Chapter 17
WhatsApp as Social Media to Enhance the Dialogic Interactions in Mathematics: Grade 9 Teachers and Learners' Voices

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Introduction

Social media is becoming popular among individuals and institutions (Oyman, 2016). Social media's importance is connecting people via smartphones or computers for internal and external communication. Zarei and Fathi (2020) noted that social media facilitates social interaction and a sense of community. It was also noted that people communicate, reach information instantaneously, create a platform for discussion, and become transparent through social media (Doğan, 2019). WhatsApp, Instagram, Twitter, and Facebook are the most commonly used social media platforms involving smartphones or computers. These social media tools are now commonly used to facilitate learning to provide opportunities in the education landscape (Doğan, 2019).

WhatsApp is a social media tool that is gaining popularity. It can facilitate sending texts, videos, pictures, audios, GIFs, and stickers (Zarei & Fathi, 2020). Doğan (2019) said that WhatsApp is being used by more than a billion people in 180 countries in which WhatsApp groups formed by internal businesses are prevalent. WhatsApp groups (WAG) promote communication, save time and stationery, and allow quick decision-making and implementation to come to the fore. WAG can be effective in learning if monitored by teachers. In WAG, learners can explore solutions to problems via discussions with peers.

Schools are among the institutions that use WhatsApp to facilitate teaching and learning (Panah & Babar, 2020; Zarei & Fathi, 2020). Panah and Babar's (2020) study noted that WhatsApp could be used for group learning to support the various learning environments possible. Kufre and Abe (2017) added that WAG can increase and strengthen communication, allow the learners to share information, encourage

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creativity and critical thinking, and promote problem-solving skills among the learners. Nsabayezu et al. (2020) concurred that WAG enhances communication and collaboration between the teachers and learners by sharing content, videos, and activities. Some studies have reported drawbacks of using WAG in the education landscape, such as increasing the teachers' workload and privacy issues (Hew, 2011).

Several studies have been conducted on using WAG in the education landscape. For example, WhatsApp as a mediating tool in Higher Education institutions was examined by Motaung and Dube (2020), while Durgungoz and Durgungoz (2021) explored the use of WhatsApp in mathematics learning. Doğan (2019) analysed a school WAG using teachers and administrators, and Nsabayezu et al. (2020) explored how WhatsApp can be used as an educational communication tool in Higher Education.

However, little attention has been given to using WAG to enhance the dialogic interactions in teaching and learning mathematics in South African secondary schools in the Limpopo province. Therefore, this study reports how WAG has improved the dialogue in the teaching and learning of mathematics. Dialogue in the context of this study refers to the teacher-learner dialogic interaction (TLDI), the learner-content dialogic interaction (LLDI), and the learner-learner dialogic interaction (LCDI) when sharing mathematical content knowledge in their WAG. This study reports on the two Grade 9 mathematics teachers and their 25 learners' voices and their understanding of the utilisation of WAG to enhance the dialogue in mathematics. Furthermore, this study analysed the drawbacks of the use of WAG to enhance dialogue.

Theoretical Lens

The study used the Transactional distance theory of Moore (1997) and the Community of Practice of Lave and Wenger (1991) to underpin the study. These two theories have been used to understand the voices of both teachers and learners on how WAG enhances the dialogue between teacher-learner, learner-learner and learner content interaction and their understanding of the utilisation of WAG in mathematics. A transactional distance theory was used to design the teachers' and learners' interview questions to report on how WAG has enhanced the dialogue in mathematics, and (b) the community of practice theory of Lave and Wenger (1991) was used to interpret the factors that affect the smooth interaction between teacher-learner, learner-learner, and learner-content in the social network selected.

Theory of Transactional Distance

The theory of transactional distance is a pedagogical concept rather than referring to the physical distance between the teacher and learner from each other (Al-Mashaqbeh & Atef, 2018). It is noted that this theory is useful when using

WhatsApp as a tool to enhance the learners' learning (Benson & Samarawickrema, 2009). This distance requires the development of teaching and learning techniques and strategies to minimise it (Al-Mashaqbeh & Atef, 2018).

This theory of transactional distance (TD) considers two main factors: dialogue and structure (Moore, 1997). Dialogue refers to the communication between the teacher and learner where the teacher provides instructions, and the learner responds to the teacher (Saba & Shearer, 2018). Teacher and learner communication relies on educational philosophy, environmental factors, the course designers, course content, and the personalities of the teacher and learner (Panah & Babar, 2020). Scholars further note that success in teaching can be associated with the teacher-learner, learner-learner, and learner-content dialogues.

The second factor is the fundamental structure that describes the level of flexibility and rigidity of the pedagogical learning aims and objectives, teaching styles, and assessment to accommodate the learners' needs (Benson & Samarawickrema, 2009). These scholars note that TD is presumably lower in programmes that have more dialogue with pre-determined compositions, such as through WhatsApp and teleconferencing. Thus, the high levels of the learners interacting in groups with little pre-determined structure despite classroom learning is an effective and useful tool for supporting TLDI, LLDI, and LCDI in mathematics.

Community of Practice

As noted earlier, the community of practice (CoP) theory is used to complement the theory of TD to underpin this study. This theory is used to understand how WAG enhanced the dialogue for secondary school learners as a means of interaction in mathematics. Wenger-Trayner (2015) describes CoP as a group of people who have gathered to share a concern or passion for something they do. In CoP, practitioners take collective responsibility for managing the knowledge they need, recognising that, given the proper structure, they are in the best position to do so (Wenger-Trayner, 2015). Farnsworth et al. (2016) noted that learning is not an individual endeavour but a social practice situated within the cultural and historical context.

In addition, individuals in CoP interact through activities to solve problems, request information, seek experience, coordinate, find synergy, build an argument, develop confidence, discuss new developments, document projects, and map and identify gaps in the knowledge (Wenger-Trayner, 2015). Wegner (1998) described three principles: mutual engagement, joint enterprise, and a shared repertoire.

Mutual engagement (how it functions) refers to an engagement and how those involved establish mutual relationships in the community based on identity participation (Wegner, 1998). The joint enterprise is the accountability and the extent to which the participants contribute to the ongoing negotiations of meaning. The shared repertoire is the knowledge of practice acquired to engage in CoP.

The researcher used these theories as a framework for this study. TD was used to address the dialogue and structure components, and CoP was used to address mutual

engagement, joint enterprise, and shared repertoire. Furthermore, they were used in this essay to develop open-ended questionnaires and the analysis of the data.

Literature Review

The literature review in this study has concentrated on TLDI, LLDI, and LCDI.

Teacher-Learner Dialogic Interaction (TLDI)

TLDI refers to the interaction and communication between the teacher and their learners. Mbwesa (2014) notes that during the dialogic interaction, teachers are important as they guide and reinforce the learners' understanding. The role of dialogue in TD, as measured via TLDI, impacts outcomes such as perceived learning and student satisfaction (Ekwunife-Orakwue & Teng, 2014). However, TLDI did not have an impact on learner grades.

Panah and Babar (2020) point out that TLDI is normally extended beyond the classroom limitations in terms of time and space. This type of dialogue can impact the learners' social, academic, and emotional development (Elhay & Hershkovitz, 2019). Elhay and Hershkovitz (2019) investigated the TLDI relationship through WhatsApp using a survey involving 155 teachers. Their study showed that TLDI through WhatsApp resulted in a better relationship and classroom environment with and for the learners.

Rosenberg and Asterhan (2018) discussed TLDI through WAG and a personal questionnaire using personal interviews and focus group interviews involving 88 learners. The scholars assert that WAG can be used to send and receive updates and manage activities. In their study, Best and Conceição (2017) found that learners have reported a sense of community and satisfaction regarding the in-person elements of the program. Panah and Babar (2020) suggested that some features like easy access, safeguarding personal privacy, creating communities, and communications are appealing in learning when engaging in WAG. Durgungoz and Durgungoz (2021) concur that WAG promotes TLDI and facilitates learning. However, these scholars have identified communication overload as a challenge for the teachers to monitor and influence the learners' dialogic interaction.

Learner-Learner Dialogic Interaction (LLDI)

LLDI is referred to as the interaction and communication between learners through social networks like WhatsApp. Smith and Erika (2016) used interviews and open-ended questions to explore the university students' perceptions of educational

interactions through social media. The scholars reported the prominence of LLDI and LCDI rather than TLDI when using social media for education. Al-Omary et al. (2015) conducted a survey involving university students and found that WhatsApp can improve learners' learning skills. Kassandrinou et al. (2014) found a relationship between LLDI and learner satisfaction and perceived learning. Furthermore, Gasaymeh (2017) also conducted a survey and found WhatsApp integration in education easy, useful, and fun.

Learner-Content Dialogic Interaction (LCDI)

LCDI is associated with the learner and content posted by the teacher on social media like WhatsApp. Panah and Babar (2020) noted that this dialogic interaction could improve the learners' learning. Chen (2001: 462) defines LCDI as "the distance of understandings that learners perceive as they study the course materials and the degree that the materials meet their learning needs and expectations of the course." LCDI using technology, enables the learners to access and navigate the course content, and it influences how the content is arranged and presented (Best & Conceição, 2017). Gunter and Junia de Carvalho (2018) examined the cognition, social, and teaching presence of the posts made by teachers during the course through WhatsApp, involving a total of 80 participants. Their findings show evidence of these presences and further show that emojis have a leading role in WhatsApp communication to keep learners on the task. Ekwunife-Orakwue and Teng (2014) revealed that LCDI has a larger impact on learner satisfaction than other types of dialogue but has no impact on the learner's final grades.

Methodology

This study aimed to report on the utilisation of WAG to enhance TLDI, LLDI, and LCDI in mathematics. The study used a phenomenological design to describe the teachers' and learners' experiences when using WhatsApp as a communication means in mathematics. Polit and Beck (2017) note that the phenomenological approach involves careful descriptions of the ordinary conscious experiences of everyday life or the descriptions of things as people experience them.

This study was conducted in one of the secondary schools in the Polokwane district of Limpopo province. The school has one principal, one deputy principal, three heads of department, and 19 teachers, including four mathematics teachers. The school has an enrolment total of 821 learners. The rationale for choosing this school as the study context is that the teachers have widely used WAG when teaching Grade 9 mathematics. However, little is known about the teachers' and learners' voices regarding the utilisation of WAG to enhance the dialogic interactions in mathematics.

The current study participants are comprised of 25 Grade 9 learners (10 males and 15 females) and their two teachers, all of whom are males from the selected school in this district.

The researcher used standardised open-ended interview questions to evaluate the teachers' and learners' voices on the utilisation of WAG to enhance the dialogue in mathematics. The question items were asked in a specific order and exactly as worded (Johnson & Christensen, 2014). The question items were adapted from the study by Al-Mashaqbeh and Atef (2018). The selected question items were modified to align with this study. The teachers' and learners' voices were interpreted based on the utilisation of WAG to enhance the dialogue in mathematics. Due to the Covid-19 restrictions, it was difficult for the researcher to conduct the focus group interviews to stimulate new ideas and concepts.

Data Collection and Analysis

The researcher administered open-ended questions to 25 learners and their two teachers to obtain the data for this study. The participants were given 2 weeks to complete the questions and return them to the teachers. All questions used in the question instrument were designed in English, as English is an official language understood and preferred by the participants. However, the participants were free to use their mother tongue when completing the given questionnaires. Prior to the analysis of the data, the researcher repeatedly read through the completed questionnaires to make sense of the meaning of the data provided by the participants.

Thematic analysis phases were used to analyse the data by organising and preparing it appropriately (Crewel & Creswell, 2018). The transcripts were developed and coded, and the data was collected from teachers and learners in a Microsoft Word table. The researcher familiarised himself with the data by reading it several times. Open coding was done by identifying the meaning chunks in the data, which were merged into several categories. The categories were merged into themes. The rationale for using content analysis was to understand the teachers' and learners' voices on the utilisation of WAG to enhance TLDI, LLDI, and LCDI. This involved the identification of prominent themes by breaking the data down into smaller units and naming the units according to the content they represent.

Ethical Issues

Permission to conduct this study was sought from the Department of Basic Education and the school principal. The study was conducted according to the Department of Mathematics Education community engagement project of the University of South Africa. After permission to conduct the study was granted, informed consent was requested from the Grade 9 learners and the two teachers. The study's purpose and

rationale were explained. In addition, the researcher established a rapport with both the learners and teachers by assuring them that their intention was not to evaluate their competency in mathematics. Their role and right to choose whether to participate in the study were also explained to both the learners and teachers. Participation was voluntary, and confidentiality was assured. The participants were permitted to withdraw from the study without punitive measures, and no personal details would be disclosed (Johnson & Christensen, 2014). Pseudonyms such as T_1, T_2, L_1, and L_2 were used instead of their real names throughout the study.

Methodological Norms

As this was a qualitative study, the researcher ensured that the study was conducted rigorously and methodologically to yield meaningful and useful results. Regarding the study's trustworthiness, the researcher ensured that the data analysis was precise and consistent and disclosed the analysis methods with enough detail to enable the reader to determine whether the process was credible (Nowell et al., 2017). As the researcher and respondents viewed the data with different eyes, member checking to strengthen the analysis and interpretation was done by checking whether what was captured was what they meant.

Furthermore, the study was sent to two of the researcher's peers for peer debriefing to provide an external check that may increase the credibility and examine the adequacy of the findings and interpretations of the raw data, as Lincoln and Guba (1985) suggested. Data source triangulation was achieved by using both the teachers' and learners' data to report on the utilisation of WAG to enhance the dialogue in mathematics.

Methodological Approach

The researcher used the main concepts from the TD and CoP theories in the methodological approach. The main concepts emanating from TD are dialogue and structure, while those of CoP are mutual engagement, joint enterprise, and shared repertoire. The definitions, descriptors and features of the main concepts are outlined in Tables 17.1 and 17.2.

Results and Discussion

The data analysis in this chapter followed a methodological approach to make sense of the participants' open-ended questionnaire responses. The data was read through repeatedly, and the participants were coded as T_1 and T_2 for the two teachers and L_1,

Table 17.1 Summary of the methodological approach (transactional distance)

Concept 1	**Dialogue**
Definition	It is communication between the teacher and learner during instruction.
Descriptors	TLDI LLDI LCDI
Features	Learners communicate to set the rules for WAG Learners interact with the teachers to learn mathematical concepts and seek clarity Learners interact among themselves to share ideas when solving mathematical problems
Concept 2	**Structure**
Definition	It is the level of flexibility and rigidity of the pedagogical learning required to achieve the aims and objectives, learning styles, and assessment to accommodate the learners' needs.
Descriptors	Teaching style Assessment
Features	Learners confirming the teaching styles used in WAG for understanding mathematical concepts Teachers successfully assessed the learners using WhatsApp to test their mathematical understanding

L_2, L_3, etc., for the learners who participated. Twelve of the twenty-five learners who received the open-ended questions completed and returned the question responses. The question items were returned by the teacher, who was requested to collect, scan, and send them to me electronically using my email address. The teachers and learners were able to use the language of their choice. The following themes were developed after repeated reading through the data: understanding WhatsApp, communication of the teacher's instructions, peer-learning, getting instrumental support, and glitches and suggestions. All direct quotations in the analysis are used verbatim.

Understanding WhatsApp

WhatsApp App is a digital tool that reduces the physical distance between teachers and learners. Al-Mashaqbeh and Atef (2018) refer to it as a pedagogical tool. The teachers and learners described it as a digital platform that reduces distance and promotes interaction and communication between the teachers and learners in the teaching and learning of mathematics. T_1 and T_2, when describing what WhatsApp App was, added that the app follows a blended approach to teaching in which the teachers communicate instructions to the learners, and the learners respond to the teachers' instructions, as Saba and Shearer (2018) suggested. The findings on WhatsApp from both the teachers and learners revealed a dialogic component of TD, as stated by Moore (1997). It *"reduce[s] the physical distance between the teacher and learners"* as the learners are used to face-to-face classroom interactions. According to the findings, the distance can be reduced, but physical distance

Table 17.2 Summary of the methodological approach (CoP)

Concept 1	**Mutual engagement**
Definition	It is the interaction between individuals that leads to the creation of shared knowledge and meanings on issues or a problem
Descriptors	Sustain mutual relationships Share ways of doing things together Knowing what others know and can do
Features	Learners respect each other's ideas during WAG discussions when creating knowledge in mathematics Learners communicate mathematical ideas, i.e., what they need to learn and share
Concept 2	**Joint enterprise**
Definition	It is the process through which people are engaged and working together towards a common goal
Descriptors	Knowing what others know and what they can do, and how they can contribute to an enterprise Shared ways of engaging and doing things together
Features	Learners know what they can do and what they can contribute to the WAG when solving mathematical problems. Learners sharing knowledge and skills to learn mathematical concepts. Teachers and learners working together to achieve a common goal when learning mathematics
Concept 3	**Shared repertoire**
Definition	It refers to the common resources used to negotiate and facilitate learning within the group.
Descriptors	Identifying specific tools, representations, and artefacts Ability to assess the appropriateness of actions and products
Features	Learners assess their own progress when learning mathematics Learners share teaching and learning in the WAG to solve mathematical problems. Learners develop ways to adapt the practise guidelines in the teaching and learning of mathematics.

can still exist, according to Saba and Shearer (2018). The issue of physical distance required the teachers to develop a WhatsApp group as a teaching and learning technique to minimise the distance (Al-Mashaqbeh & Atef, 2018).

Communication of the Teacher's Instructions

The findings show that the teachers interact and communicate instructions to the learners when creating mathematics concepts and that the learners respond to those instructions (Saba & Shearer, 2018). In other words, the teachers initiated a dialogic interaction between themselves and the learners (Moore, 1997) during mathematics through WAG. In addition, the two teachers appeared to have formed a CoP (Wenger-Trayner, 2015) where the teachers and learners engaged and solved mathematical problems. For example, T_2 said, *"In this platform (referring to WAP), we give instructions and mathematical problems to solve. We. We allow them to share ideas about those problems before they can write their solutions in their classwork*

books on their own time". This quotation supports what Panah and Babar (2020) pointed out that TLDI can be extended beyond the classroom anytime and anywhere. This shows that the teachers gave the learners mathematical activities to solve in the group and then individually in their classwork books.

Before communicating the instructions in the WAG, the teachers set baseline rules for the learners to adhere to manage their interactions. This supports what Rosenberg and Asterhan (2018) highlighted in their study that WAG can be used to send and receive messages and manage activities. The finding shows that the learners are expected to have mutual respect, as Smith and Erika (2016) suggested for CoP. For example, T_2 said, *"All group members are not allowed to post texts or messages other than mathematical activities and also to respect each other's ideas"*. In other words, the learners should work harmoniously in the group by not posting unwanted messages and working within the set boundaries as Wenger (1997) suggested. One of the basic rules was to keep in mind the language used in the group during the interaction. T_1 said, *"We requested learners to use the language that can be acceptable"*.

The findings also revealed that TLDI offers ongoing feedback via this platform (Trenkov, 2014). The learners indicated that their teachers provided constant feedback for clarity when solving mathematical problems during the interaction. Moreover, the teachers were informed about their learners' progress via the group and knew how to support them to help them understand the mathematical concepts. For example, L_6 said, *"Our teachers respond to our queries ge re sa kwišiši (when we do not understand) to clarify some mathematical concepts"*. This finding shows that WAP promotes TLDI to facilitate learning, as supported by Durgungoz and Durgungoz (2021).

Peer-Learning

LLDI revealed a dialogue among learners (Al-Mashaqbeh & Atef, 2018; Moore, 1997), mutual understanding and joint enterprise in a CoP when responding to the instructions communicated by their teachers (Wenger-Trayner, 2015). The findings revealed that WAG facilitates LLDI sharing and constructing mathematical knowledge. For example, L_4 said, *"WhatsApp group provides us with opportunities to interact, share and construct knowledge of mathematical problems in given activities."* This shows that learning is not an individual endeavour but a social practice, according to Farnsworth et al. (2016). Wenger-Trayner (2015) adds that individuals should engage and work together when sharing knowledge and determining the meaning of problems. This study revealed that WAG enables learners to listen to and respect each other's ideas and points of view. For example, L_5 said, *"This platform gives us chance to listen to our peers' point of view during discussions"*. This shows that WAG in this study can sustain mutual engagement and positive relationships among the learners.

In LLDI, the structural component of TD that increases the level of flexibility of pedagogical learning is revealed (Moore, 1997; Al-Mashaqbeh & Atef, 2018). This

shows that WAG has made the mathematical content more flexible, fun, and easy for the learners in LLDI. This supports what Gasaymeh (2017) found in their studies that WAG's integration into education is easy, useful and fun. For example, L_2 said, *"WhatsApp group makes mathematics content easy and fun through constructive feedback from other learners, as we are able to learn from each other."* This means that the constructive feedback that the learners give each other in WAG enables the learners to solve more complex problems in mathematics and makes mathematics more fun and interesting. In the same vein, the learners can measure their progress and the amount of knowledge acquired in different mathematics topics during the discussion. L_{10} said, *"In this group, we are able to see how far we can solve mathematics problems and ra tseba se re se kgonago in mathematics (know what we have acquired in mathematics)."*

Gaining Instrumental Support

The findings of LCDI showed a shared repertoire for CoP (Wenger-Trayner, 2015). The learners showed that they had access to mathematics activities through WAG and could easily access the content posted on the platform. This supports Best and Conceição's (2017) study showing that the use of technology enables learners to access and navigate the content of the subject or course. For example, L_7 said, *"In the WhatsApp group, we find mathematics activities posted by the teachers to solve, and we are used to attending classes."* This WAG appeared to meet the needs of the learners when learning mathematics as the learners are used to engaging in a face-to-face classroom.

The findings on LCDI revealed a structural component of TD (Moore, 1997; Wenger-Trayner, 2015). This shows that the more dialogic the learners' interactions are with the content, the more pedagogical the learning is to achieve the aims and objectives of the mathematical activities given by the teacher. L_{11} said, *"If we have a chance to discuss mathematical problems, we then understand maths topics."* Thus, learners with learning difficulties will be accommodated to help them deal with mathematical problems in WAG. This supports what Gunter and Junia de Carvalho (2018) said in that this type of dialogic interaction keeps the learners on task. Ekwunife-Orakwue and Teng (2014) found that this type of dialogic interaction impacts learner satisfaction and can improve the learners' learning (Panah & Babar, 2020).

Glitches and Suggestions

The glitches in this study oppose the mutual engagement of CoP (Wenger-Trayner, 2015). The scholar pointed out in CoP that the team members should have mutual respect to achieve their objectives. The findings show that the learners posted flood messages, wrong messages, and other information in WAG, such as adverts. L_8 said,

"some of the learners send wrong messages and unnecessary information in the group (e.g., Bitcoin adverts), which may lead learners to stop doing a follow-up on messages that came after." Furthermore, most of the learners seemed not to participate in the WAG due to the socioeconomic background. This could affect the effectiveness of the dialogic interactions of TLDI, LLDI, and LCDI. The findings show the inaccessibility of smartphones and laptops in terms of connectivity during WAG.

Furthermore, the issue of data being expensive for the learners was raised. L_1 said, *"Ga re na smartphones goba di-laptop tsa go connecta (we don't have smartphones or laptops to connect); our families don't afford to buy us those gadgets."* Another glitch highlighted by the learners was a poor network connection in their area, hindering them from participating in the WAG. For example, L_3, L_4 and L_9 supported this as they had a poor network connection, especially on their Vodacom line. T_1 and T_2 indicated that the use of WAG has increased their workload and is time-consuming. T_1 said, *"This group has increased our workload and needs more time to monitor participation and address learners' difficulties."* This is one of the drawbacks highlighted by Hew (2011) in the study showing that WAG increases the teachers' workload.

The teachers and learners both had suggestions for implementing WAG in teaching and learning. It is suggested that learners use the line that is most conducive to them, as poor connectivity seems to be a contextual factor. In addition, it is suggested that if the learners can be given data, their participation in the WAG may improve as some parents cannot afford to buy data for their children. L_5, L_6, L_9 and L_{12}'s responses supported each other on the issue of a lack of data. Maybe if the department can support them with data, they will be able to participate in the WAG. T_1 and T_2 said that learners could work together during dialogic interactions when solving mathematical problems, especially those who do not have smartphones. T_2 said, *"Learners who don't have smartphones may pair themselves with those who have them to avoid leaving them behind in mathematics."*

Conclusion

This study aimed to report on the teachers' and learners' voices regarding the use of WAG to enhance the dialogic interactions in mathematics. In this study, TD and CoP were used as the selected theoretical frameworks to report on the voices of the teachers and learners. TD addressed the dialogic and structural components but was unable to pay attention to the social aspect of the study, which is CoP. The two theories complement each other as part of developing an open-ended questionnaire and analysing the collected data. The findings of this study show the positive relationships of the TLDI, LLDI, and LCDI and how they are enhanced in mathematics. It additionally highlights the glitches and suggestions concerning using WAG in mathematics to enhance dialogic interactions. This study suggests that other teachers and learners can use WAG to enhance dialogic interactions in education. Another study can be conducted on the impact/effectiveness of WAG in the teaching and learning of mathematics.

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