15.88-26.92	>26.92

indices (CFI=.836, TLI=.824, RMSEA=.0843, and SRMR=.0777). Based on software recommendations, modifications were applied to improve the model. The final model displayed better fit indices, with a significant chi-square value ($\chi^2=950$, $df=535$, $p<.001$). However, the other fit indices showed improvement: CFI=.912, TLI=.903, RMSEA=.0627 (with a 90% confidence interval [CI] of .0564 to .0689), and SRMR=.0750. These values suggest that the final model adequately represents the data. Factor loadings for each indicator in the final model were statistically significant ($p<.001$) and ranged from moderate to high, indicating strong associations between the indicators and their respective factors. Competence factor had factor loadings ranging from .402 (CSS_3) to .821 (CSS_4), listening-speaking abilities from .618 (CSS_32) to .810 (CSS_33), social communication challenges from 0.603 (CSS_31) to 1.04 (CSS_24), and self-esteem from .779 (CSS_18) to 1.024 (CSS_17). In conclusion, the final model demonstrated an adequate fit, with statistically significant factor loadings for all indicators. This suggests that the four-factor model, with the applied modifications, is a valid representation of the underlying structure in the data. Also, composite reliability calculated for each factor. McDonald's ω are .916 for competence factor, .911 for listening-speaking, .928 for social communication challenges, .909 for self-esteem, and .924 for total scale. As a result, the validity and reliability studies of the scale in the context of Russia have been completed. In the last point, the scale consists of 35 items and four factors.

Data Analysis

The answers given by the participants to each question were coded as 1-5 and for reverse items as 5-1. In the Bayesian analysis conducted, the data does not necessarily have to be normally distributed. However, upon examining the kurtosis and skewness values of the measurements, we find the skewness values range from -1 to 0, and the kurtosis values fall between -0.5 and 1.5. These figures suggest a normal distribution of the data. Additionally, a Pearson correlation was performed between the sub-dimensions, resulting in values between .182 and .599. Since no value exceeded .90, it's safe to conclude that there's no multicollinearity problem in our data. Then, points were collected in the related questions to determine the levels for each dimension. Exploratory statistics (mean [M] and standard deviation [SD]) were used to determine the communication skill levels of the participants. The criteria in **Table 2** were established using SD value to categorize scores for each dimension into low, medium, and high. Bayesian statistics were used to determine to what extent the differentiation in communication skill levels according to independent variables was supported by the data. While the Bayesian t-test was used for variables with two values such as gender, Bayesian ANOVA was used for variables with more than two values such as quotient. Bayesian factor value (BF10) was calculated in Bayesian statistics.

Bayesian interpretation criteria are used to evaluate the strength of evidence in favor of a hypothesis using the Bayes factor (BF). BF compares the likelihood of the data under the alternative hypothesis (H1) to the likelihood of the data under the null hypothesis (H0). BF is expressed as BF10, representing the ratio of the probability of the data given H1 to the probability of the data given H0 ($BF10=P(\text{data} | H1)/P(\text{data} | H0)$) (Kass & Raftery, 1995).

The interpretation of BF10 values is, as follows (Dienes, 2014):

BF10<1: The data provides more evidence in favor of H0 than H1. The strength of evidence depends on how small the BF10 value is.

$1/3 \leq BF10 < 1$: Anecdotal evidence for H0.

$1/10 (0.1) \leq BF10 < 1/3 (0.33)$: Moderate evidence for H0.

$1/30 (0.033) \leq BF10 < 1/10 (0.1)$: Strong evidence for H0.

$BF10 < 1/30 (0.033)$: Very strong evidence for H0.

Table 3. Exploratory statistic based on dimensions

Dimension	n	Mean	SD	Low	Moderate	High
Competence	407	44.2	7.97	69	260	78
Listening-speaking	407	30.9	5.25	47	290	70
Social communication challenges	407	28.4	5.31	70	267	70
Self-esteem	407	21.4	5.52	73	272	62

BF10=1: The data is equally likely under both H0 and H1, which means that there is no evidence in favor of either hypothesis.

BF10>1: The data provides more evidence in favor of H1 than H0. The strength of evidence depends on how large the BF10 value is.

1≤BF10<3: Anecdotal evidence for H1.

3≤BF10<10: Moderate evidence for H1.

10≤BF10<30: Strong evidence for H1.

BF10≥30: Very strong evidence for H1.

In Bayesian analysis, the strength of evidence is often interpreted on a continuous scale, so these categories should be taken as guidelines rather than strict rules. It's important to note that Bayesian interpretation criteria are subjective and may vary across different fields or contexts.

FINDINGS

The findings are presented according to the order of the research questions.

Table 3 displays the communication skills of a 407-student sample from a university, split into four sub-dimensions: competence, listening and speaking, social communication challenges, and self-esteem. The average score for competence is 44.2, with an SD of 7.97. This indicates that university students generally have a moderate level of competence in communication. In the sample, 69 students have low competence, 260 students have moderate competence, and 78 students have high competence. This suggests that most students (63.9%) fall within the moderate range, while only 19.2% of students demonstrate high competence in communication. For listening-speaking sub-dimension, the mean score is 30.9, with an SD of 5.25. This indicates that most of the students have moderate listening-speaking skills. The data shows that 47 students have low listening-speaking skills, 290 students have moderate skills, and 70 students have high skills. Thus, 71.3% of the students have moderate listening-speaking skills, while 17.2% demonstrate high skills. Regarding social communication challenges, the mean score is 28.4, with an SD of 5.31. This suggests that most students experience moderate social communication challenges. The data indicates that 70 students have low challenges, 267 students have moderate challenges, and 70 students have high challenges. Consequently, 65.6% of students have moderate social communication challenges, while 17.2% experience high levels of challenges. Finally, the mean score for self-esteem is 21.4, with an SD of 5.52. This indicates that the students generally have moderate self-esteem in relation to their communication skills. The data reveals that 73 students have low self-esteem, 272 students have moderate self-esteem, and 62 students have high self-esteem. Most of the students (66.8%) have moderate self-esteem, while only 15.2% exhibit high self-esteem in the context of communication skills. In overview, the sample of university students generally demonstrates moderate levels of competence, listening-speaking skills, social communication challenges, and self-esteem in relation to their communication skills.

Table 4 presents the results of a Bayesian independent samples t-test for four variables. BF (BF₁₀) for competence is .642, with an error percentage of .0289. This value indicates that there is only weak evidence against the null hypothesis, suggesting that there may not be a substantial difference in competence between the two groups. BF₁₀ for listening-speaking is 1114.479, with an error percentage of <.0001. This high BF₁₀ value provides strong evidence against the null hypothesis, implying that there is a significant difference in listening- speaking abilities between the female and male groups. BF₁₀ for social communication challenges is 1.734, with an error percentage of .0116. This value indicates moderate evidence against the null hypothesis, suggesting that there might be a difference in social communication challenges between the two groups, though the evidence is not as strong as for listening-speaking. BF₁₀ for self-esteem is .117, with an

Table 4. Bayesian factor for communications skills based on gender

Dimensions	Gender	n	Mean	SD	BF ₁₀	Error %
Competence	Female	227	43.5	7.79	.642	.0289
	Male	180	45.0	8.13		
Listening-speaking	Female	227	31.9	4.33	1,114.479	<.001
	Male	180	29.6	6.00		
Social communication challenges	Female	227	27.9	4.96	1.734	.0116
	Male	180	29.1	5.66		
Self-esteem	Female	227	21.3	5.44	.117	.1361
	Male	180	21.5	5.63		

Table 5. Exploratory statistics for communications skills based on department

Dimensions	Department	n	Mean	SD
Competence	1-Faculty of Foreign Languages	26	42.8	9.72
	2-Faculty of Engineers	244	44.9	7.96
	3-Faculty of Social Sciences & Mass Communications	18	44.7	10.72
	4-IT-Department	43	42.1	6.39
	5-Institute of Psychology & Education	54	43.6	7.24
	6-Faculty of Economic & Humanitarian	22	43.5	7.56
Listening-speaking	1-Faculty of Foreign Languages	26	31.9	5.04
	2-Faculty of Engineers	244	30.1	5.60
	3-Faculty of Social Sciences & Mass Communications	18	32.7	5.20
	4-IT-Department	43	30.8	5.07
	5-Institute of Psychology & Education	54	33.0	3.48
	6-Faculty of Economic & Humanitarian	22	30.8	3.90
Social communication challenges	1-Faculty of Foreign Languages	26	28.3	3.92
	2-Faculty of Engineers	244	28.6	5.53
	3-Faculty of Social Sciences & Mass Communications	18	28.5	7.37
	4-IT-Department	43	27.8	4.22
	5-Institute of Psychology & Education	54	28.2	5.13
	6-Faculty of Economic & Humanitarian	22	27.8	5.06
Self-esteem	1-Faculty of Foreign Languages	26	22.3	5.35
	2-Faculty of Engineers	244	20.9	5.94
	3-Faculty of Social Sciences & Mass Communications	18	22.6	5.10
	4-IT-Department	43	21.6	4.93
	5-Institute of Psychology and Education	54	22.5	4.31
	6-Faculty of Economic and Humanitarian	22	21.0	4.66

error percentage of .1361. This low value indicates that there is moderate evidence in favor of null hypothesis, suggesting that there may not be a significant difference in self-esteem between the female and male groups.

Table 5 presents the means and SDs for four variables (competence, listening and speaking, social communication challenges, and self-esteem) across six departments (1-Faculty of Foreign Languages, 2-Faculty of Engineers, 3-Faculty of Social Sciences and Mass Communications, 4-IT Department, 5-Institute of Psychology and Education, and 6-Faculty of Economic and Humanitarian).

The highest mean competence score is observed in the Faculty of Engineers (44.9±7.96), while the lowest mean is observed in the IT Department (42.1±6.39). The highest mean score for listening-speaking is observed in the Institute of Psychology and Education (33±3.48), indicating more consistent performance in this department. The lowest mean score is observed in the Faculty of Engineers (30.1±5.6). The means for social communication challenges are relatively similar across all departments. The highest mean is observed in the Faculty of Engineers (28.6±5.53), while the lowest mean is observed in the IT Department (27.8±4.22) and Faculty of Economic and Humanitarian (27.8±5.06). The highest mean self-esteem score is observed in the Faculty of Social Sciences and Mass Communications (22.6±5.1). The lowest mean score is observed in the Faculty of Engineers (20.9±5.94). Overall, there are some differences in the means and SDs of the four variables across the six departments. The Institute of Psychology and Education exhibits the highest mean score for listening-speaking, while the Faculty of Engineers shows the highest mean competence score. The self-esteem and social communication challenges variables show relatively similar mean values across the departments. Bayesian ANOVA was conducted to determine at what level the data statistically supported this differentiation of H₀ and H₁.

Table 6. Bayesian factor for communications skills based on department

Dimensions	Models	P(M)	P(M data)	BF _M	BF ₁₀	Error %
Competence	Null model	0.5	0.9163	10.9442	1.0000	
	Department	0.5	0.0837	0.0914	0.0914	0.00345
Listening-speaking	Null model	0.5	0.1030	0.1150	1.0000	
	Department	0.5	0.8970	8.6640	8.6600	0.00151
Social communication challenges	Null model	0.5	0.9878	80.8558	1.0000	
	Department	0.5	0.0122	0.0124	0.0124	0.03200
Self-esteem	Null model	0.5	0.9309	13.4738	1.0000	
	Department	0.5	0.0691	0.0742	0.0742	0.00488

Table 7. Bayesian factor for communications skills based on WhatsApp usage

Dimensions	Group	n	Mean	SD	BF ₁₀	Error %
Competence	Non-user	209	44.5	7.35	.141	.115
	User	198	43.9	8.58		
Listening-speaking	Non-user	209	30.7	5.41	.121	.132
	User	198	31.0	5.09		
Social communication challenges	Non-user	209	28.6	4.97	.132	.123
	User	198	28.2	5.66		
Self-esteem	Non-user	209	21.5	5.56	.115	.138
	User	198	21.3	5.49		

Table 6 focuses on four Bayesian ANOVAs, which compare competence, listening and speaking, social communication challenges, and self-esteem across different departments within an educational institution. The model comparison for competence shows that the null model (no differences between departments) has a higher posterior probability ($P[M|data]=0.9163$) than the alternative model with department ($P[M|data]=0.0837$). BF (BF_{10}) for the alternative model is 0.0914, which suggests that the data provides strong evidence for H_0 in competence between departments. In contrast to the competence results, the model comparison for listening-speaking shows moderate evidence ($BF_{10}=8.66$) for differences between departments. The post hoc tests indicate that the most substantial difference in listening-speaking exists between the Faculty of Engineers and the Institute of Psychology and Education, with a BF_{10} of 53.464. The model comparison for social communication challenges demonstrates very strong evidence for the null model ($P[M|data]=0.9878$) compared to the alternative model with department ($P[M|data]=0.0122$), with a BF_{10} of 0.0124. This indicates that the data does not provide substantial evidence for differences in social communication challenges between departments. Similarly, the model comparison for self-esteem shows a higher posterior probability for the null model ($P[M|data]=0.9309$) than the alternative model with department ($P[M|data]=0.0691$), with a BF_{10} of 0.0742. This suggests that the data provides strong evidence for H_0 in self-esteem between departments. In summary, the Bayesian ANOVAs indicate that there is strong evidence for differences in listening-speaking abilities between departments, particularly between the Faculty of Engineers and the Institute of Psychology and Education. However, the data provides weak evidence for differences in competence, social communication challenges, and self-esteem between departments.

Bayesian independent samples t-test results in **Table 7** compare two groups, WhatsApp usage, across four variables: competence, listening-speaking, social communication challenges, and self-esteem. In terms of group descriptives, the means and SDs of the variables are fairly similar between WhatsApp user, non-user. BF (BF_{10}) values for all four variables are substantially lower than 1, which suggests that the data provides moderate evidence in favor of the null hypothesis, meaning there is no significant difference between the two groups. The error percentages associated with each BF_{10} value are relatively low, indicating that the uncertainty in BF estimates is small. The similar values in the group descriptives further support the evidence provided by the low BF values, suggesting that there are no substantial differences between the two groups for the variables under investigation.

Table 8 presents a comparison between Telegram users and non-users regarding their communication skills across four variables: competence, listening-speaking, social communication challenges, and self-esteem. BF (BF_{10}) values for all four variables are substantially lower than 1, which indicates that the data provides evidence in favor of the null hypothesis, suggesting there is no significant difference between Telegram users and non-users in terms of their communication skills. The error percentages associated with

Table 8. Bayesian factor for communications skills based on Telegram usage

Dimensions	Group	n	Mean	SD	BF ₁₀	Error %
Competence	Non-user	32	44.6	7.08	.206	.0322
	User	375	44.1	8.05		
Listening-speaking	Non-user	32	30.9	5.10	.196	.0332
	User	375	30.8	5.27		
Social communication challenges	Non-user	32	27.4	4.78	.343	.0239
	User	375	28.5	5.35		
Self-esteem	Non-user	32	21.2	5.00	.201	.0327
	User	375	21.4	5.57		

Table 9. Bayesian factor for communications skills based on Instagram usage

Dimensions	Group	n	Mean	SD	BF ₁₀	Error %
Competence	Non-user	174	43.5	8.36	.309	.0562
	User	233	44.7	7.64		
Listening-speaking	Non-user	174	30.5	5.17	.238	.0712
	User	233	31.1	5.30		
Social communication challenges	Non-user	174	28.4	5.18	.111	.1412
	User	233	28.4	5.42		
Self-esteem	Non-user	174	21.2	5.40	.131	.1222
	User	233	21.5	5.61		

Table 10. Bayesian factor for communications skills based on TikTok usage

Dimensions	Group	n	Mean	SD	BF ₁₀	Error %
Competence	Non-user	220	43.4	7.95	.905	.0212
	User	187	45.1	7.91		
Listening-speaking	Non-user	220	30.6	5.16	.154	.1062
	User	187	31.1	5.36		
Social communication challenges	Non-user	220	28.3	5.29	.116	.1376
	User	187	28.5	5.35		
Self-esteem	Non-user	220	21.3	5.36	.123	.1298
	User	187	21.5	5.70		

each BF10 value are relatively low, indicating that the uncertainty in BF estimates is small. Overall, the similarities in the group descriptives and the low BF values suggest that there are no substantial differences between Telegram users and non-users in terms of their communication skills across the four variables examined.

Table 9 presents a comparison between Instagram users and non-users regarding their communication skills across four variables: competence, listening and speaking, social communication challenges, and self-esteem. BF (BF10) values for all four variables are substantially lower than 1, which indicates that the data provides evidence in favor of the null hypothesis, suggesting there is no significant difference between Instagram users and non-users in terms of their communication skills. The error percentages associated with each BF10 value are relatively low, indicating that the uncertainty in BF estimates is small. Overall, the similarities in the group descriptive and the low BF values suggest that there are no substantial differences between Instagram users and non-users in terms of their communication skills across the four variables examined.

Table 10 presents a comparison between TikTok users and non-users regarding their communication skills across four variables: competence, listening-speaking, social communication challenges, and self-esteem. In the case of competence, BF (BF10) is .905, which is close to 1. This indicates that the data is not sufficient to support either the null hypothesis (no difference between groups) or the alternative hypothesis (a difference between groups).

The mean competence score for non-users is 43.4, while for users it is 45.1, with both groups having a similar SD (around 7.9). For listening-speaking, social communication challenges, and self-esteem, the BF10 values are all substantially lower than 1 (.154, .116, and .123, respectively), indicating that the data provides evidence in favor of the null hypothesis, suggesting there is no significant difference between TikTok users and non-users for these variables. The error percentages associated with each BF10 value are relatively low,

Table 11. Bayesian factor for communications skills based on YouTube usage

Dimensions	Group	n	Mean	SD	BF ₁₀	Error %
Competence	Non-user	56	45.5	8.31	.361	.0351
	User	351	44.0	7.90		
Listening-speaking	Non-user	56	31.1	4.69	.170	.0620
	User	351	30.8	5.34		
Social communication challenges	Non-user	56	28.4	5.74	.157	.0659
	User	351	28.4	5.25		
Self-esteem	Non-user	56	22.1	5.59	.251	.0463
	User	351	21.3	5.51		

Table 12. Bayesian factor for communications skills based on Pinterest usage

Dimensions	Group	n	Mean	SD	BF ₁₀	Error %
Competence	Non-user	260	44.2	7.88	.114	.13428
	User	147	44.2	8.16		
Listening-speaking	Non-user	260	30.3	5.42	9.916	.00229
	User	147	31.9	4.77		
Social communication challenges	Non-user	260	28.3	5.37	.121	.12808
	User	147	28.5	5.23		
Self-esteem	Non-user	260	21.3	5.49	.125	.12418
	User	147	21.5	5.58		

indicating that the uncertainty in BF estimates is small. Overall, the table suggests that there are no substantial differences between TikTok users and non-users in terms of their communication skills across the four variables examined, except for competence, where the data is inconclusive.

Table 11 presents a comparison between YouTube users and non-users regarding their communication skills across four variables: competence, listening-speaking, social communication challenges, and self-esteem. For competence, BF (BF₁₀) is .361, which is below 1, indicating that the data provides more support for the null hypothesis. Regarding listening-speaking, social communication challenges, and self-esteem, the BF₁₀ values are all lower than 1 (.170, .157, and .251, respectively), indicating that the data provides moderate evidence in favor of the null hypothesis, suggesting there is no significant difference between YouTube users and non-users for these variables. The error percentages associated with each BF₁₀ value are relatively low, indicating that the uncertainty in BF estimates is small. Overall, the table suggests that there are no substantial differences between YouTube users and non-users in terms of their communication skills across the four variables examined.

Table 12 presents a comparison between Pinterest users and non-users regarding their communication skills across four variables: competence, listening-speaking, social communication challenges, and self-esteem. For competence, social communication challenges, and self-esteem, the BF₁₀ values are also below 1 (.114, .121 and .125, respectively), suggesting that the data provides moderate evidence in favor of the null hypothesis. However, for listening-speaking, the BF₁₀ value is 9.916, which is above 1 and indicates moderate evidence in favor of the alternative hypothesis, suggesting a significant difference between Pinterest users and non-users. The mean value for non-users is 30.3, while for users it is 31.9, with users having a smaller SD (4.77) compared to non-users (5.42). The error percentages associated with each BF₁₀ value are relatively low, except for competence, indicating that the uncertainty in BF estimates is small for most variables. Overall, the table suggests that Pinterest users have significantly better listening-speaking skills than non-users, but there are no substantial differences between the groups in terms of competence, social communication challenges, and self-esteem.

DISCUSSION

The purpose of this study was to establish the level of communication skills possessed by university students and to investigate whether these levels are affected by the social media applications that the students utilize. The results obtained in the analysis results are discussed in this context.

With most of the students exhibiting moderate levels of competence, it would be beneficial to discuss methods to enhance communication skills among students, especially those with low competence levels. First,

it should be noted that communication skills are important skills for students both to increase their academic success while they are studying (Ashfaque Ahmad Shah et al., 2020; Mohammed, 2015) and to increase their business success when they enter business life (Kondo et al., 2020; Krishnan et al., 2019; Leal-Costa et al., 2020; Tavakolizadeh et al., 2015). For instance, Leal-Costa et al. (2020) highlight the significance of teaching nurse's communication skills, as these skills can help them better manage a variety of stress factors that arise during their daily interactions with patients. By enhancing their communication skills, nurses can boost their sense of self-efficacy, which will ultimately result in enhanced patient-centered care and stronger nurse-patient relationships.

With in-class activities (Malik et al., 2018; Stephenson et al., 2015) or independent courses or training (Hasanah & Nasir Malik, 2020; Kanetaka et al., 2013) organized, students' communication skills can be improved. In the study conducted by Malik et al. (2018), the communication skills of the students were improved thanks to the in-class activities carried out within the scope of the physics laboratory course. According to the results of blended learning training provided to students of the Department of Electronic Engineering Education, the blended learning model enhances students' communication skills effectively (Hasanah & Nasir Malik, 2020). Therefore, it can be concluded that both in-class activities and independent courses or training can be effective in improving students' communication skills. Overall, research has shown that both in-class activities and independent courses or training can be effective in improving students' communication skills. In-class activities, such as those conducted in the physics laboratory course, have been found to be particularly effective. Additionally, the blended learning model has been shown to enhance communication skills effectively in the context of electronic engineering education. These findings suggest that educators have a variety of options for improving students' communication skills, depending on the specific needs and goals of their courses.

The data indicates noticeable disparities in listening-speaking skills across different departments, particularly between Faculty of Engineering and Institute of Psychology and Education. These findings are consistent with other studies (Aydin, 2015; Ismet, 2018), which reveal significant variations in communication skills among participants, contingent on the department they are enrolled in. Such findings prompt inquiries into how the curriculum and pedagogical approaches of each department influence the development of students' communication abilities. Various factors could contribute to these disparities, including the teaching style of faculty members, the design of the courses, the nature of the subject matter, and the types of activities students are required to engage in. For instance, students from an education faculty may have more opportunities to develop and fine-tune their communication skills due to the nature of their curriculum. They often engage in activities such as preparing and presenting presentations and learning about teacher-student interaction models. These activities inherently require a high degree of effective communication, thereby providing students with ample opportunities to practice and refine these skills. On the other hand, faculties like Engineering, which are traditionally more focused on technical skills, might not offer the same level of exposure to communication-enhancing activities. While communication is undoubtedly essential in these fields, the primary focus of these programs might be on developing specific technical competencies. This difference in focus might result in engineering students having fewer opportunities to develop their communication skills to the same extent. These findings emphasize the need for a balanced approach in education, where the development of both technical and communication skills are given equal importance. Regardless of the discipline, communication skills are crucial in today's interconnected world. Therefore, it is recommended that universities consider integrating more communication-based activities and courses into their curriculums, even in the more technical fields. This can help ensure that all students, regardless of their major, have the opportunity to develop these important skills to their fullest potential.

The data suggests that the use of most social media platforms does not significantly impact users' communication skills, with the exception of Pinterest users who display superior listening-speaking skills compared to non-users. However, this does not decisively corroborate the hypothesis of no difference. The interplay between social media usage and an individual's communication ability is intricate and multi-dimensional (Jimenez & Morreale, 2015). A deeper dive into the effects of specific social media platforms on communication skills is warranted, especially considering the distinct user demographics, content types, and engagement levels across these platforms. For example, Pinterest's more visual, project-oriented content might stimulate a different kind of communication skillset compared to platforms like Twitter, which

emphasizes brief, text-based communication. Also, it's critical to examine whether observed differences in communication skills among social media users are influenced by platform-specific factors, such as design and functionality of platform, the nature of its user engagement, and the kind of content it promotes. For instance, Pinterest's emphasis on collaborative projects and idea sharing might foster better listening and speaking skills among its users.

Olowo et al. (2020) found a considerable link between social media use and the development of communication skills. This suggests that active engagement on social media platforms could potentially enhance individuals' capacity to communicate effectively. However, it's important to balance this viewpoint with another research. For instance, studies by Coleman et al. (2018) and Hidayat and Pratama (2019) have argued that there is no clear relationship between social media usage and communication skills. These contradictory findings imply that the effects of social media on communication skills may be more nuanced than initially perceived. The impact may depend on various factors such as the nature of the platform, the type of engagement it encourages, the frequency and manner of its usage, and the individual's existing communication skills. Hence, further research is needed to unravel this complex interrelationship and provide a more comprehensive understanding of how social media usage influences communication skills.

The data offers somewhat weak to moderate support for gender-based variations in listening-speaking and social communication challenges. Unpacking these disparities is crucial, particularly in discerning potential causes and devising strategies to encourage the comprehensive development of communication skills among all students. The matter of gender differences in communication skills has been a subject of various research studies, but the findings present a mixed picture. Some research, such as the studies conducted by Graf et al. (2017) and Korkut Owen and Demirbas Celik (2018), suggest that there is indeed a gender-based differentiation in communication skills. These differences could be a result of a multitude of factors, including societal norms, cultural expectations, and gender-based biases in teaching and learning environments. Understanding these factors is key to crafting effective strategies for leveling the playing field in terms of communication skill development. On the other hand, other research, such as studies by Aliusta et al. (2019), Alqahtani (2019), Ashfaque Ahmad Shah et al. (2020), Aydin (2015), Ismet (2018), and Malik et al. (2018), observed no discernible gender-based differentiation in communication skills. These studies suggest that gender may not be a significant determining factor for communication skills, implying that education, upbringing, personal characteristics, and experiences might play a more crucial role. This dichotomy of findings underscores the need for further research to clarify the relationship between gender and communication skills development. If differences exist, it would be beneficial to understand their root causes and work towards eliminating any unjust disadvantages or stereotypes. This would require implementing inclusive teaching strategies that equally cater to all students, irrespective of gender. If there are no differences, these findings can help dispel misconceptions about gender-based abilities and reinforce the idea that everyone, regardless of gender, has the potential to excel in communication skills. Either way, the goal remains to foster a more inclusive and fairer environment for the development of communication skills.

CONCLUSIONS

In conclusion, this study's findings cast light on the communication skills of college students across multiple dimensions, including competence, listening-speaking, social communication challenges, and self-esteem. Most students demonstrated moderate levels of communication competence, listening-speaking abilities, social communication challenges, and self-esteem. The study also uncovered differences in listening-speaking skills across academic departments, with Faculty of Engineers and Institute of Psychology and Education displaying the greatest disparity. This finding necessitates a closer examination of how departmental curricula and teaching strategies influence the development of students' communication skills. Moreover, the data suggest that the majority of social media platforms have little effect on communication skills. However, Pinterest users demonstrated superior listening-speaking skills compared to non-users, raising queries about the influence of specific social media platforms on communication skills. Gender differences in listening-speaking and social communication challenges were also observed, albeit with moderate to limited evidence. This emphasizes the need to investigate potential causes for these differences and how they can be addressed to promote the development of communication skills for all students.

Limitations and Future Research

This research offers valuable perspectives into how college students' communication skills are shaped and what factors may play a role in this process. Further investigation is needed to understand how academic departments, social media, and other elements contribute to the development of these skills, as well as to identify the most effective strategies for improvement. When considering the findings of this study, it's essential to take its limitations into account. The study's cross-sectional design makes it challenging to establish causal links between students' communication abilities and their self-perceived efficacy. A longitudinal study would present more compelling evidence about how communication skills affect students' self-efficacy over time. Moreover, the research used self-reporting methods to gauge communication skills, which might introduce bias due to their subjective nature and the possibility of social desirability bias. This bias occurs when participants give answers, they think are more socially acceptable, potentially skewing the results. Lastly, the sample size, albeit relatively large, might not accurately represent the broader population of university students, which restricts the applicability of the findings to a wider context.

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