



Factors influencing students' digital communication in an online internationalization program

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Abstract. Limited attention has been given to the factors influencing students' digital communication in online internationalization programs. The current study aimed to identify the factors influencing students digital communication in an online internationalization program: FIP (*Fakultas Ilmu Pendidikan*/Faculty of Education) English Camp. The study employed a quantitative exploratory research design. The study used a total sampling technique, including 45 students who met the criteria. Data were collected through a questionnaire and analyzed using exploratory factor analysis with IBM SPSS. The analysis results show two factors with eigenvalues greater than 1: 10.202 and 1.276, respectively. The findings revealed two main factors influencing students' digital communication in the FIP English Camp online internationalisation program: internal and external factors. Internal factors included the ability to receive, compose, and send messages, and motivation to listen to topics.

External factors comprised: number of online devices, condition of online devices, internet network connection, topics relevance, topics interestingness, topics mastery by speakers, politeness of speakers' appearance, speakers' enthusiasm, ability of speakers to involve participants, allocation of presentation time, allocation of interaction time, start and end time of activities, length of time to start and end activities. These findings provide empirical evidence that both students' individual competencies and external learning conditions play important roles in shaping effective digital communication during online internationalization activities. This study is limited by its relatively small sample size and the possibility that it did not include other relevant variables in the analysis. The study recommends expanding online internationalization programs and strengthening support for students enrolled in international classes.

Introduction

Internationalization has become one of the key strategies for enhancing the performance, collaboration, and global engagement of higher education institutions. In an increasingly interconnected educational landscape, internationalization provides opportunities for universities to establish academic partnerships, exchange knowledge and experiences, and prepare students to participate effectively in multicultural and globally oriented environments (de Wit & Altbach, 2020; Sukaatmadja et al., 2021). The development of digital technology has further expanded the scope of internationalization by enabling institutions to provide international learning experiences without requiring students and academics to participate in physical mobility programs. Consequently, internationalization activities are no longer limited to face-to-face exchanges, overseas study programs, or physical academic visits, but increasingly include virtual student

exchanges, collaborative online international learning, international webinars, virtual guest lectures, and other forms of technology-mediated interaction (Boholano, 2017; Kuivila et al., 2020; Haryanto et al., 2026). These developments have made international learning experiences more accessible and have enabled students to interact with international academics, students, and professionals across geographical boundaries.

The increasing use of digital technology in internationalization program has also created new possibilities for developing students' global competencies and communication skills. Through online interaction, students can be exposed to different perspectives, cultural backgrounds, academic practices, and communication styles while remaining within their home institutions. Such experiences can contribute to students' intercultural awareness, confidence, digital competence, and ability to communicate with individuals from diverse cultural and linguistic backgrounds (Altun, 2019; Suryani & Maksum, 2020). In this context, digital communication becomes an important component of successful online internationalization because students are required to use digital platforms not only to receive information but also to actively participate in discussions, formulate responses, express opinions, ask questions, and establish meaningful interaction with international participants. The effectiveness of an online internationalization program therefore depends not merely on the availability of digital platforms, but also on students' readiness and ability to communicate effectively within digitally mediated and intercultural environments (Kryzhanivska et al., 2025; Pavlidou et al., 2021; Aldresti et al., 2023; Marzulina et al., 2025).

FIP English Camp is a monthly initiative internationalization program to establish networking and collaboration with universities around the world through interactive discussion sessions between the academic community of the Faculty of Education, Universitas Pendidikan Ganesha, Bali-Indonesia, and invited guest speakers. This program was first implemented in December 2023 (Conversation 1) and continued throughout 2024. Each session lasted approximately one hour with a presentation by guest speakers for approximately 10 minutes; and continued with discussion, Q&A, sharing experiences, and collaboration plans for 50 minutes. The discussion topics vary across sessions and focus on issues related to campus internationalization. The approach used is the praxis community that integrates global citizenship and education development (Deroncele-Acosta et al., 2023; Nasir, 2020). Guest speakers share their experiences related to the session topic and discuss opportunities for future international collaboration. Unlike conventional international programs that rely on physical mobility, FIP English Camp depends almost entirely on participants' ability to communicate effectively through digital platforms. Students must actively listen, formulate responses, ask questions, and interact with international speakers in real time.

One of the challenges that emerged in the FIP English Camp program is building active student involvement through digital communication with guest speakers. However, the factors influencing students' active digital communication during the FIP English Camp have not yet been investigated. Exploring the factors that influence student digital communication in online internationalization programs such as the FIP English Camp program is necessary. This is because digital communication skills are one aspect of digital competence for students as 21st century learners as well as members of digital citizenship (Thannimalai & Raman, 2018; Xu et al., 2023; Widana & Ratnaya, 2021). In addition, exploring the factors that influence student digital communication will be the basis for further development of digital communication skills to support other online internationalization programs considering that internationalization is a strategic key to organizational change in higher education (Tripathi & Agrawal, 2014; Vallori, 2014).

Transition from conventional internationalization activities to digitally mediated interaction presents several challenges. Unlike face-to-face interaction, online communication is strongly influenced by technological access, internet connectivity, the availability and condition of digital

devices, the organization of learning activities, and participants' familiarity with digital communication practices (Ghani et al., 2022; Halpern et al., 2022). Students may also experience difficulties in expressing ideas, responding spontaneously, maintaining attention, or interacting confidently with international speakers in real time. At the same time, the characteristics of the online learning environment, including the relevance and attractiveness of discussion topics, the communication style and engagement of speakers, and the allocation of time for presentation and interaction, may determine the extent to which students are willing and able to participate (Marzuki et al., 2019; Pramudyani, 2020). Thus, meaningful communication in online internationalization programs is shaped by the interaction between students' individual competencies and motivation and the external conditions provided by the program (Cantú-Ortiz et al., 2020; Kryzhanivska et al., 2025; Hendra et al., 2025; Hafsah et al., 2026).

In line with the digital transformation in higher education, various internationalization programs in higher education utilizing digital technology have been implemented, such as virtual student exchange, collaborative online international learning, and online internships (Tyaningsih et al., 2021; Wu et al., 2022). Maintaining the quality and sustainability of the international education programs in the future requires educators and education administrators to take into account the characteristics and customs of international genealogies, inherent and specific characteristics, students' socio-cultural identities, and various social phenomena between nations (e.g., social media phenomena, internet-related phenomena) (Ibrahim et al., 2018; Li & Chu, 2021). Intercultural online learning as a new form of campus internationalization programs is influenced by information literacy, learning structuring, and technological support. In addition to providing opportunities for various internationalization programs, digital transformation also creates obstacles that need to be considered. Aspects that have the potential to hinder digital transformation in general include: environment, strategy, organization, technology, society and culture, social anxiety and various other aspects that need to be explored further (Halpern et al., 2022; Kuivila et al., 2020).

As digital learning environments continue to evolve, technologies and communication practices that were effective several years ago may no longer meet current educational needs. Consequently, providing continuous professional development opportunities for educators, particularly those that encourage the sharing of effective online teaching practices, has become increasingly important for maintaining the quality of online education programs (Chen & Tu, 2021; Rofi'i et al., 2023). For student teachers, developing effective digital communication skills is particularly important because they are expected to communicate confidently and effectively with digitally native learners using both verbal and non-verbal forms of communication (Widana et al., 2018; Wardani et al., 2022).

Digital communication, as a form of global competence in the digital era, is one of the essential communication skills integrated with other competencies, including creativity and innovation, initiative, self-efficacy and resilience, strategic planning and evaluation, problem-solving and decision-making, transformational leadership, clear visual communication, and teamwork and networking. Previous research studies have examined digital communication from various perspectives. In the workplace, digital communication has been associated with both positive and negative outcomes, including greater work flexibility and collaboration, as well as challenges related to information overload, work connectivity, and interpersonal relationships (Criollo-C et al., 2024; Kivunja, 2014). In education, research has primarily focused on improving students' access to digital learning and identifying factors that support effective digital communication in learning environments. Therefore, understanding the factors that influence students' digital communication is essential for improving the effectiveness of future online internationalization initiatives (del Campo et al., 2023; Halpern et al., 2022).

Although previous studies have examined digital communication, online learning, and internationalization, these topics have largely been investigated independently. Limited attention has been given to the factors influencing students' digital communication in online internationalization programs, particularly those involving real-time interaction with international guest speakers. This gap highlights the need to better understand the conditions that support effective digital communication in such learning environments. Identifying these influencing factors can provide an empirical basis for designing communication-focused learning programs that better prepare student teachers to participate effectively in online internationalization activities.

Based on the description, the problem addressed in this study is the lack of knowledge regarding the factors influencing the digital communication of students participating in the FIP English Camp online internationalization program. The theoretical and empirical literature suggests that multiple factors may contribute to students' digital communication in online internationalization programs. Thus, the objective of this study is to analyze the factors influencing the digital communication of students participating in the FIP English Camp online internationalization program.

Method

Research Method and Design

This study employed a quantitative exploratory research design to identify and examine the underlying factors influencing students' digital communication in an online internationalization program. The exploratory design was selected because the study aimed not merely to describe students' perceptions but also to identify the underlying structure among the observed variables associated with digital communication during the FIP English Camp program. Exploratory factor analysis (EFA) was therefore used to examine interrelationships among the observed variables and group them into a smaller set of interpretable underlying factors (Tavakol & Wetzel, 2020).

The study was conducted within the context of an online internationalization program, namely the FIP English Camp, which provided students with opportunities to communicate and interact with international guest speakers through digital platforms. The quantitative approach enabled the researchers to systematically measure students' perceptions and statistically examine the relationships among the measured variables.

Participants, Research Subjects, and Informants

The participants were 45 students from the Faculty of Education's international class program at Universitas Pendidikan Ganesha, Bali, Indonesia. All participants attended the FIP English Camp sessions conducted throughout 2024. The participants were considered appropriate research subjects because they had direct experience participating in the online internationalization activities and were therefore able to evaluate the communication experience based on their actual participation. In addition to the student participants, three experts were involved in the instrument validation process. The experts judged the relevance, clarity, appropriateness, and representativeness of the questionnaire items in relation to the conceptual aspects of digital communication investigated in the study. Thus, the students served as the primary research subjects, while the experts served as informants for establishing the content validity of the research instrument.

Sampling Technique and Sample Selection Criteria

The study employed total sampling because the number of students who met the research criteria was relatively limited and all eligible participants were accessible to the researchers. The sample

consisted of 45 students who fulfilled the following criteria: (1) they were enrolled in the Faculty of Education's international class program; (2) they participated in the FIP English Camp during 2024; (3) they had direct experience participating in the online sessions; and (4) they voluntarily completed the research questionnaire. The use of total sampling ensured that all students who had direct experience with the program and met the inclusion criteria were represented in the study. Participation in the questionnaire was voluntary, and the participants were informed about the purpose of the study before completing the instrument.

Location and Duration of the Research and Validation of Research Results

The research was conducted at the Faculty of Education, Universitas Pendidikan Ganesha, Bali, Indonesia, in the context of the FIP English Camp online internationalization program. The program consisted of eleven English Camp sessions conducted throughout 2024. Data collection was carried out after the students had obtained sufficient experience participating in the program, enabling them to evaluate the digital communication experience based on their participation across the sessions.

The validity of the research results was addressed through several stages. First, the questionnaire underwent expert judgment involving three experts before being administered to the participants. Second, the instrument was piloted with students who had characteristics similar to those of the research participants to identify potential problems concerning item clarity and comprehensibility. Third, the collected data were subjected to statistical suitability tests, including the Kaiser-Meyer-Olkin (KMO) measure, Bartlett's Test of Sphericity, and Measure of Sampling Adequacy (MSA), before conducting exploratory factor analysis. These procedures were used to ensure that the resulting factor structure was supported by both theoretical and empirical considerations.

Research Procedures

The research was conducted through sixth sequential stages. The stages can be seen in Image 1.

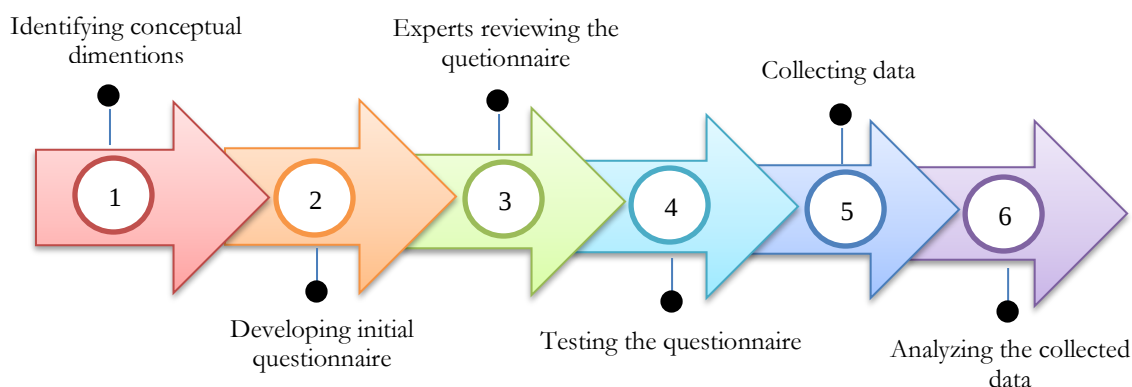


Image 1. Research Procedures

First, the researchers identified the conceptual dimensions of digital communication relevant to the online internationalization program through a review of the relevant literature and the characteristics of the FIP English Camp activities. Five conceptual aspects were identified: communication ability, facilities, topic characteristics, guest speaker characteristics, and activity duration. Second, the researchers developed an initial questionnaire consisting of 17 observable variables representing the five conceptual aspects. Third, the instrument was submitted to three experts for content validation. The experts assessed the relevance, clarity, and appropriateness of each item. Revisions were made based on their recommendations. Fourth, the revised questionnaire was piloted with students who possessed characteristics similar to those of the target

participants. The pilot process was intended to identify ambiguous statements and assess the preliminary consistency of the instrument. Fifth, the final questionnaire was administered online through Google Forms to the 45 eligible participants. The participants were informed about the purpose of the study and were asked to complete the questionnaire based on their actual experiences during the FIP English Camp. Finally, the completed responses were downloaded, screened, coded, and analyzed using IBM SPSS. Descriptive and preliminary statistical analyses were conducted before exploratory factor analysis to determine the underlying factor structure of students' digital communication experiences.

Data Collection Techniques and Research Instruments

Data were collected using an online questionnaire administered through Google Forms. The questionnaire was developed based on five conceptual aspects of students' digital communication in the FIP English Camp: (1) communication ability, (2) facilities, (3) topic characteristics, (4) guest speaker characteristics, and (5) activity duration.

The questionnaire consisted of 17 favorable statements measured using a five-point Likert scale. The response categories ranged from 1 = strongly disagree to 5 = strongly agree. Each item represented an observable variable related to students' experiences and perceptions of digital communication during the program. Table 1 presents the instrument grid.

Table 1. Questionnaire Blueprint for Students' Digital Communication

No.	Conceptual Aspect	Variable/Indicator	Code	Measurement
1	Communication Ability	Ability to receive messages	X1	5-point Likert scale
2	Communication Ability	Ability to compose messages	X2	5-point Likert scale
3	Communication Ability	Ability to send messages	X3	5-point Likert scale
4	Communication Ability	Number of online devices	X4	5-point Likert scale
5	Facilities	Condition of online devices	X5	5-point Likert scale
6	Facilities	Internet network connection	X6	5-point Likert scale
7	Facilities	Relevance of topics	X7	5-point Likert scale
8	Facilities	Interestingness of topics	X8	5-point Likert scale
9	Topic Characteristics	Motivation to listen to the topic	X9	5-point Likert scale
10	Topic Characteristics	Mastery of topics by speakers	X10	5-point Likert scale
11	Topic Characteristics	Politeness of speakers' appearance	X11	5-point Likert scale
12	Guest Speaker Characteristics	Enthusiasm of speakers	X12	5-point Likert scale
13	Guest Speaker Characteristics	Ability of speakers to involve participants	X13	5-point Likert scale
14	Guest Speaker Characteristics	Allocation of presentation time	X14	5-point Likert scale
15	Activity Duration	Allocation of interaction time	X15	5-point Likert scale
16	Activity Duration	Start and end time of activities	X16	5-point Likert scale
17	Activity Duration	Length of time to start and end activities	X17	5-point Likert scale

Instrument Validity and Reliability Tests

Content validity was established through expert judgment involving three experts with relevant expertise in education, English language learning, and/or internationalization. The experts evaluated the questionnaire in terms of relevance, clarity, appropriateness, and alignment between each item and the intended conceptual aspect. The validation results indicated that the instrument was categorized as “very good” (A), with an average validation score of 100, indicating that the questionnaire was considered appropriate for data collection. Following expert validation, the questionnaire was piloted with students who had characteristics similar to those of the research participants. The pilot test was conducted to examine the clarity and consistency of the questionnaire items and to identify potential problems before the main data collection.

The reliability of the instrument was examined using internal consistency analysis. Cronbach’s alpha coefficient was used to determine whether the questionnaire items demonstrated adequate consistency in measuring the intended constructs. In addition, the empirical suitability of the items for factor analysis was examined using the KMO measure, MSA values, and Bartlett’s Test of Sphericity. These procedures provided complementary evidence regarding the quality and suitability of the instrument for exploratory factor analysis.

Data Analysis Techniques and Criteria

The collected data were analyzed using IBM SPSS. The analysis consisted of data screening, descriptive analysis, assessment of factorability, factor extraction, and factor interpretation. First, the data were screened to identify incomplete responses and potential data-entry errors. Descriptive statistics were then used to summarize the participants’ responses to the 17 questionnaire items.

Second, the suitability of the correlation matrix for factor analysis was examined using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett’s Test of Sphericity. The KMO statistic was used to assess sampling adequacy, with values closer to 1.00 indicating greater suitability for factor analysis. As a general criterion, a KMO value of at least .60 was considered acceptable, whereas higher values indicated stronger sampling adequacy. Bartlett’s Test of Sphericity was expected to be statistically significant ($p < .05$), indicating that the correlation matrix contained sufficient relationships among variables for factor analysis. The Measure of Sampling Adequacy (MSA) was also examined for individual variables. Items with MSA values below the acceptable threshold were considered for removal if their exclusion improved the factor structure and was theoretically justifiable.

Third, exploratory factor analysis was conducted to identify the underlying dimensions represented by the 17 observed variables. Factor extraction was performed to reduce the observed variables into a smaller set of interpretable factors while retaining as much of the relevant information as possible. The number of factors was determined by considering eigenvalues, the scree plot, explained variance, and the interpretability of the resulting factor structure. Factor loadings were examined to determine the strength of the relationship between each observed variable and the extracted factor. The criteria used for factor loading is ≥ 0.50 .

The interpretation of the extracted factors was based on the pattern of items with substantial factor loadings and their conceptual similarity. Items that demonstrated weak loadings or substantial cross-loadings were considered carefully and, where appropriate, excluded from the final factor solution based on both statistical and theoretical considerations.

Trustworthiness

Although this study employed a quantitative design, procedures associated with credibility, transferability, dependability, and confirmability were incorporated to strengthen the overall rigor and transparency of the research process. Credibility was strengthened through the use of

participants who had direct experience with the FIP English Camp, expert validation of the questionnaire, pilot testing, and statistical examination of the instrument before factor analysis. These procedures helped ensure that the collected data appropriately represented students' experiences of digital communication in the program.

Transferability was supported by providing a clear description of the research context, participants, program characteristics, data collection procedures, and measurement dimensions. The study was conducted in a specific international class context at Universitas Pendidikan Ganesha; therefore, the findings should primarily be interpreted within comparable online internationalization programs rather than assumed to be universally generalizable. Dependability was addressed by documenting the research procedures systematically, including instrument development, expert validation, pilot testing, questionnaire administration, data screening, and statistical analysis. The use of explicit analytical criteria for KMO, Bartlett's Test, MSA, factor loadings, eigenvalues, and explained variance further enhanced the consistency and reproducibility of the analytical process.

Confirmability was strengthened by grounding the interpretation of the findings in the collected questionnaire data and the statistical results rather than in researchers' personal assumptions. The factor structure was interpreted based on empirical relationships among the observed variables and was cross-checked against the conceptual dimensions established during instrument development. The involvement of three experts in the validation stage also provided an external perspective on the appropriateness of the instrument. Overall, these procedures were intended to ensure that the research findings were supported by a transparent research process, appropriate measurement procedures, and systematic statistical analysis.

Results and Discussion

Prior to factor extraction, assumption tests were conducted to determine whether the data met the requirements for exploratory factor analysis.

Table 2. SPSS Output of KMO MSA Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.746
Bartlett's Test of Sphericity	Approx. Chi-Square	761.912
	df	136
	Sig.	.000

Based on Table 2, the KMO and Bartlett's Test result was 0.746 (> 0.5), indicating adequacy (the criterion for conducting factor analysis is $KMO\ MSA > 0.5$). Table 2 also shows that the significance value for Bartlett's Test of Sphericity was 0.000 (< 0.05 ; the criterion for conducting factor analysis is Bartlett's Test Sig. < 0.05). Consequently, factor analysis in this study could proceed as the prerequisites were met. The MSA test also showed that all 17 variables had an $MSA > 0.5$, meaning all variables were suitable for factor analysis.

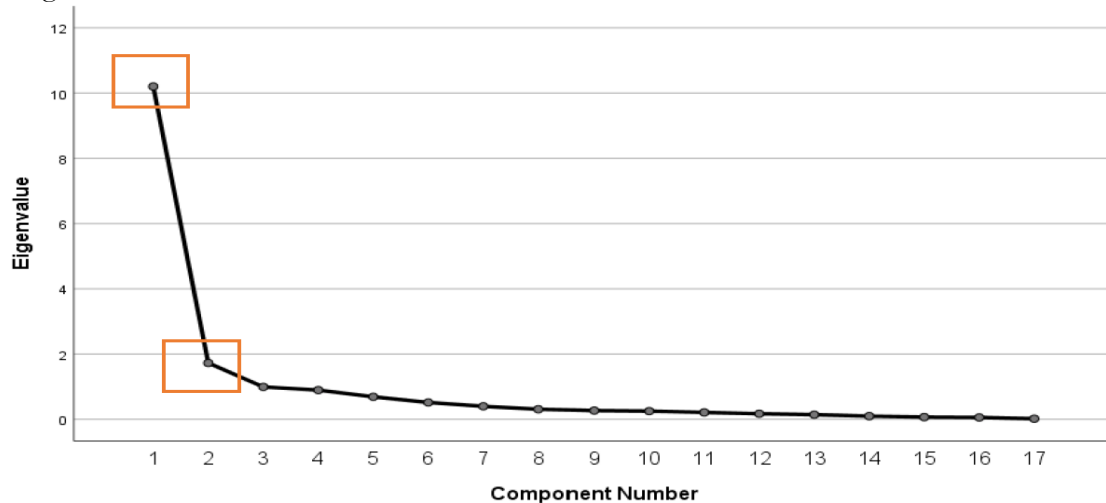
Once all prerequisite tests had been completed, the next step was factor extraction. The SPSS output for the factor analysis specifically the "Variance Explained" results presented in Table 3 indicates that two factors were extracted from the 17 observed variables. This is evident from the Eigenvalues greater than 1; specifically, two factors had Eigenvalues of 10.202 and 1.726. This finding indicates that the 17 observed variables can be meaningfully summarized into two broader dimensions representing students' digital communication in the FIP English Camp program.

Table 3. SPSS Output of Total Variant Explained

Initial Eigenvalues				Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.202	60.009	60.009	10.202	60.009	60.009
2	1.762	10.150	70.160	1.726	10.150	70.160
3	.992	5.837	75.997			
4	.895	5.267	81.263			
5	.689	4.051	85.314			
6	.515	3.031	88.345			
7	.398	2.338	90.684			
8	.307	1.809	92.492			
9	.268	1.574	94.067			
10	.251	1.474	95.541			
11	.210	1.234	96.775			
12	.170	.998	97.773			
13	.141	.830	98.603			
14	.097	.570	99.173			
15	.067	.396	99.569			
16	.055	.324	99.892			
17	.018	.108	100.000			

Extraction Method: Principal Component Analysis

To clarify the two broader dimensions formed, one can examine the resulting scree plot, as shown in Image 2.

**Image 2.** Scree plot result

Based on the scree plot and eigenvalues greater criterion, two factors with eigenvalues greater than 1 were retained. The 17 observed variables were subsequently distributed across these two underlying factors based on their factor loadings.

Table 4 presents the SPSS Component Matrix output, displays factor loading values that indicate the magnitude of the correlation between the variables and their respective factors (Components 1 and 2). Table 4 indicates that Factor 1 potentially comprises variables X_1 , X_4 , X_5 , X_6 , X_7 , X_8 , X_9 , X_{10} , X_{11} , X_{12} , X_{13} , X_{14} , X_{15} , X_{16} , dan X_{17} while Factor 2 comprises variables X_2 and X_3 .

Table 4. SPSS Output of Component Matrix

	Component	
	1	2
X1 Ability to receive messages	.715	.320
X2 Ability to compose messages	.565	.713
X3 Ability to send messages	.527	.752
X4 Number of online devices	.730	-.287
X5 Condition of online devices	.692	-.268
X6 Internet network connection	.802	-.163
X7 Relevance of topics	.828	.013
X8 Interestingness of topics	.895	.057
X9 Motivation to listen to the topic	.809	.257
X10 Mastery of topics by speakers	.861	-.004
X11 Politeness of speakers' appearance	.864	.024
X12 Enthusiasm of speakers	.808	-.093
X13 Ability of speakers to involve participants	.803	.119
X14 Allocation of presentation time	.728	-.332
X15 Allocation of interaction time	.819	-.252
X16 Start and end time of activities	.839	-.197
X17 Length of time to start and end activities	.779	-.251

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Factor rotation was performed to clarify the factor loadings. The results of the factor rotation are indicated by the Rotated Component Matrix values presented in Table 5. The results of the factor rotation indicate significant findings. This is evident from the high factor loading values and the successful positioning of the 17 variables in explaining two factors. Factor 1 comprises the variables X₁, X₂, X₃, X₉. Factor 2 includes the variables X₄, X₅, X₆, X₇, X₈, X₁₀, X₁₁, X₁₂, X₁₃, X₁₄, X₁₅, X₁₆, and X₁₇.

Table 5. Output SPSS Rotated Component Matrix

	Component	
	1	2
X1 Ability to receive messages	.448	.642
X2 Ability to compose messages	.117	.902
X3 Ability to send messages	.065	.916
X4 Number of online devices	.774	.130
X5 Condition of online devices	.731	.126
X6 Internet network connection	.772	.273
X7 Relevance of topics	.703	.437
X8 Interestingness of topics	.738	.509
X9 Motivation to listen to the topic	.562	.636

	Component	
	1	2
X10 Mastery of topics by speakers	.740	.439
X11 Politeness of speakers' appearance	.728	.465
X12 Enthusiasm of speakers	.741	.336
X13 Ability of speakers to involve participants	.628	.515
X14 Allocation of presentation time	.795	.090
X15 Allocation of interaction time	.832	.205
X16 Start and end time of activities	.821	.262
X17 Length of time to start and end activities	.797	.186

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Based on the obtained results, the following points can be discussed. Five conceptual domains, represented by 17 observed variables, were analyzed using exploratory factor analysis, resulting in the extraction of two underlying factors. These two factors, derived from the seventeen explored variables, can be named based on the variables distributed across them (Ridha et al., 2018). Factor 1, which comprises the variables X₁ (ability to receive messages), X₂ (ability to compose messages), X₃ (ability to send messages) and X₉ (motivation to listen to topics) are variables originating from within the participants themselves. Therefore, Factor 1 can be designated as the internal factor. Factor 2, which comprises the variables X₄ (number of online devices), X₅ (condition of online devices), X₆ (internet network connection), X₇ (relevance of topics), X₈ (interestingness of topics), X₁₀ (mastery of topics by speakers), X₁₁ (politeness of speakers' appearance), X₁₂ (enthusiasm of speakers), X₁₃ (ability of speakers to involve participants), X₁₄ (allocation of presentation time), X₁₅ (allocation of interaction time), X₁₆ (start and end time of activities), and X₁₇ (length of time to start and end activities), are variables originating from outside the participant. Therefore, Factor 2 can be designated as the external factor.

Internal factors were identified as one of the two major factors influencing students' digital communication during the FIP English Camp. This factor comprises four variables: the ability to receive messages, the ability to construct messages, the ability to send messages, and the motivation to listen to conversation topics. The emergence of these variables indicates that effective digital communication is strongly influenced by students' individual communication competencies and psychological readiness to participate in online interaction (Aliyev et al., 2021; Chamidy et al., 2023; Kurniarini, 2023). The ability to receive messages enables students to comprehend information conveyed by international guest speakers, while the ability to construct and send messages allows them to formulate and communicate their ideas appropriately. At the same time, motivation to listen to conversation topics reflects students' willingness to remain attentive and engaged throughout the interaction. These findings suggest that digital communication is not solely determined by the availability of communication technologies but also depends substantially on students' capacity and willingness to use those technologies for meaningful interaction (Koptseva et al., 2021; Mamaeva et al., 2022; Jayantika et al., 2024).

The findings further indicate that students' internal characteristics can determine the extent to which opportunities for international communication are successfully transformed into meaningful learning experiences (Koptseva et al., 2021; Mamaeva et al., 2022). Even when adequate technological facilities and online platforms are available, meaningful interaction with international

guest speakers may be limited if students lack confidence, motivation, or sufficient communication skills to actively participate in discussions. In an online internationalization context, students are required not only to understand messages but also to respond, formulate ideas, and initiate or sustain communication with speakers from different linguistic and cultural backgrounds (Koptseva et al., 2021; Mamaeva et al., 2022). Therefore, communication competence and motivation should be regarded as complementary dimensions of students' digital communication readiness. These findings are consistent with previous research identifying language and technological proficiency, motivation, intelligence, and aptitude as internal factors that may influence participation and outcomes in international-scale educational programs (Akram et al., 2022; Leung et al., 2017; Widana et al., 2019). The present findings extend this perspective by demonstrating that, within an online internationalization program, these internal characteristics are manifested specifically through students' ability to receive, construct, and transmit messages as well as their motivation to attend to and engage with conversation topics.

The second factor identified in this study is referred to as the external factor. This factor comprises 13 variables that influence students' digital communication during the FIP English Camp, including the number and condition of online devices, internet network connectivity, topic relevance, topic interestingness, speakers' mastery of the topics, the politeness of speakers' appearance, speakers' enthusiasm, their ability to involve participants, allocation of presentation time, allocation of interaction time, the starting and ending time of activities, and the duration required to initiate and conclude the activities. The composition of this factor demonstrates that the external conditions influencing digital communication extend beyond technological infrastructure (Peper et al., 2021; Prasetya, 2021). Although the availability and condition of digital devices and stable internet connectivity constitute important prerequisites for online interaction, students' communication experiences are also shaped by pedagogical and organizational elements. Relevant and interesting topics can stimulate students' attention and willingness to participate, while speakers who demonstrate strong topic mastery, enthusiasm, appropriate presentation, and the ability to involve participants can create a more interactive communication environment (Praptiningsih et al., 2020; Zhang et al., 2018). Similarly, the allocation and management of presentation and interaction time can determine whether students have sufficient opportunities to listen, formulate responses, ask questions, and engage in meaningful exchanges with international speakers.

The prominence of these external variables suggests that the effectiveness of digital communication in online internationalization programs is partly dependent on how institutions design, organize, and facilitate the learning environment. In other words, technological access alone does not guarantee meaningful international interaction; rather, digital communication emerges from the interaction between technological resources, instructional design, speaker performance, and opportunities for student participation. This interpretation is consistent with previous research identifying external factors as conditions beyond the individual characteristics of participants, including organizational and institutional support, the provision of appropriate equipment and learning environments, and institutional culture (Barasa, 2023; Burke et al., 2024). Access to learning resources, including digital facilities and resource persons, has also been reported as an important external condition influencing students' online learning capabilities and outcomes (Hofer et al., 2023; Lin & Yang, 2022). Therefore, universities implementing online internationalization programs need to adopt a comprehensive approach that addresses both technological and pedagogical dimensions. Ensuring reliable digital infrastructure should be accompanied by careful topic selection, effective time management, engaging and culturally responsive guest speakers, sufficient interaction opportunities, and structured activities that encourage students to communicate actively. Such an integrated approach can transform online internationalization from a technology-mediated activity into a meaningful space for sustained intercultural communication and learning.

Taken together, these findings indicate that successful online internationalization requires more than adequate technological infrastructure. Students' communication competence, confidence, and motivation are important consideration in supporting meaningful digital interaction with international partners. The identification of both internal and external factors has several important implications for higher education institutions. First, universities should adopt a more holistic approach to online internationalization by addressing students' communicative readiness alongside technological provision. Pre-program activities such as communication training, language preparation, digital communication orientation, and confidence-building activities can help students become more prepared to participate actively in international online interactions. Second, program designers should ensure that external conditions, including the quality of digital facilities, topic relevance, guest speaker engagement, interaction opportunities, and time allocation, are carefully planned. Guest speakers should also be encouraged to employ interactive strategies that provide students with opportunities to ask questions, express opinions, and engage in two-way communication. By integrating these internal and external dimensions, online internationalization can move beyond simply providing virtual access to international experiences toward creating meaningful, participatory, and sustainable intercultural learning environments.

The results obtained in this research provide empirical evidence of two underlying factors influencing students' digital communication skills in an online internationalization program. Each factor is explained by related variables that reflect students' internal and external characteristics. Previous research has examined the influence of several variables on students' digital communication skills. However, previous studies have not clearly demonstrated how these variables can be empirically grouped into underlying factors provided a clear rationale for considering them as components of broader factors. The novelty of the present study lies in identifying and empirically grouping these variables into two broader dimensions, namely internal and external factors, within the specific context of an online internationalization program. This provides a more integrated understanding of the conditions associated with students' digital communication than examining individual variables separately.

Nevertheless, this study has several limitations that should be considered when interpreting the findings. The study involved only 45 students from the international class program at one university and focused specifically on participants in the FIP English Camp. Therefore, the findings may not be directly generalizable to students from different institutions, academic disciplines, cultural backgrounds, or types of online internationalization programs. In addition, the data were collected through a self-reported questionnaire, which may be influenced by participants' subjective perceptions and response tendencies. The relatively small sample size also represents a limitation for exploratory factor analysis and warrants caution in interpreting the stability of the identified factor structure. Furthermore, the study focused on students' perceptions and did not incorporate other perspectives, such as those of international guest speakers, program organizers, or lecturers. Future research should therefore replicate the study with larger and more diverse samples across multiple institutions and online internationalization programs. Researchers could also use mixed-methods designs by combining questionnaires with interviews, focus group discussions, classroom observations, or digital interaction data to better understand how internal and external factors operate in practice. Longitudinal studies could further examine whether students' communication competence, confidence, and motivation change as they gain repeated experience in international online interactions. Such research would provide stronger evidence for developing evidence-based program designs and institutional strategies for sustainable online internationalization.

Conclusion

This study concludes that the factors influencing students' digital communication during the FIP English Camp Online Internationalization Program can be categorized into two broad dimensions: internal and external factors. Internal factors relate to students' communication competence and motivation, whereas external factors include technological readiness, the characteristics of the learning activities and the quality of speaker engagement. These findings may serve as a reference for universities in designing future online internationalization programs by emphasizing not only technological readiness but also students' communication competence and the quality of learning activities. It is recommended to enhance students' digital communication skills through human resource capacity-building activities, such as training sessions and the inclusion of courses designed to foster these skills.

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