



# “We are much closer here”: exploring the use of WhatsApp as a learning environment in a secondary school mathematics class

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Received: 9 May 2020 / Accepted: 2 June 2021 / Published online: 7 June 2021  
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## Abstract

In this study, we examined a mathematics teacher’s communicative acts on an instant messaging tool, WhatsApp, and its role in creating a sustained learning environment between secondary-school students and a teacher in Turkey. The interactions of a mathematics teacher and his students ( $n=38$ ) over two years were explored. The WhatsApp group increased interaction in out-of-school hours. Analysis of the teacher’s communicative acts was the leading force that encouraged the group to continue to interact. The teacher portrayed an informal and sincere presentation of himself on social media. A constructive communication style between teacher and students was fostered by connecting through WhatsApp in out-of-school hours, when the teacher’s informal communicative acts have facilitated their learning.

**Keywords** Instant messaging platform · Online learning environment · Out-of-school interaction · Social media · Social presence · Teacher–student relationship

## Introduction

Students and teachers spend a considerable amount of time in schools, which are large communities consisting of different sub-communities that convene as classrooms. Various benefits of a positive teacher/student relationship have been identified. Children’s behaviours in the school context are strongly influenced by the nature of the teacher/student relationship (Wubbels & Brekelmans, 2005). Students might find it easy to connect to the school community in social and academic terms as a result of a supportive teacher/student interaction (Brok et al., 2010; Jennings & Greenberg, 2009), and this might lead to a healthier learning environment (Davis, 2001).

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The teacher–student relationship has also been researched in digital platforms. The use of social media as a learning environment has been found to bring about many opportunities, such as encouraging peer collaboration, informal learning and student autonomy (Bingham & Conner, 2010; Collins & Halverson, 2010; Greenhow et al., 2009), providing ease of communication with instructors (Denker et al., 2018) and promoting collaboration between instructors and students (Harper, 2018). Some studies have reported pitfalls, such as increasing teachers’ workload and privacy issues (Hew, 2011). During the Covid-19 outbreak in 2020, online learning environments became even more significant, especially teacher–students interactions in these platforms. We investigated WhatsApp as a medium of teacher–students interactions and its potential to be a learning environment.

### **WhatsApp as a learning environment for teacher–student out-of-school interactions**

WhatsApp is an instant messaging tool that allows participants to send texts, audio messages, video messages, emoticons and animated or static images. It is possible to create a group for a maximum of 256 people.

Robinson et al. (2015) explored the use of WhatsApp in an educational context and stated that WhatsApp enabled participants to socialise, particularly when they felt lonely or were at risk of becoming bored. Interactions were generally related to peer-teaching and resource sharing, but there were also social and emotional conversations. Based on the opinions of 12 teachers who had voluntarily created or joined a WhatsApp group with their students, Bouhnik and Deshen (2014) found that the teachers could better know their students’ personalities and interests and that the WhatsApp group created a sense of belonging. Solidarity, cooperation and dealing with challenges were found to be created using WhatsApp. Pimmer et al. (2019) also emphasised that, along with the intensity of the participation, the mode of engagement has a crucial role in social indicators (Lai, 2016). Timmis (2012) also concluded that instant messaging services provide a context for social and emotional support for peers.

When Rosenberg and Asterhan (2018) explored secondary-school student–teacher interactions on WhatsApp from the perspectives of students, they observed that students favour using WhatsApp over other social media platforms such as Facebook or Twitter. Ease of communication, the communication style, ease of access, and the ability to form groups on WhatsApp were mentioned as advantages. The study revealed that WhatsApp is used as an ‘official’ communication channel by the teachers for organisational aims such as sending announcements and organising learning activities.

### **Turkish context for the selection of the platform**

As a learning environment, WhatsApp also has been used in Turkey in various educational settings, including second-language learning, astronomy courses, medical teaching, chemistry education, or history teaching. Academics, teachers, and professional services staff have adopted WhatsApp as a means of a fast, easy, and reliable medium that replaces e-mail on many occasions in Turkey. The intensive usage of WhatsApp even led the Turkish government to publish an official decree that prohibits the use of the instant messaging tool when sensitive data are shared (<https://www.resmigazete.gov.tr/eskiler/2019/07/20190706.pdf>).

Studies that explored WhatsApp as a learning environment in Turkey reported increased student satisfaction and motivation (Aktas & Can, 2019; Saritepeci et al., 2019), more-positive attitudes towards the course, joy and excitement (Aktas & Can, 2019), and a sense of belonging (Zan, 2019). Saritepeci et al. (2019) reported that the students used the WhatsApp group for information sharing and extracurricular activities. While Yuzbasioglu et al. (2020) reported that the students increased their academic knowledge via exchanges in a WhatsApp group, Saritepeci et al. (2019) emphasised that students' learning in WhatsApp groups tend to be superficial rather than meaningful.

## Theoretical framework for the study

The concept of social presence guides the interpretation of the teacher–student interactions in the WhatsApp group. Whilst Short, Williams, and Christie (1976) laid the foundation of social presence theory, Garrison et al. (1999) developed the Community of Inquiry (CoI) framework involving social presence for virtual learning environments.

Garrison et al. (2001) claimed that feelings of isolation could be removed by reflecting feelings, using a sense of humour, or sharing thoughts, all of which signal that people on the other side of the digital tool are real. The instructor's presence is particularly important for learners to sustain their motivation to be engaged (Wise et al., 2004). Garrison et al. (1999) identified three essential presences in their 'community of inquiry framework', which are or should be seen in a digital learning environment: social, cognitive, and teaching presences. Among these three presences, managing the instructor's social presence has become more significant for virtual platforms. Garrison et al. (1999) identified three elements of social presence as being:

- *emotional expressions* that refer to using a sense of humour, reflecting feelings, and self-disclosure in the learning and teaching process
- *open communication* that means that students freely communicate and express their ideas
- *group cohesion* or "activities that build and sustain a sense of group commitment" (Garrison et al., 2001, p. 101).

The element of Social Presence in Community of Inquiry resonates with this study's aim: instructors who have a high social presence in a digitally-mediated learning environment might foster high-quality teacher/student interactions.

## Perceptions of community and teacher/student relationships in Turkey

There have been a few studies in Turkey into teacher/student relationships in face-to-face contexts. In one of the early studies, İpek (1999) found that the participating students perceived that their teachers tended to be authoritarian, but teachers stated that they had a democratic relationship with their students. In a more-recent study, İpek and Terzi (2010) similarly found that there was a significant difference between teachers' and students' perceptions of the teacher/student relationship, with students having more-negative attitudes towards teachers. When Balay et al. (2012) investigated secondary-school students' relationships with teachers in Turkey, they found that students associated the concept of authority with their perceptions of teachers, with those students having a very formal relationship with teachers, which has also been confirmed by other studies (Göçer & Deryakulu, 2004;

Yalçın Durmuş & Demirtaş, 2009). In terms of teacher/students' out-of-class interactions, it was stated that both teachers and students seemed to agree about the lack of opportunity to meet and communicate outside school hours (İpek & Terzi, 2010).

## Research questions

Studies of teacher–student interaction in an instant messaging learning environment reported an increased opportunity for interactions and creating a sense of community by utilising an instant messaging tool. However, the central theme in these studies involved mediators rather than how teachers played a role in creating a sustainable communication channel in these digitally-mediated learning environments. In the current study, we explored the nature of a teacher's interactions on an instant messaging tool in out-of-school hours through the following research questions:

**RQ 1** Can the use of a mobile instant messaging app (WhatsApp) serve as a learning platform on which students can participate outside school hours?

**RQ 2** How can an instant messaging tool (WhatsApp) help to increase interactions outside school hours?

**RQ3** How did the teacher's interactions occur on a mobile instant messaging tool (WhatsApp)? What were the reflections of students' understandings of the nature of the teacher's interactions in the WhatsApp group?

## Method

Because our research sought understanding of the experiences arising in complex social phenomena, such as relationships and human actions on digital platforms, qualitative data-collection methods were used. Yin (1994) suggested three principles for the data-collection process. First, there should be multiple data sources. Second, there should be a case study database to organise data sets concisely (Baxter & Jack, 2008). Third, a chain of evidence should be maintained. This study was accomplished by the work of two Turkish-English language-speaking researchers through NVivo 10 software, which enabled working on and comparing a considerable proportion of the results on the same platform.

In this study, three data-collection methods were employed: online observation, online documentation, and interviewing. Table 1 presents how and why these data sets were analysed in response to the research questions.

## Participants and context

The teacher is 42 years old, teaches mathematics, and had been teaching for 17 years in three different schools. He stated that, although he was not a technophobe, the lack of facilities, the curriculum, and the lack of time had constrained him from using technology in the classroom. All 38 students were 14 years old when the group was created. There are six hours of mathematics lessons a week in their timetable. The students attended a state school located outside the province of Hatay, Turkey.

**Table 1** Research questions mapped to data sets and necessity of use

Research question	Data sets			Necessity and analysis procedures
	Participants' interactions in WhatsApp group	Interviews with teacher	Interviews with student	
RQ1: Can use of mobile instant messaging app (WhatsApp) serve as a learning platform on which students participate outside school hours	✗			To explore density of participants' involvement in WhatsApp group
RQ2: Whether or how did an instant messaging tool (WhatsApp) help to increase interactions outside school hours?		✗	✗	Descriptive analysis to reveal participants' level of activity To understand in what ways, if any, the WhatsApp tool creates a sustainable online community outside school hours Thematic content analysis to reveal participants' opinions about potential of WhatsApp for creating an online community
RQ3: How did teacher's interactions occur on a mobile instant messaging tool (WhatsApp)? What were the reflections of students' understandings of nature of teacher's interactions in WhatsApp group?	✗	✗	✗	To explore how the nature of teacher's communicative acts in the group was perceived by students Inductive thematic analysis to analyse interview results along with teacher's messaging in WhatsApp group

## Data generation and ethical considerations

Three data-generation methods were used: online documentation, online and face-to-face semi-structured interviews, and online observation. The first transfer of the WhatsApp conversations to Nvivo was carried out 59 days after the group was initiated. The fifth and final transfer of messages to Nvivo for analysis was carried out after five months after the first message was sent to the group. Two audio-recorded interviews and three online interviews via WhatsApp were conducted with the teacher. Twelve students, including the most-passive and most-active ones in the group, were interviewed face-to-face in one of the school classrooms.

Before the data generation process, ethical permissions and consents have been granted by several institutions and individuals, including the University of Nottingham's ethical committee, the mayor of the Hatay province that the school is located, the school governor, the teacher, the students, and parents of the students. Turkish Ministry of Education was also informed, and the necessary permissions were obtained. All the participants were aware of the researcher's presence in the group. The possible risks and dangers of using WhatsApp—such as damage to the teacher's status and exploitation of the messages and images—were explained to the participants. Joining the WhatsApp group was voluntary, so no assessment was carried out due to the students' level of activity.

## Data analysis

Considering the unique nature of the culture, relationships, communication styles, and characteristics of the participants and the digital tool, the method of inductive thematic analysis (Braun & Clarke, 2006) was used to understand groups of people by its dynamics. Unlike the deductive approach, categories and themes should be generated from the data rather than using some pre-established frameworks or theories to code the data. Two Turkish-English speaking researchers analysed 40% of the data. Table 2 shows the themes generated in response to the research questions.

## Results

### Boosting out-of-school interactions

The school starts at 7:00 am and finishes at noon. Almost all the message exchanges took place outside school hours. The interactions among participants generally started with one student posting a question and others trying to solve it Fig. 1.

The teacher was the most-active participant, with 3203 messages sent to the WhatsApp group. Although the number of messages cannot reflect the time and effort that each student invested in the group, the fact that the participants used the group for nearly two years to communicate outside school hours is important evidence supporting a sustained communication channel. Figure 2 shows the number of messages sent to the group across 20 weeks. Figure 3 shows the hourly and weekly interaction patterns of the participants for 20 weeks.

Most messages within these randomly-selected nine weeks were sent during weeks 1 and 2. The interactions showed a significant decrease in weeks 12, 13 and 14 because

**Table 2** Final themes extracted from data sets that address research questions

Data set	Themes	Research question addressed
Descriptive analysis of participants' level of interactions in out-of-school hours	Boosting out-of-school interactions	RQ1: Can use of a mobile instant messaging app (WhatsApp) serve as a learning platform on which students can participate outside school hours?
Thematic analysis of teacher's posts and comments	Ease of use and mobility	RQ2: Whether or how did an instant messaging tool (WhatsApp) help to increase interactions outside school hours?
Nature of teacher's interactions and reflections of students' understanding	WhatsApp as a meeting point for motivation Teacher's problem solving/helping interactions and feeling of gratitude Teacher's self-disclosure and sense of closeness Teacher's stimulative interventions as motivation for students Wishes, prayers, appreciations and sense of care	RQ3: How did the teacher's interactions occur on a mobile instant messaging tool (WhatsApp)? What were the reflections of students' understandings of nature of teacher's interactions in WhatsApp group?

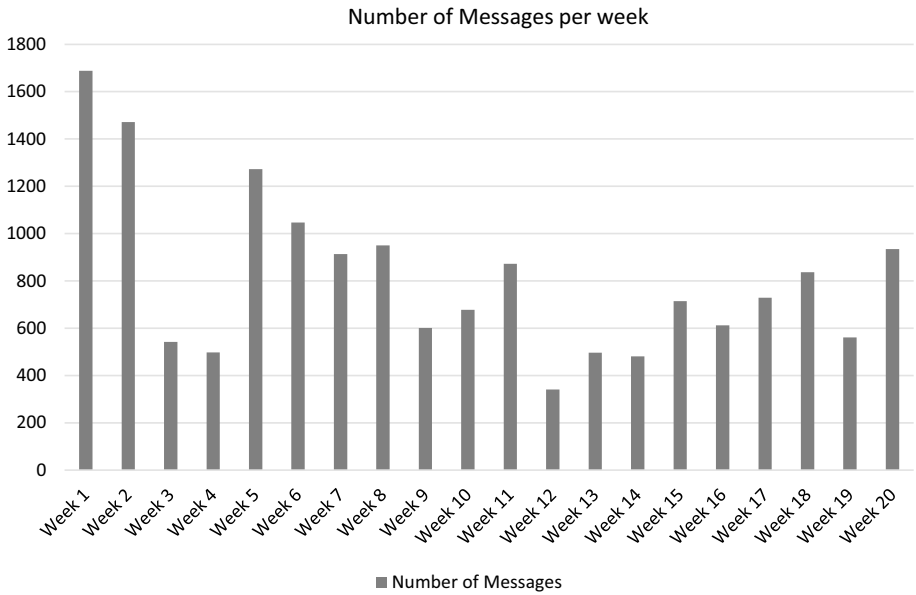


Fig. 1 Number of messages sent to the WhatsApp group across 20 weeks

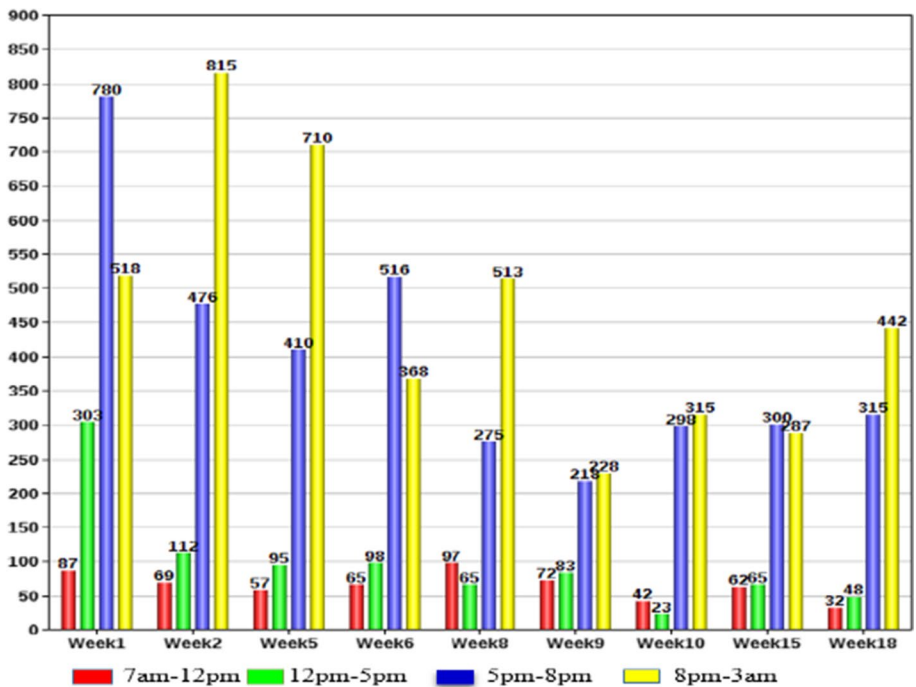
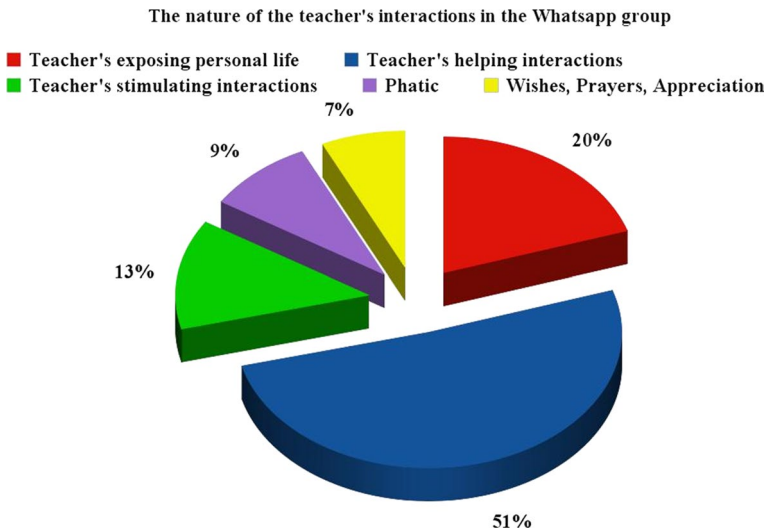


Fig. 2 Hourly and weekly distribution of number of messages sent to WhatsApp group





**Fig. 3** Distribution of themes extracted from teacher's messages in WhatsApp group

these weeks were in term holidays, which shows that WhatsApp seemed to enable participants to connect during the holidays. The hourly distribution of the messages shows that participants mostly preferred to send messages to the group in the evenings and nights (5 pm–8 pm and 8 pm–3 am).

### **Ease of use and mobility**

When participants were asked their reasons for using the WhatsApp group, the teacher and all the interviewed students reported that it was easy to use and there was access to the group anywhere and at anytime because each participant had a smartphone. Although the students' main aim was to solve as many questions as possible, their level of activity was increased by the mobility of smartphones and the ease of access that WhatsApp offered:

Well, I think it is smartphones and WhatsApp. Today technology makes things easier. You know you don't have to spend a considerable amount of effort to do something. To be honest, no matter how important maths is for my students and me, if we had tried to do this in a, you know, discussion forum which required you to switch your laptop on and then log in and see who had posted what, there is no way neither me nor they have this time and energy. (The teacher)

The teacher compared laptops and mobile telephones in terms of their mobility because he perceived his laptop as something to be used at home. He also emphasised that although the students' goal of solving mathematics questions was crucial, the learning platform that mediates such an important goal is seen as a constraint (laptop) or an advantage (mobile telephones).

All interviewed students reported that they generally checked the group when they were notified that someone had sent a message. Hence, they were able to follow the flow of the messages without any confusion. S3 stated:

WhatsApp notifies you whenever there is a message, so I always check the group if I have an internet connection. Even if I don't solve the questions, I check who is doing what, even if I am about to sleep or out.

S3 explained the notification feature, which enabled him to check the group before too many messages made following the conversation difficult. He also pointed out that he observed the group in different locations even though he did not actively participate, which might show that smartphones and the notification feature of WhatsApp facilitated S3 to connect with the group.

### **WhatsApp as a meeting point for motivation**

The WhatsApp group was revealed to be a meeting point where the students found opportunities to motivate themselves by sending their mathematics questions, solving others' questions, and observing their peers' interactions. All students interviewed emphasised that, because the school is located far from the city centre, they lived in different parts of the city and did not have opportunities to meet outside school hours. They perceived the WhatsApp group as a meeting point:

Our school is in the outer part of the city, so we come from different parts of the city. My friends now at least solve my questions, and I can see what they are doing. This also motivates me when I don't want to study. (S7)

This statement reflects the overall attitude of the interviewed students towards the WhatsApp group. Unlike other Turkish schools, which only accept students from their own neighbourhood, this school is located outside the city. S6 also stated:

We have been in the same class for two years, but I don't remember chatting with my friends in-out-of-school that much. Our teachers just try to finish the topics, and we just have ten minutes break and after that everybody goes home.

The interviewed students were asked whether they thought that having a social-media group brought about any benefits or harm. They stressed that the WhatsApp group enabled them to solve more questions, particularly their peers' questions, which was a motivating factor for them:

It was nice because I feel that I have solved all the questions available for the topics because I was solving my friends' questions, which were the most difficult ones. (S9)

The WhatsApp group seemed to function as a bridge among the participants who were able to help one another and find some motivation. The teacher's role in such a digital meeting point and the students' reactions are considered in the following sections.

### **Nature of teacher's interactions in WhatsApp group and reflections of students' understandings**

The teacher's messages were coded according whether they carry a unit of meaning that could affect the students' attitudes towards him negatively or positively. Four themes identified throughout the inductive thematic analysis are listed below, and the teacher's communicative acts in the messages are shown in Fig. 3:



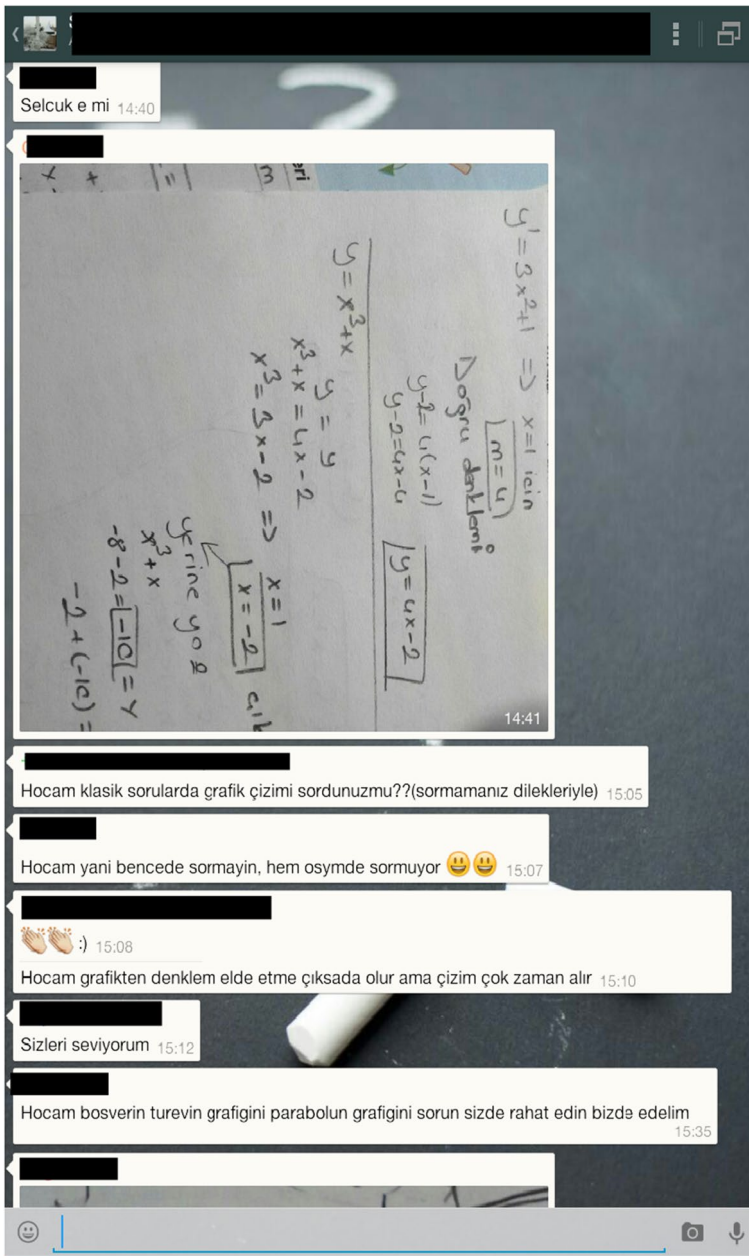


Fig. 5 Participants' interactions in WhatsApp group

S8: Because I can't always ask questions in the classroom but my friends or our teacher solved all my questions that I sent to our group. Our teacher once solved a question I sent in a supermarket on an egg package (laughs).

Another point revealed in the teacher's helping interaction was that WhatsApp as a mobile instant messaging tool helped group members to follow the messages and give immediate responses. For instance, the next comment from the WhatsApp group refers to one of the occasions when the idea of anytime, anywhere interaction was seen in practice.

S13: Teacher, could you solve the first one?

Teacher: I am outside right now; I will solve it when I get home, hopefully.

Teacher: <The image of Solution>

S13: Thanks, I understood it.

Teacher: I could not find any paper.

S13: Did you solve it on your way home, teacher?

Teacher: Yes.

S13:

Teacher: I solved it on the top of an egg packet in the supermarket.

S13: What can I say, teacher? May God bless you.

S28: You are great, teacher, wow, I will be like you when I grow up. You are my idol.

In this excerpt, S13 sent a question to the group, but he asked the teacher to solve it. Although the teacher stated that he was outside and would solve it when he got home, it was clear that he was in a supermarket as he solved the question on an egg carton and took a photograph of it. This excerpt shows that the mobile device and internet connection made the teacher's intervention possible. The students' reaction shows that the students found the teacher's helping interaction more valuable because it had occurred while he was on the move.

### Teacher's self-disclosure cultivating a sense of closeness

The second theme emerged from the teacher's messages, which revealed information about his personal life. The teacher shared his feelings with the students, such as "guys, please forgive me for today, I couldn't solve any of your questions, I am really not in my mood today to do some mathematics, I am now feeling content for some reason and I wish you would always be happy and I love you all, guys, and I have missed you". The teacher expressing his feelings did not appear frequently but, when the students were asked their opinion about these communicative acts, they seemed to be influenced. S3 stated:

I never liked math; you know, maths teachers are kind of, hmm, like dull, boring (laughs). Our teacher was not that different, he was just teaching in the class, but he is like a different person in the group. He is more like us, you know, like a friend but older. I think we are much closer here.

In comments like the quotation above, students reported the difference between the teacher's classroom behaviours and the WhatsApp group. The teacher shared messages related to what he was currently doing, with these messages also reflecting his personal life. The majority of the messages in the theme of teacher's self-disclosure constituted interactions of this kind, such as "I am now on the move, traffic is terrible, and that is why I couldn't solve your question, please help each other" and "guys, I am now going to my village; the bus is trembling, I can't look at the questions". S7 also stated that:

We just know the names and surnames of our teachers... but now we know many things about Mehmet, our teacher, he lets us know what he is doing, where he is

going...I mean, this group is not just like a question-solution-question-solution thing, we also share other things.

The teacher's disclosure of aspects of his personal life in different ways seemed to create opportunities for students to communicate with him and develop a sense of belonging. A more-informal and close relationship was reported compared with their face-to-face interactions because of his disclosure of various episodes from his personal life.

### **Teacher's stimulative interventions as motivation for the students**

A different role that the teacher's communicative acts played was his stimulative interactions. When the students became less active in the group, the teacher sent some prompts to encourage and motivate them to study. These prompts were sometimes directed to specific individuals, but they were generally sent to the whole group. Examples include "I guess you are studying, our group is so silent!", "Good night, guys, I cannot see anyone over here. Are you that busy? Or are you studying mathematics?". With these messages, the teacher checked what students were doing at the time. After these prompts, some students became active and stated that they had just started to study.

The teacher also asked students to solve their peers' questions even though he was available. He stated that he wanted to encourage students to be more active rather than solve all the questions. These messages can be illustrated as "Come on guys, who is going to solve <S26's> question?", "Couldn't you solve <S17's> questions? Come on, look at those questions. I am waiting".

After these prompts, most questions were solved by the available students. Because most of the students actively participated in the group, they were asked about their motivation source. Although all the students emphasised the importance of mathematics as the first reason, they added how the teacher encouraged them to study. One student stated:

Our teacher is very active in the group, but we are the ones who will take the exam, I mean I am embarrassed when I don't study while our teacher is that active. He generally asks us if we are studying or not. Or he was just asking us to solve one another's questions. I remember that a couple of times, I started studying after he sent these kinds of messages.

### **Wishes, prayers and appreciations creating a sense of care**

Particularly before examinations and on national and religious days, the teacher prayed for students and gave them his good wishes. Almost all students replied to these wishes and prayers by thanking him. A few times, students asked the teacher to pray for them before the examinations: "May God help you in the exam tomorrow. I believe in you", "Guys, I believe in you and trust you. We will have great results with you hopefully". The teacher's motivating messages seemed to comfort students before the examinations. S5 stated:

We got used to getting some motivational messages from our teacher before the exams. I don't know, but it is a bit relaxing because he always says that he believes in us even if we don't get great results. Knowing that he is praying for us during the exam is a bit relaxing for me, to be honest.

Social prompts such as wishes and prayers seemed to play an important role in building a sense of attachment to the teacher. When students were asked about these messages, they were content to be cared about and noticed.

## Discussion

This study revealed that WhatsApp as an instant messaging tool facilitated creation of a learning environment outside school hours. Key implications of this study can be summarised as:

- Secondary-school students' engagement with mathematics learning can be improved by increasing out-of-class teacher–student interaction by creating a digital learning environment.
- Mobile instant messaging tools can act as a learning environment and increase student–student and teacher–student interactions around learning and teaching.
- Meaningful teacher presence in a digitally-mediated learning environment can be reflected in various ways and has a significant role in student engagement and group sustainability.

The WhatsApp group was sustained for longer than anticipated. Teachers' informal interactions with students and the peer-to-peer support in the group were critical in the WhatsApp group's sustainability.

Students' perceptions of their teacher were affected positively as the instant messaging tool offered a more-flexible environment for the teacher to open himself up to the students. The teacher being able to give immediate feedback to students and to disclose aspects of his personal life were associated with the facilities that the WhatsApp group provided. The classroom environment and the WhatsApp group were distinguished from each other in terms of formality and informality. The participants found the social media platform flexible for talking about extracurricular things, whereas the classroom was perceived as a teaching place where teachers teach without having social conversations. Derks et al. (2008) also found no evidence to support the view that digitally-mediated learning environments are less emotional than face-to-face ones. It has been claimed that, to provide a high-quality digital learning experience, there should be a high social presence, which is also described as “a measure of the feeling of community that a learner experiences in an online environment” (Tu & McIsaac, 2002, p. 131). Humour, self-disclosure, greetings, and phatic are several communicative acts that can increase teachers' social presence on online platforms (Anderson et al., 2001). Students have been more comfortable when communicating with teachers who use emoticons and students' names and who project their personality into these environments (Waldeck et al., 2001).

### RQ1 (Research question 1)

RQ 1 involved whether the use of a mobile instant messaging app (WhatsApp) can serve as a learning platform on which students can participate outside school hours. Intense participation was seen in the WhatsApp group. Contrary to the proposed project time of five months, participants used the group daily for two years. Considering that six months of this duration were holidays, a sustainable communication channel seemed to have been created

through WhatsApp, which had a crucial impact on creating a learning environment for out-of-school interactions. WhatsApp seemed to facilitate participants' socialisation with their peers. Because participants did not have the opportunity to meet face-to-face outside school hours, WhatsApp seemed to fill this gap. Mobility, easy access, and the notification feature of WhatsApp and smartphones seemed to facilitate participation in the group. This finding is also consistent with previous research (Falloon, 2011; He & Huang, 2017) suggesting that adding asynchronous communication tools in a blended learning environment helped learners to develop a sense of togetherness. Overall, the WhatsApp group also provided students with instant, synchronous interaction with their peers and the teacher.

As Tragant et al. (2021) also reported, WhatsApp has gone beyond a traditional classroom to one in which students take ownership and initiate discussion and conversation about school work. Students have become more active than teachers and have engaged with their peers' questions and queries. A similar conclusion was drawn in this study, with the WhatsApp group offering an informal platform that encouraged student-led discussion.

Because the role of instructors on WhatsApp has been investigated, the need for a pedagogical framework was also explored to further understanding of WhatsApp as a learning platform (Zulkanain et al., 2020). In their evaluation of WhatsApp through the Community of Inquiry framework, Zulkanain et al. (2020) concluded that all elements of CoI, cognitive, social and teaching presence, can be reflected on WhatsApp for learning and teaching purposes. The authors state that the CoI framework can be used to enhance learning and teaching practices for digital instant messaging tools such as WhatsApp. After comparing of WhatsApp and other social media platforms such as Facebook, Rosenberg and Asterhan (2018) stated that WhatsApp is more natural as a learning platform. Privacy concerns also are better addressed on WhatsApp than for other social media tools (Wang et al., 2012). As also was evident in this study, the popularity of WhatsApp among students and adults could facilitate its integration into the school context (Rosenberg & Asterhan, 2018). Thus, by default, WhatsApp overcomes the barriers of familiarity, simplicity, and adaptability found with many other digital tools (Fewkes & McCabe, 2012).

There are also concerns that the nature of the WhatsApp platform and its text-based communication might lead to miscommunication and confusion (Zulkanain et al., 2020). Using WhatsApp anywhere anytime might distract users because most interactions might occur while teachers and students engage with day-to-day tasks (Dar et al., 2017). Instructors might struggle to attend to each students' messages, which could discourage students (Deibert, 2015).

## **RQ2 (Research question 2)**

RQ 2 involves whether or how an instant messaging tool (WhatsApp) helps to increase interactions outside school hours. Many studies have addressed the significance of portable devices for use anywhere and anytime (Cicchino & Mirliss, 2004; Clarke, 2012; Durgunoz, 2012; Gill, 2007; Ozok et al., 2008; Sheehy et al., 2005). "Touch screen technology was seen as especially beneficial due to its size and weight, its portability, with an interface that was easy to understand as well as intuitive to use" (Clarke, 2012, p.11). Participants in this current study were able to check the group anytime anywhere, with WhatsApp notifying the users whenever a message was sent to the group. Because providing immediate feedback has a crucial role in encouraging learners (Vrasidas & McIsaac, 1999), mobile devices have the potential to fulfil this expectation. However, such instant interaction opportunities which encourage students to interact with the teacher more than ever could



increase teachers' workload, but encouraging peer-to-peer support is crucial along with the teacher's presence.

Rosenberg and Asterhan (2018) refer to Media Richness Theory, which posits that the use of various media enriches the given message based on its social context and the preferred mode of communication. WhatsApp, in this regard, outperforms face-to-face and other modes of digital platforms (e.g. Learning Management Software) (Rosenberg & Asterhan, 2018). Instructor and peer availability and the flexibility of switching from private to public communication and privacy also make WhatsApp more convenient as a learning environment. Maske et al. (2018) identified various benefits of WhatsApp as a learning platform, including familiarity, easy accessibility, approachability, availability and immediate feedback. Participants in our study found that WhatsApp was a practical, feasible and acceptable learning platform. Although messages such as wishes, prayers, and appreciations positively affected the group's social atmosphere in our study, Maske et al. (2018) stated that such messages create discomfort and distraction among participants. However, the number of participants in Maske et al.'s (2018) study was 250, which is higher than in this study. Therefore, students and instructors might like to find educational content in large WhatsApp groups so that social presence might not be a priority.

As mentioned previously, the ease of use of WhatsApp and the mobility aspects come with disadvantages. Tragant et al. (2021) noted that, when students and teachers are in various settings and engage in some activities (e.g. playing with their kids, talking to friends), they might not give their full attention to messages. This could create a lack of in-depth discussion and meaningful conversation that are expected in a learning environment. One of the elements of cognitive presence, therefore, might not be seen in practice. Garcia-Gomes (2020) also draws attention to the ease of use of WhatsApp, which could lead to misunderstandings. The author suggests that instructors should closely monitor interactions among students to prevent such issues. To resolve such issues, training sessions could focus on effective communication and the etiquette of using WhatsApp as a learning environment. However, Rosenberg and Asterhan (2018) underline that, despite such drawbacks of WhatsApp and the teacher's fears of miscommunication, students are mindful of these pitfalls that are rooted in such instant-messaging tools. Participants in this study also reported that students tolerate situations in which others might have missed their messages. Hence, the emphasis remained on the benefits of WhatsApp being an easy-to-use digital mobile application.

### RQ3 (Research question 3)

RQ 3 involved how the teacher's interactions occur on a mobile instant messaging tool (WhatsApp), as well as reflections of students' understandings of the nature of the teacher's interactions in the WhatsApp group? Analysis of the teacher's messages in the group revealed that there were five communicative acts through which the teacher interacted with the students: problem-solving/helping interactions (51%); self-disclosure (20%); stimulating interactions (13%); phatic (9%); and wishes, appreciation, and prayers (7%).

Most messages were related to helping interactions, which can also be called teaching presence according to Garrison et al. (2001)'s Community of Inquiry Framework. The teacher's helping interactions were one cause of students being active in the group. Extra effort by the teacher outside school hours was noticed and appreciated by most of the students, met students' learning needs, and revealed a sense of togetherness between the teacher and the students. Although teaching presence was not the prime aim on the occasions when the teacher

helped students while on the move, it did increase the teacher's social presence. Thus, there was an unseen social impact within the teaching presence when assistance was provided in challenging situations. Thus, with the anytime/anywhere access facility of WhatsApp, more communication opportunities arose between the teacher and the students, which created a sense of closeness.

Apart from problem-solving activities, the teacher disclosed aspects of his personal life by giving limited information about what he did and how he felt outside school. An essential finding of this study was informality, which is also related with teachers' manipulation of identity to allow them to be being more informal on social media platforms. Lampert (1993), Pascarella (1980), Pascarella et al. (1978) and Spady (1970) also confirm that teacher/student informal interactions have a positive impact on students' achievement and the way in which they approach teaching and learning. Mazer et al. (2007) claim that teachers disclosing a significant amount of information about themselves is seen as more credible by students, while teachers with low online self-disclosure are seen as less credible. Johnson (2011) also claims that instructors who share more social posts on Twitter are perceived as more positive than instructors who share more scholarly postings.

The more that teachers increased their frequency of social media use incorporating more social elements, the more that participating students' perceptions of the teacher image were positively affected. Although the medium is different (Facebook), Asterhan and Rosenberg (2015) confirm what this study has also revealed, namely, that direct contact with students on a social media platform positively affects their relationship with students. Informality was seen in the teacher's self-disclosure and social remarks, such as sending good wishes, prayers and emoticons, and it seemed to create a sense of closeness and being cared for. The instructor's self-disclosure can be considered to be an effective means of communication that allows students to feel closer to their teachers (Cayanus, 2004; Fusani, 1994). Several studies have emphasised how a teacher's self-disclosure (Cayanus & Martin, 2008; Cayanus et al., 2008; Stoltz & Bryant, 2014) or immediacy behaviours (Frymier & Houser, 2000; Miller et al., 2014) have a significant role in teacher/student communication. In particular, self-disclosure has been found to close the psychological gap between students and teachers (Mazer et al., 2007). In a study exploring playfulness through media richness theory in mobile instant messaging, Hsieh and Tseng (2017) also reported that text messaging and emoticon use enrich communication and foster social connectedness among users.

As was the case in this study, Tragant et al. (2021) underlined that the students spontaneously started using more of the WhatsApp group without the teacher's participation. Because informal conversations, in particular, triggered such increased communication, the authors suggest conducting more studies of the importance of humour and phatic. This study confirms that the messages such as phatic, wishes, prayers and appreciation encourage participants to engage with the group and create a sense of togetherness. Pimmer et al. (2021) underline that social media and instant messaging tools contribute to the improvement of resilience, whereas Mano (2020) claims that the general use of social media has a significant role in strengthening resilience during the COVID-19 crisis. Pimmer et al. (2021) also add that utilising WhatsApp as a learning environment can enhance resilience.

## Conclusion

Using an instant messaging tool outside school hours was found to be beneficial both academically and socially, but this does not mean that the experiences of every teacher and student will be similar. In our study, the teacher was not chosen purposefully, and this WhatsApp group did not exist before data collection. Because this teacher might have been exceptionally motivated to help his students, more case studies should be conducted to investigate how other teachers cope with using such an instant messaging tool.

Although the students' main concern when using the WhatsApp group was to be prepared for the national examination, a significant proportion of the messages were social-oriented (wishes, appreciations, prayers and phatic). The conversational form which WhatsApp offers led participants to have such social exchanges. More importantly, the teacher intentionally allowed the use of social language to flourish in the group. We can conclude that digital instant messaging tools used by teachers and students in their day-to-day life, such as WhatsApp, can be used as an effective learning environment in which a positive teacher–student relationship also can be fostered.

**Acknowledgements** We would like to acknowledge Professor Charles Crook's contributions and valuable feedback in the preparation of this paper.

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