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From Chats to Skills: Leveraging WhatsApp to Develop 21st-Century Competencies among Students at Sokoine University of Agriculture, Tanzania

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Abstract
This study examined the role of WhatsApp in enhancing 21st-century skills among undergraduate students in Tanzanian higher education. Anchored in digital pedagogy and competency-based learning, the study adopted a descriptive research design, involving 250 undergraduate students enrolled in a compulsory English course and three course instructors. Data was collected primarily through a self-administered questionnaire, with limited qualitative insights from interviews and WhatsApp chat observations used to contextualize findings. Analysis employed descriptive statistics and correlational analysis to summarize students' perceptions and experiences. Findings indicate that WhatsApp promotes communication, collaboration, critical thinking, creativity and social–emotional skills through real-time interaction, peer feedback and resource sharing. Students expressed overwhelmingly positive perceptions of WhatsApp as a supplementary learning platform, particularly valuing its immediacy for clarification, feedback, and academic support. Nonetheless, connectivity challenges and disparities in access constrained the platform's effectiveness. The study concludes that WhatsApp is a viable pedagogical tool for supporting competency-based higher education and recommends its structured integration into teaching, accompanied by clear pedagogical guidelines and improved digital infrastructure.

Keywords: WhatsApp, 21st-century skills, collaborative learning, higher education.

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Introduction
The widespread use of smartphones among university students worldwide, including in Tanzania, has made WhatsApp a key tool in higher education. Studies show that students rely on WhatsApp for social and academic purposes due to its accessibility, ease of use and multimedia-sharing capabilities (Lee, 2023; Suárez-Lantarón et al., 2022). In Tanzania, WhatsApp has supported second-language (English) learning in large classes, fostering interactivity and collaboration (Mwakapina et al., 2016). During the COVID-19 pandemic, it served as an alternative learning platform, helping students, teachers and parents remain connected and maintain learning when in-person classes were disrupted (Nyinondi & Mwakapina, 2023). Among Tanzanian pre-service teachers, WhatsApp facilitates academic communication, peer collaboration and resource sharing (Kimaro, 2025).

Globally, evidence shows students use WhatsApp to organize study groups, share resources, coordinate tasks and receive institutional updates (Murire, 2023; Usman, 2022). Scholars (Mwakapina et al., 2016; Baguma et al., 2019; Nyinondi & Mwakapina, 2023) emphasise the platform's growing importance in supporting learning. These studies collectively highlight the increasing role of WhatsApp as a means for educational engagement and collaboration, cementing its status as a vital part of modern student life.

WhatsApp has revolutionized communication in the 21st century by enabling fast, low-cost global interactions across social and academic settings. Features like text messages, voice notes, images, videos, and document sharing make it essential for maintaining social and professional connections (Lee, 2023; Suárez-Lantarón et al., 2022). Beyond social purposes, research shows that WhatsApp enhances key skills, such as collaboration through group chats, which foster the co-construction of knowledge and the exchange of materials (Murire, 2023; Kimaro, 2025). Its constant communication environment improves students' ability to articulate ideas, ask questions and engage confidently in academic discussions (Mwakapina et al., 2016). It is also argued that WhatsApp promotes critical thinking, as students discuss academic content, solve problems and evaluate resources (Ajani & Khoalenyane, 2023; Usman, 2022). Studies in Tanzania indicate that WhatsApp supported reflection, problem-solving and self-directed learning during COVID-19, demonstrating its role as a flexible educational tool (Nyinondi & Mwakapina, 2023). Overall, WhatsApp is more than just a communication platform; it significantly contributes to developing essential 21st-century skills.

In the 21st century, higher education institutions face increasing pressure to equip students with skills like communication, collaboration, critical thinking, analytical reasoning and social-emotional skills to prepare them for academic success and the global labor market (Trilling & Fadel, 2009; Voogt & Roblin, 2012). In Tanzania, the Tanzania Commission for Universities (TCU) and the Ministry of Education, Science and Technology (MoEST) promote curriculum reforms that incorporate competency-based learning, digital pedagogy and skills aligned with labor-market needs (Tanzania Commission for Universities, 2022; Ministry of Education, Science and Technology, 2023). Mobile technologies, such as WhatsApp, have changed students' communication and learning practices by enabling peer collaboration, information sharing and interactive engagement (Mwakapina et al., 2016; Nyinondi & Mwakapina, 2023; Lee, 2023). However, limited research exists on how WhatsApp helps develop 21st-century skills in Tanzanian higher education, leaving a gap in understanding the role of informal digital practices in curriculum reforms.

This gap is significant because WhatsApp represents a widely accessible platform that can support interactive and collaborative learning aligned with MoEST objectives. Research shows that WhatsApp can facilitate flexible communication, collaborative problem-solving, peer-to-peer discussion and resource sharing, which are closely related to the development of modern competencies (Murire, 2023; Kimaro, 2025; Usman, 2022). This study investigated how WhatsApp interactions turn routine chats into opportunities to develop modern skills like communication, critical thinking, analysis, collaboration, and social-emotional abilities.

Literature Review

This section reviews and critically synthesizes relevant theoretical, empirical and policy-oriented literature on technology integration in higher education, the educational use of WhatsApp and its implications for the development of 21st-century competencies, with particular reference to the Tanzanian context.

The integration of digital technologies into higher education has profoundly transformed pedagogical practices. Contemporary teaching and learning environments increasingly incorporate social media platforms, mobile applications and online communication tools to enhance student engagement, facilitate collaboration and support blended and flexible learning models (Trilling & Fadel, 2009; Voogt & Roblin, 2012). Among these digital technologies, WhatsApp has emerged as one of the most widely adopted mobile-based communication platforms in educational contexts due to its accessibility, low data consumption, user-friendliness and multifunctional communication features (Nyinondi & Mwakapina, 2023).

Empirical evidence demonstrates that WhatsApp plays a significant role in supporting both formal and informal learning by enabling real-time interaction, peer collaboration and continuous access to instructional materials (Al-Rahmi et al., 2015; Lee, 2023). Globally, WhatsApp has been employed in diverse educational settings to promote

collaborative learning, enhance learner autonomy and strengthen interaction between instructors and students. For example, studies indicate that WhatsApp enhances communication efficiency and learner motivation through sustained interactive engagement (Alamer & Al-Khateeb, 2021; Lee, 2023). Improvements in comprehension and language accuracy among ESL learners engaged in WhatsApp-mediated discussions have been empirically confirmed (Noroozi et al., 2021). Collectively, these studies suggest that WhatsApp extends learning beyond traditional classroom boundaries by creating interactive digital learning spaces that foster active engagement and skill development.

In Tanzania, the adoption of mobile technologies among university students has become widespread, with WhatsApp emerging as the most dominant platform for both social and academic communication. A growing body of Tanzanian scholarship—including Ishengoma and Mtaho (2014), Mwakapina et al. (2016), Mtega (2021), Nyinondi and Mwakapina (2023) consistently documents the exponential rise in social media use among undergraduate students. These studies identify WhatsApp as the most preferred platform due to its convenience, immediacy, affordability and capacity to facilitate peer-to-peer interaction and communication with instructors.

Empirical studies conducted within Tanzanian universities demonstrate that WhatsApp plays multiple instructional roles, including supplementing classroom teaching, enhancing collaborative learning, supporting assignment-related discussions and enabling access to learning materials shared by instructors. For example, Mwakapina et al. (2016) reported that integrating WhatsApp into language instruction significantly improved learners' participation, interaction and confidence in using English, thereby reinforcing its pedagogical potential. Similarly, Mtega (2021) observed that WhatsApp promotes peer learning and knowledge sharing, particularly in large classes that characterize many Tanzanian higher education institutions. These findings indicate that WhatsApp has become deeply embedded in students' everyday academic practices and thus holds considerable potential as a tool for developing broader educational competencies.

Contemporary educational discourse emphasizes the need for learners to acquire a range of competencies commonly referred to as 21st-century skills. These include communication, collaboration, creativity, critical thinking, problem-solving, digital literacy and social-emotional competencies (Trilling & Fadel, 2009; Voogt & Roblin, 2012). Higher education institutions worldwide, and increasingly in Tanzania, are under mounting pressure to integrate these competencies into teaching and learning processes to enhance graduates' employability and adaptability in dynamic knowledge economies.

In Tanzania, national education policies and reforms strongly emphasize competency-oriented education. The Tanzania Commission for Universities (TCU) and the Ministry of Education, Science and Technology (MoEST) underscore the integration of digital pedagogy, skills development and technology-enhanced learning as central to higher education transformation (Tanzania Commission for Universities, 2022; Ministry of Education, Science and Technology, 2023). Moreover, the Higher Education for Economic Transformation (HEET) project reinforces this shift toward competency-based, labor-market-responsive education by encouraging institutions to integrate digital technologies that foster interactive, collaborative learning environments.

Within this policy framework, examining how widely used digital tools, such as WhatsApp contribute to the development of 21st-century skills becomes imperative. The platform's features, including group discussions, multimedia sharing, instant feedback and collaborative problem-solving, closely align with pedagogical practices advocated in modern competency-based education frameworks.

A growing body of empirical research demonstrates the pedagogical value of WhatsApp in fostering a range of learner skills across educational contexts. Studies consistently show that WhatsApp enhances communication skills by providing real-time interaction spaces in which students communicate more freely and frequently than in traditional classroom settings (Gamage, 2022). In terms of collaboration, Arifani et al. (2020) establish that WhatsApp facilitates peer interaction, cooperative learning, joint task completion and collective problem-solving.

Regarding language and cognitive development, several studies report improvements in language accuracy, comprehension and analytical thinking among learners who use WhatsApp for collaborative

learning (Lai & Zhao, 2006; Noroozi et al., 2021). Furthermore, Alamer and Al-Khateeb (2021) demonstrated that integrating WhatsApp into language learning increases learner participation and motivation. In addition, Retnaningsih et al. (2023) found that WhatsApp-supported flipped learning enhances student engagement and academic performance, suggesting the platform's potential to foster learner autonomy and reflective learning.

Despite these positive findings, the literature highlights several limitations. Many studies suffer from limited generalizability due to narrow contextual focus, short-term research designs, small and homogeneous samples and inadequate examination of long-term skill development. Moreover, existing studies concentrate primarily on language proficiency and general academic performance, leaving the development of broader 21st-century competencies relatively underexplored. This gap underscores the need for empirical research that examines how everyday digital practices, especially WhatsApp-mediated academic interactions, can be pedagogically harnessed to align with national higher education goals and contribute meaningfully to modern skill development. Thus, this study examined how universities can strategically transform everyday digital chats, particularly through WhatsApp, into pedagogical spaces that unlock and enhance students' modern competencies.

Methodology

This section outlines the research design, study context, participants, data collection procedures, analytical techniques and ethical considerations used to address the study's objectives.

Design

This study used a descriptive design to explore how universities can turn digital chats into teaching spaces. It focused on the role of WhatsApp interactions in fostering students' 21st-century skills, with limited qualitative insights used to support the interpretation of findings. This method allowed for measuring skills outcomes across many students.

Study Area and Context

The study was conducted at Sokoine University of Agriculture (SUA), located in Morogoro, Tanzania, providing a university setting that can be used as a pedagogical space to foster students' modern competencies. The focus was on undergraduate students enrolled in a compulsory remedial English course for students who did not pass the English placement test administered upon admission during the 2023/2024 academic year. At SUA, all first-year students are required to take this placement test, and those who score below 50% are automatically enrolled in a remedial English course to enhance their language proficiency.

To promote learner engagement and extend learning beyond classroom boundaries, course instructors established a dedicated WhatsApp group as a supplementary learning platform. The group functioned as an informal learning space where instructors shared exercises, clarifications and supplementary materials. In response, students participated through questions, peer discussions and collaborative problem-solving. This WhatsApp group became an integral part of the instructional process and thus provided a suitable context for examining its role in skill development.

Population and Sampling

The target population comprised undergraduate students enrolled in the remedial English course and their course instructors. A total of 250 students were selected through voluntary participation from a WhatsApp group with over 500 members. In addition, five students were purposively selected for in-depth interviews to obtain detailed personal learning experiences. Furthermore, three course instructors who moderated the WhatsApp group were purposively selected as participants due to their direct involvement in the course and in digital instruction.

Data Collection Methods

Quantitative data was collected using a self-administered questionnaire distributed to 250 participating students. The questionnaire captured information on students' WhatsApp usage patterns, perceived learning benefits and the influence of WhatsApp interactions on the development of 21st-century skills. To facilitate the interpretation of quantitative findings, limited qualitative data was gathered through targeted in-depth interviews with five students and three course instructors as well as selective observations of WhatsApp interactions focusing on discourse patterns and communication behaviours. These qualitative insights offered contextual clarification of the quantitative results without serving as the primary source of evidence.

Data Analysis

Quantitative data was analyzed using descriptive statistics, including frequencies and percentages, to summarize students' WhatsApp usage patterns and perceived development of modern skills. Limited qualitative data was analyzed thematically, where interview transcripts and selected WhatsApp chat excerpts were coded and organized into themes such as communication, collaboration, digital literacy, and learner engagement. The qualitative insights were used solely to provide contextual clarification and support the interpretation of the quantitative findings, ensuring a more nuanced understanding of WhatsApp's contribution to students' development.

Ethical Considerations

Ethical standards were strictly observed throughout the study. Participation was voluntary and all participants provided informed consent prior to data collection. Confidentiality and anonymity were ensured by using pseudonyms. The research permit was formally granted by the Sokoine University of Agriculture Management through the Directorate of Postgraduate Studies, Research and Consultancy.

Findings and Discussion

This section presents the findings and discussion of the findings, guided by research questions.

Research Question 1: What is the perception of students on WhatsApp's role in skills development?

As shown in Table 1, the majority of students perceived that WhatsApp enhanced their collaborative skills (85.6%), critical thinking (76.8%) and social–emotional skills (69.6%). These findings demonstrate students' strong endorsement of WhatsApp as a pedagogically valuable platform in developing 21st-century key competencies.

Particularly the highest rating of collaborative skills reflects WhatsApp's interactive affordances, such as group discussions, peer feedback and shared problem-solving, which are central to collaborative learning. Similar trends have been reported in previous studies (Arifani et al., 2020; Alamer & Al-Khateeb, 2021; Noroozi et al., 2021), indicating that WhatsApp strengthens peer interaction and cooperative learning in higher education contexts.

Table 1: Students' Perceptions of WhatsApp's Role in Skills Development (N = 250)

	Critical Thinking		Social and Emotional		Collaborative		Integration into Education	
Responses	f	%	f	%	f	%	f	%
Yes	192	76.8	174	69.6	214	85.6	199	79.6
No	58	23.2	76	30.4	36	14.4	51	20.4

Table 2: Challenges Encountered by Students during WhatsApp-Supported Educational Activities

Item	Connectivity	Distraction from other Conversations	Difficulty in Organizing	Limited Participation	Total
Group discussion	78	11	13	3	105
Sharing material	45	0	5	0	50
Asking question	11	5	0	0	16
Collaborative projects	22	4	4	6	36
YouTube videos	29	3	5	6	43
Total	**185**	**23**	**27**	**15**	**250**

Research Question 2: What challenges do students encounter when performing selected educational activities through WhatsApp?

Students were asked to indicate challenges they experience while engaging in various educational activities through WhatsApp in terms of group discussions, sharing learning materials, asking questions, participating in collaborative projects and watching YouTube-based language lessons. The distribution of reported challenges is presented in Table 2.

Results in Table 2 indicate that connectivity (185 cases) was the most prevailing challenge across the educational activities. This was especially during group discussions (78 cases) and sharing of learning materials (45 cases), where stable internet access is essential. Other challenges included difficulty in organizing discussions (27 cases) and distractions from other conversations (23 cases). The least perceived challenge was limited participation with 15 cases. Interestingly, no respondent reported distraction during the sharing of materials.

These findings reveal that while WhatsApp is widely used for diverse academic purposes, ranging from group discussions to multimedia learning, its educational effectiveness may be structurally constrained by infrastructural limitations, such as internet reliability. This supports broader discourses on digital divide in sub-Saharan African higher education, where access and connectivity continue to affect the pedagogical value of digital platforms (Bashir, 2021; GSMA, 2024).

Research Question 3: Is there a significant relationship between WhatsApp educational activities and the challenges encountered?

To establish the relationship between WhatsApp learning activities and challenges experienced, the study conducted a correlational analysis using Chi-square as presented in Table 3. The Pearson Chi-Square test reveals a significant association between educational activities performed on WhatsApp and the types of challenges encountered ($\chi^2 = 35.544$, df = 12, $p < .001$). This indicates that the nature of the learning activities students engage in is significantly related to the challenges they experience. The significant Linear-by-Linear Association ($p = .010$) further suggests the presence of a systematic trend in this relationship.

Table 3: Statistical Tests on the Relationship Between Educational Activities and Challenges

Statistical Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	35.544a	12	.000
Likelihood Ratio	39.417	12	.000
Linear-by-Linear Assoc.	6.590	1	.010
N of Valid Cases			250
Symmetric Measures			
Interval by Interval			
Pearson's R	.163	.068	2.596
Approx. Sig.			.010c
Ordinal by Ordinal			
Spearman Correlation	.100	.067	1.578
Approx. Sig.			.116c
N of Valid Cases			250

Pearson's correlation coefficient ($r = .163$, $p = .010$) indicates a weak but statistically significant positive relationship, implying that as engagement in more complex WhatsApp learning activities increases, challenges, particularly connectivity and coordination difficulties, also tend to increase. However, Spearman's correlation was not statistically significant ($p = .116$), suggesting that the relationship is sensitive to measurement scale and may not be strictly monotonic.

These findings imply that while WhatsApp meaningfully supports collaborative and interactive learning, its effectiveness is moderated by infrastructural and organizational constraints. As the intensity and complexity of learning activities increase, technical and coordination challenges become more pronounced.

Research Question 4: Is participation in collaborative learning associated with engagement in educational activities on WhatsApp?

Table 4 presents the association between students' participation in WhatsApp-facilitated collaborative learning and their engagement in specific educational activities on the platform.

Table 4: Educational Activities and Participation in Collaborative Learning (N = 250)

Educational Activities	Yes	No	Total
Group discussions	104	1	105
Sharing study materials	38	12	50
Asking questions to peers/instructors	16	0	16
Collaborative projects	28	8	36
Watching YouTube lessons	28	15	43
Total	**214**	**36**	**250**

The results show that almost all students who participated in group discussions (104 out of 105) were also involved in collaborative learning activities facilitated through WhatsApp. Similarly, all respondents who used WhatsApp to ask academic questions (16 out of 16) reported participating in

collaborative learning. High proportions were likewise observed for collaborative projects (28 out of 36) and sharing of study materials (38 out of 50).

These results demonstrate that engagement in educational activities on WhatsApp is strongly embedded within collaborative learning practices. Students who participate in collaborative learning are substantially more likely to engage in interactive educational tasks such as discussions, peer consultation, material exchange and group project work. This confirms WhatsApp's central role as a collaborative academic space rather than merely a communication tool.

Following the descriptive Yes/No responses, a Chi-square test of independence and related association measures was conducted to determine whether a statistically significant relationship exists between participation in collaborative learning and engagement in educational activities on WhatsApp (Table 5).

Table 5: Statistical Relationship Between Collaborative Learning and Educational Activities (N = 250)

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	38.258[a]	4	.000
Likelihood Ratio	45.916	4	.000
Linear-by-Linear Association	25.842	1	.000
N of Valid Cases	250		

a. 1 cells (10.0%) have an expected count of less than 5. The minimum expected count is 2.30.

The Pearson Chi-Square test indicates a statistically significant association between students' participation in collaborative learning and their engagement in WhatsApp-based educational activities ($\chi^2 = 38.258$, df = 4, $p < .001$). The Likelihood Ratio and Linear-by-Linear Association tests further confirm this strong relationship ($p < .001$). These findings clearly demonstrate that participation in collaborative learning and engagement in WhatsApp educational activities are not independent of each other. Rather, they are interconnected, reinforcing the view that WhatsApp serves as a functional collaborative learning environment within the university context.

Research Question 5: What specific 21st-century skills do students perceive WhatsApp as promoting?

Students were asked to identify specific roles WhatsApp plays in enhancing their 21st-century skills. The results are presented in Table 6.

Findings indicate that students primarily perceive WhatsApp as a platform for enhancing teamwork and collaboration (36.4%), followed by independent learning (20.0%) and peer support in learning (18.0%). These three roles account for a cumulative 74.4% of all responses, underscoring WhatsApp's strong contribution to socially mediated learning processes.

Table 6: Roles of WhatsApp in Enhancing 21st-Century Skills (N = 250)

Roles/Functions	**%**	**Cumulative %**
Facilitating teamwork and collaboration	36.4	34.4
Encouragement of Independent Learning	20.0	54.4
Creates Peer support and encouragement in learning	18.0	72.4
Promoting digital literacy	11.2	83.6
Encouraging problem-solving through discussions	8.8	92.4
Enhancing creativity through multimedia sharing	4.0	96.4
Fostering global communication and cultural awareness	3.6	100
Total	**100.0**	

WhatsApp's contribution to digital literacy (11.2%) and problem-solving through discussion (8.8%) further reflects its role in supporting higher-order cognitive and technological competencies. However, its perceived influence on creativity (4.0%) and global communication and cultural awareness (3.6%) remains comparatively limited, suggesting that these advanced competencies may require more structured pedagogical integration than currently implemented. The findings demonstrate that WhatsApp plays a significant role in enhancing key 21st-century skills among undergraduate university students in Tanzania. The statistical association between participation in collaborative learning and educational activities (Table 5) confirms that WhatsApp is functioning as an active collaborative academic learning environment, not merely a social communication platform.

The dominance of teamwork, independent learning and peer support aligns closely with constructivist and social learning theories, which emphasize knowledge construction through interaction and shared meaning-making. These results further corroborate earlier studies (Albers et al., 2015; Arifani et al., 2020; Rahaded et al., 2020; Nyinondi & Mwakapina, 2023), which similarly found that WhatsApp enhances collaboration, communication, and learner engagement.

Research Question 6: How does WhatsApp contribute to the enhancement of selected 21st-Century Skills?

This section examined how specific 21st-century skills, namely communication, collaboration, critical thinking, creativity and social–emotional skills, are enhanced through WhatsApp-supported learning. Students' perceptions are summarized in Table 7.

As shown in Table 7, most respondents agreed that WhatsApp offers opportunities to enhance communication skills in both written and spoken modes. Specifically, 77.6% of students reported that WhatsApp provides opportunities for expressing thoughts clearly in written communication and 94% agreed that it facilitates voice and video communication. Also, the findings indicate a high level of agreement that WhatsApp facilitated collaboration and problem-solving among students, with 95.6% agreeing it allows real-time project collaboration and 94.4% reporting it helps contribute ideas and solve problems with peers. The platform's real-time communication feature was identified as a key factor in fostering effective collaboration among users, regardless of location.

Similarly, regarding critical thinking skills, the majority of respondents agreed that WhatsApp aids them in evaluating information and making informed decisions (90.4%) and 92.4% agreed it encourages critical analysis during debates or discussions.

Table 7: Perceived Enhancement of 21st-Century Skills through WhatsApp (N = 250)

Skills	How WhatsApp Enhances 21st century skills (N=250)	Disagree		Neutral		Agree	
		f	%	f	%	f	%
Communication	Provides me with opportunities to express thoughts and ideas clearly in written communication	22	8.8	34	13.6	194	77.6
	Helps to send voice messages and make voice and video calls	9	3.6	6	2.4	235	94
Collaboration	Allows us to work together on projects, share ideas, and communicate in real-time	5	2	6	2.4	239	95.6
	Helps me to contribute ideas and solve problems together with other peers	8	3.2	6	2,4	236	94.4
Critical Thinking	Helps me to evaluate information /learning materials and make informed decisions."	7	2.8	17	6.8	226	90.4
	Encourages me to think critically and analyze information during debates or discussions	5	2	14	5.6	231	92.4
creativity	Provides me with opportunities to share creative ideas and solutions.	28	11.2	8	3.2	214	85.6
	Multimedia use promotes creativity and diversity in communication.	3	1.2	5	2	242	96.8
Social	Allows us to express ourselves freely, promoting emotional intelligence and empathy					250	100
	Helps me build and maintain social connections.	3	1.2	4	1.6	243	97.2
Emotional	Helps me to understand and manage my emotions better.	5	2	2	2.8	238	95.2
	Improved my empathy and understanding of others' feelings.	5	2	14	5.6	231	92.4

WhatsApp provides access to vast amounts of information and users must be able to critically evaluate it. Furthermore, the findings indicate that WhatsApp promoted creativity through opportunities to share creative ideas and solutions (85.6%) and that multimedia use enhanced creativity and diversity in communication (96.8%).

Moreover, the last skills assessed were social and emotional. All respondents agreed that WhatsApp facilitates self-expression and promotes emotional intelligence while 97.2% reported it helps build and maintain social connections. For emotional management, 95.2% of students agreed that WhatsApp helps them understand and manage their emotions and 92.4% indicated it improves empathy and understanding of others' feelings.

The platform provides users with opportunities to engage in discussions and debates, thereby fostering the development of critical thinking skills. In an interview with an instructor who used the forum to facilitate learning, the respondent emphasised the platform's role in enhancing 21st-century skills:

> All right, WhatsApp helps boost 21st-century skills. It's like a virtual classroom where we chat, discuss, and share resources, deepening our understanding of rules. Also, it fosters collaboration, critical thinking, and digital literacy through group projects and the analysis of language use. So, it is not just about WhatsApp; it prepares us for the skills we need in today's world" (Instructor 1, May 2024).

Beyond transversal skills, WhatsApp was found to support the development of language proficiency, particularly in writing and grammar. Students reported that regular text-based interaction improved spelling and punctuation, grammatical accuracy, sentence formulation and awareness of peer-based feedback. Access to shared learning materials (articles, quizzes, videos) further supported autonomous learning and content reinforcement while the autocorrection feature helped detect simple language errors. These findings indicate that WhatsApp supports both formal language learning and informal linguistic refinement. An instructor further emphasized this evaluative dimension: "We observe participation, evaluate student contributions and gather feedback within the WhatsApp group to assess learning and skill development." This confirms WhatsApp's role not only as an interaction platform but also as a continuous formative assessment space.

Conclusion and Recommendation

Students perceive WhatsApp as useful for improving skills such as collaboration, critical thinking and social-emotional skills. It is widely supported for interactive, socially driven learning. However, connectivity issues and organizational challenges were the main obstacles students faced when using WhatsApp for learning. These findings highlight that infrastructure is a major constraint on effective WhatsApp-based learning. As students participate more frequently or engage in more advanced activities, they encounter increased technical and logistical difficulties. Participation in collaborative learning is linked to engagement in WhatsApp educational activities, demonstrating that WhatsApp is an effective environment for collaboration. It is not just a communication platform.

WhatsApp mainly supports teamwork, collaboration, independent learning and peer support in educational settings. Although digital literacy and problem-solving skills were also recognized, creativity and global awareness received less emphasis. Additionally, WhatsApp promoted skills development through real-time interaction, information sharing, peer discussion and multimedia use. It improved communication, collaboration, critical thinking, creativity and social-emotional skills while also aiding language learning and ongoing formative assessment.

Based on the conclusions, the study recommends that universities recognize WhatsApp as a supplementary educational tool and provide clear guidelines for its structured use to promote skill development. Institutions should invest in reliable internet, affordable mobile data and technical support to ensure fair access and continuous engagement for all students. The design of WhatsApp-based learning activities should consider limitations, using blended or flexible methods to address connectivity issues. Instructors should include structured collaborative tasks in WhatsApp groups to increase engagement, peer interaction and skill development. These activities should also encourage creativity, innovation, intercultural communication, collaboration and critical thinking. Universities should train instructors on creating effective WhatsApp activities aligned with learning goals and incorporate them into assessments to promote accountability and practical skill application.

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