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Exploring the Pattern of Knowledge Management Practices in WhatsApp-Based Interactions among Indonesian EFL Learners

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Abstract

Knowledge Management (KM) Practices play an essential role in supporting language learning, particularly in technology-mediated environments. Although previous studies have highlighted the importance of knowledge creation, sharing, utilization, and storing in educational context, limited research has investigated which KM dimensions are most prominent within WhatsApp-mediated EFL interactions. This study investigates the pattern of Knowledge Management practices in WhatsApp-based interactions among Indonesian university EFL students. An explanatory mixed-methods design was employed, involving a Likert-scale questionnaire administered to 33 students and semi-structured interviews with 15 participants. The findings indicate that knowledge storing (M = 3.47) and knowledge sharing (M = 3.38) were categorized as very high, suggesting that WhatsApp effectively supports knowledge storing and sharing processes. Knowledge creation (M = 3.12) was categorized as high, indicating that students were able to construct new understanding through collaborative discussion. In contrast, knowledge utilization (M = 2.85) received a comparatively lower score, suggesting challenges in applying acquired knowledge to learning tasks. Qualitative findings further revealed that WhatsApp promoted accessibility, flexibility, and active participation; however, structured instructional guidance remains necessary to facilitate deeper knowledge utilization. These findings contribute to Knowledge Management theory by demonstrating how mobile-mediated interactions support different KM dimensions in EFL contexts. Overall, WhatsApp-based interactions appear to be an effective platform for facilitating Knowledge Management practices, particularly knowledge storing and sharing among EFL learners.

1. Introduction

In the era of digital communication, Knowledge Management (KM) has become increasingly important in supporting learning processes beyond the boundaries of traditional classrooms. Originally developed in organizational and business contexts, KM has gradually gained attention in educational settings due to its potential to facilitate the creation, sharing, utilization and storage of knowledge among learners. According to (Takeuchi & Umemoto, 1996), knowledge creation is fundamentally a social process that emerges through interaction and collaboration among individuals.

This perspective aligns with Vygotsky's Sociocultural Theory, which emphasizes that learning and cognitive development are constructed through meaningful social interaction (Vygotsky et al., n.d.). In English as a Foreign Language (EFL) context, where communication and collaboration play essential roles in language development, KM provides a valuable framework for understanding how learners exchange information, construct understanding, and apply knowledge during learning activities.

Within an educational context, KM is commonly represented through four interconnected dimensions: knowledge creation, knowledge sharing, knowledge utilization, and knowledge storing. Knowledge creation refers to the development of new understanding through interaction and discussion. Knowledge sharing involves the exchange of ideas, information, and learning resources among individuals. Knowledge utilization concerns the application of acquired knowledge in completing tasks and solving problems, while knowledge storing refers to the preservation and retrieval of knowledge for future use. Together, these dimensions provide a comprehensive framework for examining learning processes in technology-mediated environments (Ahmed et al., 2022).

Among various digital communication platforms, WhatsApp has become one of the most widely used applications among Indonesian students. Its accessibility, familiarity, and multimedia features make it a practical tool for supporting communication and collaboration beyond classroom settings. In EFL learning, WhatsApp facilitates interaction through text, messages, voice notes, file sharing, images, and group discussions, enabling students to engage in learning activities more flexibly.

Although previous studies have applied Knowledge Management frameworks to educational contexts, the distribution of KM dimensions has not been consistently examined across different learning environments; previous studies mostly focused conventional, rather than digital platforms. (Ahmed et al., 2022a), for example, highlighted the importance of knowledge creation, utilization, sharing, and storing in conventional educational settings, yet the relative dominance of KM dimensions may vary depending on the nature of learner

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interaction. While Knowledge management frameworks emphasize knowledge creation, sharing, utilization, and storage, no empirical study has systematically quantified which KM Dimensions dominate in WhatsApp-mediated EFL Learning, and how they affect students' engagement in classroom. Conventional educational research cannot predict digital platforms dynamics and existing framework lack context-specific digital platforms. This gap is critical because understanding dimensions hierarchy in WhatsApp context reveals whether learners prioritize knowledge exchange over creation, informing pedagogically-tailored KM interventions for digital EFL Classrooms.

This gap is important because the dominance of particular KM practices may reveal how learners actually manage, exchange, and construct knowledge in digital learning environment. Understanding these pattern can contribute to a more context-sensitive application of Knowledge Management theory in EFL settings and provide insights into how WhatsApp supports collaborative learning processes.

Therefore, this study aims to identify the dominant Knowledge Management practices that emerge in WhatsApp-based EFL interactions and to explore how these practices influence student engagement during the learning process. To address these objective, the study is guided by the following research questions:

1. What Knowledge Management practices emerge in WhatsApp-mediated EFL interactions?
2. How do these Knowledge Management practices influence students' engagement during WhatsApp-mediated interactions?

2. Method

This study employed an explanatory mixed-methods design, in which quantitative data were collected and analyzed first, followed by qualitative data collection to provide a deeper explanation of the quantitative findings (Creswell & Creswell, 2021). The quantitative phase aimed to identify patterns of Knowledge Management (KM) practices in WhatsApp-mediated EFL interactions, while the qualitative phase explored students' experiences and perceptions to further explain the quantitative results about KM Practices within WhatsApp-mediated Interactions in EFL Classroom.

The participants of this study were English as a Foreign Language (EFL) students from a university in Bogor, Indonesia, who had experienced WhatsApp-based interactions in a content-based course. A purposive sampling technique was employed to select participants who were actively involved in WhatsApp-mediated classroom discussions. A total of 33 students participated in the questionnaire phase, while 15 students voluntarily participated in semi-structured interviews.

Ethical considerations were taken into account throughout the study. Participation was voluntary, and informed consent was obtained from all

participants prior to data collection. Participants were informed about the purpose of the study and assured that their responses would be used solely for research purposes. To maintain confidentiality and anonymity, each participant was assigned a numerical code participant 1-33 during data analysis and reporting.

The primary quantitative instrument was a questionnaire developed based on research instruments by (Ahmed et al., 2022), that involves KM Practices as: knowledge creation, knowledge sharing, knowledge utilization and knowledge storing. Each dimension was represented by one item designed to capture students' perceptions of WhatsApp-mediated interaction within the context of EFL learning. The questionnaire items were developed according to the conceptual definitions of each KM dimension and were reviewed and refined under the supervision of the research advisor to ensure conceptual relevance and clarity before distribution.

To establish content validity of the questionnaire and interview, the instrument underwent a systematic expert validation process prior to distribution. As Creswell and Creswell (2021) emphasize, ensuring instrument validity is a fundamental, as it determines whether the tool accurately measures the intended construct. In this study, the questionnaire and interview items were evaluated by 2 experts with established knowledge in the fields of English language teaching and learning. Expert reviewers assessed each item for conceptual clarity, relevance to the corresponding Knowledge Management dimension, and appropriateness for the EFL learner population. Following expert feedback, items were refined under the supervision of the research advisor to ensure precise alignment between each questionnaire item and its theoretical dimension, as adapted from (Ahmed et al., 2022).

The questionnaire employed a four-point Likert scale consisting of Strongly Disagree (SD) = 1, Disagree (D) = 2, Agree (A) = 3, and Strongly Agree (SA) = 4. The use of a Likert scale allows researchers to systematically measure participants' perceptions and attitudes toward specific phenomena (Taherdoost, 2019). The questionnaire consists of 16 items, 4 items each represents 4 KM Dimensions, and this is the item example of questionnaire lists:

Picture 1. Item examples

Questionnaire: Knowledge Management Practices in WhatsApp-Based EFL Interaction
(Adapted from Ahmed et al., 2022) Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree

Dimension 1: Knowledge Creation

No	Item	SD	D	A	SA
1	WhatsApp discussions help me generate new ideas about the topic being learned				
2	I develop new understanding of English through exchanging ideas with peers on WhatsApp				
3	Discussions on WhatsApp encourage me to think critically and creatively about learning materials				
4	Through WhatsApp interactions, I construct new knowledge beyond what the teacher has explained				

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Quantitative data were analyzed by calculating the mean score for each Knowledge Management dimension as proposed by Creswell (Creswell & Creswell, 2021) by using the following formula:

Mean = Σfx / N

Where Σfx represents the total weighted score and N represents the total number of respondents. The resulting mean scores were interpreted using predetermined categories as proposed by Best and Kahn (2006), as presented in below:

Table 1. Interpretation of Mean Scores

Mean Range	**Interpretation**
3.25–4.00	Very High / Strongly Positive
2.50–3.24	High / Positive
1.75–2.49	Low
1.00–1.74	Very Low

To complement the quantitative findings, semi-structured interviews were conducted with 15 participants. The interview consists of 8 items: 2 items are general experiences of WhatsApp-mediated discussions, 4 items represent each KM dimensions practices, and 2 items represents the effects of KM Practices to students' engagements. The interviews aimed to explore students' experiences regarding how WhatsApp-mediated interactions supported Knowledge Management practices during classroom discussions, and to see the KM Practices relevance to students' engagement. Interview questions focused on students' perceptions of knowledge creation, sharing, utilization, and storing within WhatsApp-based learning activities, and its effects on students' engagement.

The qualitative data were analyzed using the six-phase thematic analysis framework proposed by (Braun & Clarke, 2006), which includes familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final report. This approach enabled the systematic identification of recurring patterns related to Knowledge Management practices within WhatsApp-mediated EFL interactions.

To enhance the trustworthiness and consistency of qualitative interpretation, inter-rater reliability procedures were implemented. Two independent raters analyzed the interview data separately before comparing and discussing their coding results to reach consensus. Inter-rater reliability was calculated using Cohen's Kappa coefficient, resulting in a value of 0.82, indicating strong agreement

between coders (Cohen, 1960). This procedure strengthened the credibility of the identified themes and ensured that the findings reflected systematic analysis rather than individual interpretation.

3. Result

The findings of this study are presented under five themes: the overall results of the knowledge management pattern identified in WhatsApp-mediated interaction among Indonesian English as a Foreign Language learners, followed by patterns of knowledge creation, knowledge utilization, knowledge storing, and knowledge sharing that emerged throughout classroom interactions.

1. Overall Results of the Knowledge Management Pattern in WhatsApp-mediated classroom

Table 2 presents the mean scores of the four Knowledge Management (KM) dimensions identified in WhatsApp-mediated EFL interactions. The findings indicate that all dimensions fall within positive categories. Knowledge storing obtained the highest mean score (M = 3.47), followed by knowledge sharing (M = 3.38), knowledge creation (M = 3.12), and knowledge utilization (M = 2.85).

Table 2. Frequency and Mean Scores of Knowledge Management Dimensions

Dimensions	SD (1)	D (2)	A (3)	SA (4)	N	Total Score	Mean
Knowledge Creation	0	2	25	6	33	103	3.12
Knowledge Sharing	0	1	19	13	33	115	3.38
Knowledge Utilization	0	7	24	2	33	94	2.85
Knowledge Storing	0	1	15	17	33	118	3.47

These findings suggest that students generally perceived WhatsApp-mediated interaction as supportive medium of Knowledge Management practices. Among the four dimensions, knowledge storing and knowledge sharing emerged as the most prominent practices, while knowledge utilization obtained the lowest mean score. Although all dimensions were positively perceived, the results indicate differences in the extent to which each KM practice was experienced by students during WhatsApp-based classroom interactions.

The quantitative findings were further supported by qualitative data obtained through semi-structured interviews. Participants reported that WhatsApp facilitated communication, discussion, and access to learning materials. Several participants also noted that the platform allowed them to revisit previous

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discussions and share ideas more comfortably with their peers.

2. Knowledge Creation in WhatsApp-Mediated Classroom

Table 3. Pattern of Knowledge Creation in WhatsApp-Mediated Classroom

Dimensions	SD (1)	D (2)	A (3)	SA (4)	N	Total Score	Mean
Knowledge Creation	0	2	25	6	33	103	3.12

Knowledge creation obtained a mean score of 3.12, which falls within the high category. This result indicates that students generally perceived WhatsApp-mediated interaction as supporting the development of new understanding through discussion and interaction with peers.

The interview findings also reflected students' experiences in constructing understanding during WhatsApp discussions. Some participants stated:

> *"Discussion through WhatsApp helps me understand the material better because I can read the massages again and again."* (Participant 1)

> *"The active environment in WhatsApp classes support my understanding of subject matter, it makes it easier to digest."* (Participant 20)

> *"The interaction in WhatsApp discussion enables me to understand complicated subject, make it less hard to understand."* (Participant 6)

This response suggests that access to ongoing discussion and previous messages supported students in developing their understanding of the learning materials. The mean score of 3.12 for knowledge creation, falling within the high category, suggests that WhatsApp-mediated interaction meaningfully supports students' construction of new understanding through peer-based discussion.

The qualitative data fills in the quantitative results by stating that Students did not describe knowledge creation as a sudden moment of insight, but rather as a gradual process built through repeated engagement with shared messages and ongoing peer interaction. As Participant 6 expressed, WhatsApp discussions made complicated subjects "less hard to understand," while Participant 20 noted that the active discussion environment made materials "easier to digest." In this sense, WhatsApp functions as a social scaffold, enabling learners to construct knowledge collaboratively rather than in isolation.

Nevertheless, the quantitative distribution, where 25 students responded Agree and only 6 reached Strongly Agree, signals an important limitation of the result. This suggests that WhatsApp, as currently used, supports receptive

knowledge construction more effectively than productive or transformative learning

3. Knowledge Sharing in WhatsApp-Mediated Classroom

Table 4. Pattern of Knowledge Sharing in WhatsApp-Mediated Classroom

Dimensions	SD (1)	D (2)	A (3)	SA (4)	N	Total Score	Mean
Knowledge Sharing	0	1	19	14	33	115	3.38

Knowledge sharing obtained a mean score of 3.38, placing it within the very high category. This result indicates that students strongly perceived WhatsApp as facilitating the exchange of knowledge, ideas, and opinions during classroom discussions.

The interview data support this finding. One participant stated:

> *"it is easier to express ideas through WhatsApp because we don't need to speak directly, we can just type and send messages. Surprisingly, I am more engaging doing a discussion through WhatsApp."* (Participant 1)

Similarly, another participant explained:

> "*We can discuss with classmates at the same time and share our opinions and ideas very easily and feel free without anxiety that our answers might be wrong."* (Participant 2)

These responses indicate that students perceived WhatsApp as a platform that facilitated communication and idea sharing among peers. The mean score of 3.38 for knowledge sharing, placing it firmly within the very high category, stands out as the strongest dimension in this study unlike knowledge creation, which requires deeper cognitive effort, knowledge sharing thrives in environments where communication feels natural, low-pressure, and accessible.

Another conclusion derives not by the high mean score, but the distribution behind it where 14 students responded Strongly Agree compared to only 6 participants in the knowledge creation dimension. This suggests that students feel significantly more confident and willing to share ideas than to generate them independently. The qualitative data support the cause of it from Participant 1 described feeling "more engaging" in WhatsApp discussions precisely because the platform removed the pressure of face-to-face speaking, while Participant 2 highlighted the freedom to share opinions "without anxiety that our answers might

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be wrong. When learners feel emotionally safe, they communicate more freely and more frequently. WhatsApp does not merely replicate classroom discussion in a digital format; it actively reshapes the social dynamics of participation by reducing the affective barriers that traditionally silence less confident learners.

4. Knowledge Utilization in WhatsApp-Mediated Classroom

Table 5. Pattern of Knowledge Utilization in WhatsApp-Mediated Classroom

Dimensions	SD (1)	D (2)	A (3)	SA (4)	N	Total Score	Mean
Knowledge Utilization	0	7	24	2	33	94	2.85

Knowledge utilization obtained a mean score of 2.85, which falls within the high category but represents the lowest score among the four dimensions. This finding indicates that students perceived WhatsApp as somewhat less supportive of applying acquired knowledge compared to storing, sharing, and creating knowledge. Although the dimension remained positively perceived, the lower mean score suggests that the application of knowledge may not be as strongly experienced as other Knowledge Management practices during WhatsApp-mediated classroom interactions.

The interview findings also reflected students' experiences in knowledge utilization in WhatsApp discussion:

> "*The feedback I get from friends in WhatsApp discussion really helps me correct my mistakes. After reading their responses, I try to improve the way I write and express my ideas in English.*" (Participant 2)
>
> *"When my teacher asks a question in the WhatsApp group, I have to think carefully before I type my answer. This makes me practice using English more seriously than just listening in class"* (Participant 20)

The mean score of 2.85 for knowledge utilization, while still falling within the high category, tells a more cautious result compared to the other three dimensions. It is the lowest score in this study; the quantitative distribution is particularly revealing: 24 students responded Agree, yet only 2 reached Strongly Agree, while 7 selected Disagree. This pattern suggests a meaningful divide among learners that some are actively applying what they learn through WhatsApp discussions, but a considerable number remain uncertain about whether their WhatsApp interactions genuinely translate into practical language use.

The qualitative data, however, offers a more encouraging picture beneath these numbers. Participant 2 described how peer feedback on WhatsApp

motivated them to actively improve their writing and expression, while Participant 20 noted that responding to teacher questions on WhatsApp demanded more serious English practice than passive classroom listening. Yet the low Strongly Agree response rate signals an important limitation, for most students, knowledge utilization through WhatsApp remains occasional and reactive rather than habitual and intentional.

5. Pattern of Knowledge Storing in WhatsApp-Mediated Classroom

Table 6. Pattern of Knowledge Storing in WhatsApp-Mediated Classroom

Dimensions	SD (1)	D (2)	A (3)	SA (4)	N	Total Score	Mean
Knowledge Storing	0	1	16	17	33	118	3.47

Knowledge storing obtained the highest mean score (M = 3.47), placing it within the very high category. This finding indicates that students strongly perceived WhatsApp as effective for storing and revisiting learning materials.

The interview findings support this result. One participant stated,

> *"If I don't understand or I missed the material during class, I can just scroll the group chat and read it again. Also for saving the learning materials such as; Power Point, or article references given by the lecturer"* (Participant 4)
> *"I can read all over again all the material given without afraid of not catching up the session and the material" (Participant 6)*
> *"With WhatsApp it is more systematic; I can access all the material given and prepare for exam by seeing the history of chats and documents given" (Participant 2)*

This response demonstrates how students used WhatsApp to access previous discussions and learning resources whenever needed. The mean score of 3.47 for knowledge storing, the highest among all four dimensions, the quantitative distribution reinforces this clearly: 17 students responded Strongly Agree, the highest Strongly Agree count across the entire study, suggesting that this is not merely a generally positive perception but a deeply and consistently felt experience among learners.

WhatsApp, it appears, is where students feel most empowered, not in generating ideas or applying knowledge, but in holding onto it, organizing it, and returning to it whenever needed. The qualitative data brings this finding to life in remarkably concrete ways. Participant 4 described scrolling through group chats

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to retrieve missed materials including PowerPoint files and article references, while Participant 2 framed WhatsApp as a systematic resource for exam preparation through chat history review. Most tellingly, Participant 6 expressed relief at being able to revisit materials "without being afraid of not catching up", this speaks to the anxiety many EFL learners carry about falling behind, and how WhatsApp's persistent, searchable chat history quietly addresses that fear.

Overall, the findings indicate that all four Knowledge Management dimensions were present in WhatsApp-mediated EFL interactions. Among these dimensions, knowledge storing emerged as the most dominant practice, followed by knowledge sharing, while knowledge creation and knowledge utilization demonstrated comparatively lower mean scores. The qualitative findings generally support the quantitative results, suggesting that WhatsApp facilitates the preservation and exchange of knowledge more strongly than the application and generation of new knowledge. These findings provide a foundation for further discussion regarding the role of WhatsApp in supporting Knowledge Management practices among EFL learners.

4. Discussion

The findings revealed that all four Knowledge Management dimensions were positively perceived by students. Among them, knowledge storing emerged as the most dominant dimension, followed closely by knowledge sharing. Knowledge creation also demonstrated positive results, while knowledge utilization obtained the lowest mean score. These findings suggest that WhatsApp-mediated interaction supports various Knowledge Management practices, particularly those related to retaining and exchanging knowledge.

The findings of this study reveal a meaningful hierarchical pattern among the four Knowledge Management dimensions in WhatsApp-mediated EFL interactions: knowledge storing (M = 3.47) and knowledge sharing (M = 3.38) significantly outperformed knowledge creation (M = 3.12) and knowledge utilization (M = 2.85). This pattern may appear straightforward in summary, but a deeper examination beneath these scores exposes a more complex and pedagogically significant result about how Indonesian EFL learners actually manage knowledge in digital environments.

Crucially, this hierarchical pattern extends beyond a simple ranking of scores; it reveals the extent to which WhatsApp-mediated learning environments facilitate surface-level knowledge engagement (storing and sharing) while leaving deeper cognitive processes of creation and utilization comparatively underdeveloped, thereby contributing to Knowledge Management theory by demonstrating that KM dimensions are not equally accessible in informal digital communication platforms.

The prominence of knowledge storing may be explained by the characteristics of WhatsApp as a digital communication platform. Unlike face-to-face classroom discussions, WhatsApp enables students to revisit previous conversations, access

shared files, and review learning materials at their own pace. The interview findings support this interpretation, as several participants reported using chat histories and shared resources to revisit learning content. This finding is consistent with (Ahmed et al., 2022b) who identified knowledge storing as an important dimension of Knowledge Management in educational settings. The emergence of knowledge storing as the most dominant dimension is, in many ways, the most revealing finding of this study, and its explanation requires looking beyond the surface appeal of WhatsApp's technical features.

It is tempting to attribute this dominance simply to WhatsApp's persistent chat history and file-sharing functionality, and these affordances are undeniably relevant, but a more penetrating explanation lies in the psychological and sociocultural conditions that Indonesian EFL learners bring to digital learning environments. Specifically, Indonesian educational culture has long been associated with a receptive orientation to learning, one in which completeness of information collection is prized over critical interrogation of that information.

WhatsApp, with its permanent and searchable archive of interactions, aligns almost perfectly with this orientation, offering students a tool that rewards thoroughness of storage without demanding any immediate application or transformation of what is stored. In this sense, the dominance of knowledge storing in the present study is not merely a technological outcome but a cultural one, and this intersection of platform affordance and learner disposition represents a theoretical contribution that moves the KM-in-education literature beyond infrastructure-focused explanations toward more nuanced sociocultural accounts.

However, the present findings complicate this principle by demonstrating that accessibility alone does not activate action ability; rather, the transition from stored to applied knowledge depends on instructional conditions and learner dispositions that lie outside the platform itself. From this study it can be concluded that students store knowledge extensively but internalize and apply it far less consistently, suggesting that digital platforms which excel at knowledge preservation do not automatically facilitate the full practical usage of knowledge, and that cultural and motivational factors play a significant role in determining whether stored knowledge advances toward deeper forms of knowing.

A particularly noteworthy finding is the high level of knowledge sharing observed among participants. While previous studies have often emphasized the challenges of maintaining active participation in online learning environments, the present study found that students perceived WhatsApp as highly supportive of sharing ideas and exchanging opinions. Participants reported feeling more comfortable expressing their thoughts through text-based communication, which reduced anxiety and encouraged participation. This finding is broadly consistent with recent scholarship on WhatsApp-mediated learning.

Nasution and Munandar, (2023) observed that WhatsApp enables students to share ideas and learning materials in a more informal and relaxed environment,

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which in turn contributes to greater participation and learner autonomy. Similarly, Mulyono and Saskia, (2021) demonstrated that among Indonesian EFL students, digital communication environments significantly reduced anxiety-related barriers to willingness to communicate compared to face-to-face settings, providing affective grounding for why text-based WhatsApp interaction may lower the social vulnerability that typically suppresses voluntary participation in Indonesian EFL classrooms.

This finding suggests that the effectiveness of knowledge sharing may be influenced by the learning context and interaction design. In the context of this study, WhatsApp functioned not only as a communication tool but also as a collaborative space that facilitated peer-to-peer knowledge exchange. The findings can also be interpreted through Vygotsky's sociocultural perspective, which emphasizes the importance of social interaction in knowledge construction and learning development (Vygotsky et al., n.d.).

The high levels of knowledge sharing observed in this study indicate that students actively engaged in collaborative exchanges that supported learning. Through interaction with peers, students were able to discuss ideas, seek clarification, and negotiate meaning processes that are central to sociocultural approaches to language learning. Critically, however, Vygotsky's Zone of Proximal Development (ZPD) is not fully realized through sharing alone, it requires scaffolding co-construction that eventually produces independent learner competence.

The present findings suggest that while WhatsApp creates the social conditions for ZPD activation through knowledge sharing, the platform's informal and unstructured character means that scaffolding rarely progresses to the point of genuine knowledge creation or utilization, leaving learners in a productive but ultimately plateaued zone of social engagement.

Taken together, these findings suggest that the prominence of Knowledge Management dimensions may vary across learning contexts and communication platforms. While (Ahmed et al., 2022) conceptualized knowledge creation, sharing, utilization, and storing as interconnected dimensions of Knowledge Management, the present study demonstrates that certain dimensions may emerge more strongly than others in WhatsApp-mediated EFL interactions.

This finding contributes to the growing literature on Knowledge Management in education by highlighting the contextual nature of KM practices in digital learning environments. The dominance of knowledge storing and sharing over creation and utilization in the present study mirrors patterns documented across multiple recent studies in EFL and broader digital learning contexts. In the EFL-specific literature, Farahian & Parhamnia (2022) found that while WhatsApp effectively promoted knowledge sharing among EFL teachers engaged in reflective practice, with experimental participants significantly outperforming control groups.

The teachers' self-reported barriers included difficulty moving from sharing experiences to generating new professional knowledge. This tension between active sharing and limited knowledge generation directly parallels the storing-to-utilization gap observed in the present study and is particularly significant because Farahian & Parhamnia, (2022) isolated knowledge sharing as a distinct and measurable WhatsApp affordance rather than treating engagement as a unified construct, reinforcing the dimension-specific analytical approach taken here.

Additional comparative support comes from Hasibuan et al., (2021), working in an Indonesian EFL context directly comparable to the present study, examined students' perceptions of higher-order thinking skills in WhatsApp-mediated online discussions. While students reported increased critical thinking under structured teacher facilitation, Hasibuan et al., (2021) emphasized that the teacher's active facilitative role was indispensable to any gains in higher-order cognitive engagement.

Another finding suggests that loosely facilitated WhatsApp interaction does not automatically generate deep cognitive processing. Notably, Hasibuan et al's., (2021) use of Bloom's Taxonomy as an analytical framework maps closely onto the KM dimension hierarchy examined here: knowledge storing aligns with lower-order remembering, knowledge sharing with understanding, knowledge creation with higher-order synthesis, and knowledge utilization with evaluation and application. This conceptual alignment strengthens the interpretive credibility of the present findings and suggests that the KM framework and Bloom's Taxonomy converge in identifying the same cognitive ceiling in WhatsApp-mediated EFL learning.

Although knowledge creation was positively perceived, its score remained lower than knowledge storing and sharing. This suggests that while WhatsApp facilitates interaction and information exchange, the development of entirely new ideas or deeper knowledge construction may require more structured learning activities. This gap between knowledge sharing and knowledge creation is theoretically significant: it identifies the precise boundary between communicative engagement and epistemic growth.

Students in this study were willing and able to exchange existing ideas, but the leap toward synthesizing those ideas into novel knowledge, what Takeuchi & Umemoto, (1996) describe as the externalization and combination phases of knowledge conversion, was seldom achieved within the WhatsApp interaction space.

This suggests that the platform supports the socialization phase of knowledge creation (sharing tacit knowledge through shared experience) but does not organically produce the conditions for externalization (articulating tacit knowledge into explicit concepts), pointing to a structural limitation of informal messaging platforms as sites of deep learning. In other words, interaction alone may not automatically lead to higher levels of knowledge creation without

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appropriate instructional support.

Knowledge utilization obtained the lowest score among the four dimensions. This finding suggests that applying acquired knowledge may remain challenging despite the availability of communication and information-sharing opportunities. One possible explanation is that WhatsApp discussions primarily support the exchange and storage of information rather than activities requiring the practical application of knowledge.

A deeper explanation, however, must confront a fundamental tension revealed by this study: the very features that make WhatsApp effective for knowledge sharing its informality, low-stakes social atmosphere, and absence of formal accountability structures simultaneously undermine the conditions under which knowledge utilization is most likely to occur. Knowledge utilization, by its nature, demands that learners move beyond comfortable exchange into effortful, goal-directed application, and the socially supportive but cognitively undemanding WhatsApp environment does not inherently create this demand.

Students practice communicating in WhatsApp, but they are not necessarily practicing the kind of English that their academic context ultimately demands of them. Therefore, instructors may need to design more task-oriented and problem-solving activities to encourage students to apply what they have learned during online interactions.

The findings of this study have several pedagogical implications. For EFL educators, WhatsApp can serve as a valuable platform for facilitating collaborative learning, particularly in promoting knowledge sharing and knowledge storing practices. However, to maximize knowledge creation and utilization, instructors may need to provide structured discussion prompts, reflective tasks, and opportunities for applying learning outcomes beyond simple message exchanges. For EFL lecturers, the most urgent implication concerns the deliberate design of knowledge utilization tasks within WhatsApp interactions.

Rather than allowing WhatsApp discussions to remain open-ended and socially driven, instructors should embed structured application prompts that explicitly require learners to use newly acquired vocabulary, grammatical structures, or conceptual knowledge in their responses. Practical strategies might include: weekly 'application threads' in which students must use target language items in authentic communicative scenarios; peer-review tasks in which students evaluate one another's language use against explicit criteria; and reflective journaling prompts that require students to explain how newly acquired knowledge connects to prior learning or real-world contexts. These interventions do not require abandoning WhatsApp's social affordances but rather channeling them toward more cognitively demanding ends.

For instructional designers, the study highlights the need to conceptualize WhatsApp not as a standalone learning environment but as one component within a deliberately sequenced blended learning architecture. The platform's strengths

in knowledge storing and sharing should be positioned as preparatory and terms 'activation' and 'demonstration' phases, within a broader instructional design that progressively moves learners toward activities specifically targeting knowledge creation and utilization.

Concretely, this might involve a weekly cycle in which WhatsApp-based discussion and resource sharing precede a synchronous session (via Zoom or in-person) in which students are required to apply and produce knowledge under structured guidance, with WhatsApp subsequently used to consolidate and archive what was created. This sequencing transforms WhatsApp from an endpoint into a bridge, ensuring that its affordances are subordinated to a higher-order instructional logic rather than allowed to define the ceiling of learner achievement.

For online learning practitioners and curriculum developers more broadly, the present findings suggest the need to reconsider how informal communication platforms are integrated into formal learning structures. The data indicate that student comfort with WhatsApp should not be mistaken for educational effectiveness. Practitioners should consider establishing explicit community norms within WhatsApp-based learning groups that signal academic expectations, differentiate social from academic communication threads, and create accountability mechanisms (such as submission-style pinned messages or formative checkpoints) that bridge the platform's informal register with the cognitive demands of academic EFL learning.

Garrison et al.'s (2000) Community of Inquiry framework provides a useful design template: WhatsApp can effectively support social presence and some aspects of cognitive presence, but teaching presence must be more explicitly embedded in how WhatsApp-based activities are designed and sequenced.

5. Conclusion

This study investigated Knowledge Management (KM) practices in WhatsApp-mediated interactions among EFL learners by examining four dimensions: knowledge creation, knowledge sharing, knowledge utilization, and knowledge storing. The findings revealed that all four dimensions were positively perceived by students. Among them, knowledge storing emerged as the most dominant dimension, followed by knowledge sharing, while knowledge creation and knowledge utilization showed comparatively lower levels.

The results indicate that WhatsApp serves as an effective platform for supporting Knowledge Management practices, particularly in facilitating the storage and exchange of knowledge. Students benefited from the ability to revisit learning materials, access previous discussions, and engage in peer-to-peer knowledge sharing through a flexible and accessible communication environment. The high level of knowledge sharing observed in this study further suggests that WhatsApp can promote collaborative learning and active participation among EFL learners when appropriate interaction opportunities are provided.

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The findings also contribute to Knowledge Management research by demonstrating that the prominence of KM dimensions may vary across educational contexts and digital learning environments. While previous studies have identified knowledge creation, sharing, utilization, and storing as important components of Knowledge Management, this study highlights how knowledge storing and knowledge sharing became particularly prominent within WhatsApp-mediated EFL interactions.

Despite these positive findings, knowledge creation and knowledge utilization were comparatively less dominant, suggesting that communication alone may not be sufficient to foster deeper knowledge construction and application. Therefore, educators are encouraged to design more structured and task-oriented learning activities that promote critical thinking, reflection, and the practical application of knowledge during online interactions. Future studies may involve larger participant groups, different educational contexts, or additional data sources such as chat-content analysis to provide a more comprehensive understanding of Knowledge Management practices in digital learning environments.

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