STUDENTS' AND TEACHERS' PERSPECTIVES ON SOCIAL-EMOTIONAL SUPPORT WHEN LEARNING MATHEMATICS VIA ANONYMOUS WHATSAPP POSTS

Ruti Segal[1], Yaniv Biton[2], Olga Fellus[3]

[1]Oranim Academic College of Education
[2]Centre for Educational Technology (CET), [3]Brock University

This paper is part of a larger mixed-methods study that focuses on 152 students' and 24 teachers' experiences of learning mathematics via anonymous WhatsApp posts. The study was conducted within the Bagroup program, a statewide initiative supporting Grade 11-12 students in preparing for their matriculation exams in mathematics. Following registration, students were assigned to 40 WhatsApp groups with approximately 100 students each. The groups engaged in solving mathematical problems for three months before the exam. In this paper, we investigate social-emotional aspects. Data comprised the WhatsApp posts and questionnaires. Findings suggest that learning through WhatsApp occasions makes readily available emotional support and an increased sense of confidence.

INTRODUCTION

A growing body of research suggests that digital social platforms such as WhatsApp can be instrumental for teaching and learning. Online social networking has become popular among both youth and adults (Biton et al., 2015; Biton & Segal, 2021; Greenhow & Askari, 2017).

It is not surprising then that there has been an influx of research focusing on the pedagogical benefits of using social media as productive sites for promoting and supporting learning (Yeo, 2014). Most of the studies focus on post-secondary contexts, such as teacher education (e.g., Dyson et al., 2015). Research on the use of social media platforms for teaching and learning in K-12 mathematics contexts remains underexplored. Given the prevalence of the use of social media in everyday life, especially among teenagers, we conjecture that research that looks into the use of such platforms in mathematics education is much needed.

LITERATURE REVIEW

Teaching and learning mathematics in and through social networks

Studies exploring social media platforms for learning and teaching have found that the interaction over social media contributes to socializing (Madge et al., 2009) and increases self-esteem and social capital (Tong et al., 2021).

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Research demonstrates that WhatsApp-mediated learning enhances student engagement, collaboration, and academic performance (Biton & Segal, 2024; Durgungoz & Durgungoz, 2022; Segal & Biton, 2024; Tong et al., 2021). The continuous availability of peers and teacher support particularly benefits students struggling with mathematics anxiety, providing immediate assistance when frustration might otherwise lead to disengagement (Nida et al., 2020). In addition, opportunities for mathematical sense-making, positive experiences, and beliefs about one's mathematical abilities have been linked to developing positive mathematical identities in learners (Fellus, 2019). These elements, combined, offer a platform for emotional support and perseverance.

In this paper, we focus on the WhatsApp social platform. WhatsApp is a Mobile Instant Messaging (MIM) application made available to the public about two decades ago, in 2009. WhatsApp's popularity has been attributed to the fact that it shares many common features with face-to-face communication, and to the sense of immediacy and simultaneity it affords, as messages synchronously flow between group members (Malka et al., 2015).

Integrating Social-Emotional Learning and Mathematics Learning

Teachers are expected to be aware of the emotional and social aspects involved in learning, requiring special focus on promoting well-being and cultivating a safe learning environment (NCTM, 2021). Research shows that fear of making mistakes in traditional classroom settings can trigger anxiety and significantly hinder student participation in mathematics (Boaler, 2016). Students need both cognitive skills and confidence to meet mathematical challenges, necessitating tasks that are engaging and that provide opportunities for collaboration alongside other support mechanisms and encouragement (Wilkie & Sullivan, 2018). Social-emotional learning (SEL) encompasses five core competencies: self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (CASEL, 2020). Key factors for developing SEL include peer feedback, fostering collaborative work, and trusting relationships (Safir & Dugan, 2021). Incorporating SEL into mathematics education is crucial given common negative attitudes toward the subject. Teaching should develop both SEL and mathematical skills simultaneously, allowing students to manage emotions, handle frustration, and seek help when needed (Sears et al., 2022).

METHODS

Our study is part of a larger research project that focuses on exploring how students and teachers experience and perceive learning mathematics over a social network. This paper particularly aims at identifying and characterizing students' and teachers' perspectives on the contribution of the WhatsApp Bagroup project learning environment to students' emotional needs and supports.

Research question

What are teachers' and students' perceptions on the contribution of the WhatsApp *Bagroup* project learning environment to the students' emotional needs?

Research environments - The *Bagroup* project

The *Bagroup* project was initiated by the Learning Center for Education Technology for the Israeli Ministry of Education to offer the use of WhatsApp to high school students as they prepare for their math matriculation exams (*Bagrut* in Hebrew). WhatsApp groups of approximately 100 students each from across the country were set up and overseen by an experienced teacher. The project ran approximately two to three months before the date of the exam, during which hundreds of thousands of messages were sent that included mathematics content, questions and solutions, and explanations. The project offered the following advantages. (1) **Immediacy**: Students who encountered any learning difficulty were able to get an immediate, professional response from a teacher or help from other students (peer learning). (2) **Equality**: Using the free WhatsApp technology allowed the entire student body to participate and receive help for their problems. (3) **Mobile learning**: The smartphone supplements formal classroom instruction anywhere and anytime. (4) **Support circles**: The program helped strengthen understanding and feelings of capability, increasing self-confidence. (5) **Variety**: Students were exposed to many learning and problem-solving methods.

Setting

Learning in each of the WhatsApp *Bagroup* groups was based on the blended learning format, which included synchronous and asynchronous sessions (Tella, 2014). The weekly synchronous WhatsApp sessions featured structured dialogue on selected mathematical topics with full student participation; asynchronous support enabled students to post questions at any time and receive responses from peers and teachers. A teacher oversaw the group to ensure consistency, but most of the learning was through student-student interaction. A learning program was designed specifically for the project, and every day, questions in one of several pre-defined topics in mathematics were posted and solved within the group. For each topic, two or three 45-minute-long WhatsApp lessons were held in which the teacher presented a selected topic and emphasized significant points of knowledge. Learning was continuous (24/7) and facilitated the work in a variety of ways that included text messages, voice messages, photos, videos, questions, presentations, and more.

Sampling method

A nonprobability sampling method was used based on the availability and willingness of participating teachers and students to fill out the questionnaire and submit it. 152 students (Grade 11 and Grade 12) and 24 teachers completed the questionnaire.

Research tools

Four data collection tools were used: **1.** *Questionnaire*. At the end of the three-month learning period, each participating teacher and the student were asked to complete a questionnaire that included 16 Likert-type statements on a 6-point scale (1 = Strongly Disagree; 6 = Strongly Agree) and 14 open-ended questions. The questionnaires were constructed together with and validated by a team of mathematics education experts to monitor and evaluate the actions of the participants. **2.** *Interviews*. At the end of the learning period, informal semi-structured interviews were conducted via video chats with three teachers and two project managers. **3.** The content of the WhatsApp messages. Content analysis is underway using the grounded theory approach. **4.** Observations of four groups of students as they communicated on WhatsApp.

Data analysis

Data analysis was both quantitative and qualitative and included four stages (Corbin & Strauss, 2014; Creswell, 2014): (1) A quantitative analysis of the Likert-type statements in the questionnaires; (2) A qualitative analysis of the open questions in the questionnaires and the interviews; (3) cross-matching information obtained from the quantitative and qualitative analyses; and (4) searching for evidence/episodes from the students' and teachers' messages to corroborate the findings obtained in the previous stages.

In this paper, we present an analysis of the quantitative and qualitative data gleaned from the teachers' and students' questionnaires.

FINDINGS

Factor analysis of the Likert statements revealed that five items ($\alpha = .79$) load strongly on a single factor representing "SEL support through WhatsApp." Both teachers ($M = 3.56$, $SD = 0.89$) and students ($M = 3.51$, $SD = 1.15$) reported moderate to strong perceptions of SEL support from both groups, with minimal variation between them.

Table 1 presents the average score and standard deviation of the five major factors that contribute to learners' emotional needs as reported by 152 Students and 24 Teachers who participated in the "*Bagroup*" Project.

Table 1. Averages and standard deviations of the Five Major Factors that contribute to Learners' Emotional Needs as reported by Students and Teachers Who Participated in the "*Bagroup*" Project

Statement	**Teachers**		**Students**	
Teacher/Student	**Average**	**SD**	**Average**	**SD**
Category related to the contribution of the WhatsApp environment to learners' emotional needs	**3.56**	**0.89**	**3.51**	**1.15**
T: I managed to track the students' progress via the WhatsApp discourse	3.83	1.17		
S: I managed to follow the lesson during the WhatsApp discourse			3.46	1.65
T: I managed to explain the material just as well as in a regular class	3.33	1.05		
S: I managed to understand the material in the WhatsApp environment at the same level as in a regular class			3.84	1.3
T: WhatsApp allows students to participate without fear of making mistakes	4.14	1.39		
S: WhatsApp allows participation without fear of making errors			3.73	1.68
T: The written discourse in WhatsApp is preferable over the verbal discourse in regular classes	2.5	1.41		
S: The written discourse in WhatsApp is preferable over the verbal discourse in a regular class			2.8	1.53
T: Teaching through WhatsApp allowed me to meet the specific needs of each student	4.04	1.47		
S: Learning through WhatsApp allowed me to meet my specific needs as a learner more than in a regular classroom			3.72	1.61

The quantitative data reveal notable alignment between teachers' and students' perceptions regarding WhatsApp's contribution to emotional needs in mathematics learning, with both groups reporting moderately positive overall responses (teachers: M=3.56, SD=0.89; students: M=3.51, SD=1.15). The most striking finding is the high agreement on WhatsApp's ability to create a safe learning environment, with teachers rating "WhatsApp allowed students to participate without fear of making mistakes" as the highest item (M=4.14, SD=1.39), closely mirrored by students' ratings (M=3.73, SD=1.68). Interestingly, while teachers expressed confidence in meeting individual student needs through WhatsApp (M=4.04, SD=1.47), there was a notable discrepancy in how effectively material was understood, with students reporting better comprehension in WhatsApp environments (M=3.84, SD=1.3) compared to teachers' more modest assessment of their ability to explain material effectively (M=3.33, SD=1.05), suggesting that peer interaction and asynchronous learning opportunities may compensate for perceived teaching limitations in digital environments.

The qualitative findings reinforce the quantitative results, with 88% of teachers and 43% of students highlighting WhatsApp's availability as a key advantage, aligning with the high ratings for meeting individual needs (M = 4.04 for teachers). While teachers emphasized accessibility (84%) and peer learning (62%), students particularly valued mutual help (39%), immediacy (26%), and the ability to revisit content (20%). Interestingly, while students rated anonymity highly in quantitative items (M = 3.73), none mentioned "anonymity" in their open-ended responses. Instead, they described its effects: "I can ask things I'd never ask in class"; "No one knows who I am, so I'm not embarrassed", and "It's easier when you're just another person in the group." In contrast, 17% of teachers explicitly discussed anonymity's importance: "The anonymity encourages students to ask questions without fear of judgment."

DISCUSSION

The convergence of quantitative and qualitative findings reveals how WhatsApp environments address students' social-emotional needs through distinct yet complementary mechanisms. The high agreement between teachers (M=4.14) and students (M=3.73) that WhatsApp reduces fear of making mistakes represents a fundamental shift from traditional classroom dynamics, where public errors can trigger anxiety and hinder participation (Boaler, 2016). This finding aligns with SEL principles emphasizing safe learning spaces for emotional regulation and risk-taking (CASEL, 2020). The qualitative data illuminates how this safety emerges: teachers recognized anonymity's role (17%), while students valued mutual peer help (39%), suggesting that WhatsApp's structure, combining teacher guidance with peer support, creates safety nets for learners.

The linguistic divergence between teachers' "peer learning" (62%) and students' "mutual help" (39%) reveals fundamentally different conceptualizations of collaborative support. Teachers frame peer interaction through pedagogical lenses,

emphasizing knowledge construction and diverse problem-solving exposure. Responding students in our sample experienced it as survival solidarity, practical assistance in managing academic demands. This extends Nida et al.'s (2020) findings by suggesting that effective peer support operates simultaneously at multiple levels: pedagogical (as teachers perceive) and practical (as students experience). The Bagroup's success may stem from supporting both dimensions without requiring explicit acknowledgment of either.

The platform thus addresses multiple SEL competencies simultaneously: self-management through controlled participation timing, social awareness through exposure to diverse thinking, and relationship skills through mutual support networks. This multi-layered support system may explain why both teachers and students perceived WhatsApp as effectively meeting individual learning needs, despite their different conceptualizations of what constitutes effective support. Our findings suggest that CASEL's (2020) SEL framework requires adaptation for anonymous digital environments. Traditional SEL models assume face-to-face interaction where emotional support emerges through interpersonal relationships. The Bagroup experience of our respondents suggests that SEL can potentially be structurally embedded through platform design, anonymity is designed to support emotional safety, scale guarantees peer support, and synchronicity enables self-management.

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