Online Mathematics Classrooms as Performative Spaces: A Goffman-Garfinkel Framework

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DOI: https://dx.doi.org/10.47772/IJRISS.2025.91100271

Received: 10 November 2025; Accepted: 20 November 2025; Published: 06 December 2025

ABSTRACT

This article explores how undergraduate online mathematics classrooms at South African universities function as performative spaces shaped by visibility, role expectations, and social accountability. The sudden shift to digital learning platforms during the COVID-19 pandemic revealed logistical and infrastructural gaps, raising important questions about identity, participation, and maintaining classroom order. Although the transition to remote teaching was often seen as a technological or pedagogical challenge, this research approaches it from a sociological perspective by analysing the subtle ways in which order is preserved in digitally mediated environments. Using the frameworks of Erving Goffman's dramaturgical sociology and Harold Garfinkel's ethnomethodology, the study examines how lecturers and students in online mathematics classrooms perform, manage, and interpret social interactions through platforms such as Zoom, Microsoft Teams, and institutional learning management systems. Based on data from three South African universities—including video recordings, chat logs, WhatsApp group conversations, interviews, and fieldnotes—the research identifies key interaction patterns: self-presentation strategies, repair routines following breaches of background expectancies, and backstage cooperation among students to sustain participation. The findings indicate that these classrooms are more than simple channels for delivering content; they are socially dynamic environments where meaning, legitimacy, and accountability are co-constructed in real-time. The study also highlights the complex emotional labour and identity negotiations involved in engagement by students and lecturers, especially under pressures such as exposure, technological surveillance, and asynchronous misunderstandings. Viewing online mathematics classrooms as performatively and interactionally structured, the article calls for a broader re-evaluation of digital pedagogy that extends beyond mere access and assessment to focus on the everyday micro-practices that uphold educational meaning and order.

Keywords: Ethnomethodology, Dramaturgical Sociology, Micro-practices, Digital Learning, Interactional Structure

INTRODUCTION

One of the most significant changes in education in the twenty-first century was sparked by the COVID-19 pandemic, which compelled educational institutions worldwide to make a sudden switch from in-person to online instruction. This shift was fraught with difficulties in the South African higher education system, such as disparities in infrastructure, a lack of devices, data limitations, and psychological stress on both employees and students. Much attention has been paid to these structural barriers; a different, less visible transformation was also taking place: the reconstitution of classroom interaction as a digital and performative phenomenon.

In traditional face-to-face classrooms, the roles of students and lecturers are shaped by spatial arrangements, physical gestures, and direct presence. A raised hand signals a question, a pause indicates readiness to answer, and eye contact confirms participation. These cues, often overlooked, form a social choreography that upholds order. Many of these signals disappeared when the sudden shift to online teaching took place, replaced by chat messages, silent avatars, and virtual voices. How did these new environments substitute for subtle social cues? In what ways did lecturers sustain authority and clarity? Furthermore, how did students decide when to speak, stay silent, or withdraw?

This article addresses these questions by examining undergraduate mathematics classrooms conducted online at three South African universities. Rather than focusing solely on cognitive or content-based dimensions of teaching, this study explores the interactional and performative dynamics that underpin online engagement. It contends that virtual classrooms are not merely neutral environments in which learning occurs, but instead staged spaces where identities are performed, norms are negotiated, and order is sustained through collective micro-practices.

While mathematics is often treated as a purely cognitive or symbolic discipline, it is also a deeply social one. Risk, exposure, and negotiation are all involved when presenting a proof, explaining an idea, or resolving an issue in front of peers. These factors are amplified in virtual settings, where even the most well-meaning educational efforts can be derailed by delays, misunderstandings, and ambiguity. Because they feel embarrassed, students are reluctant to switch on cameras. Lecturers often erroneously interpret silence as a sign of a lack of attention. Chat messages are too late to be of any educational value. These dynamics demonstrate the degree to which maths classes serve as both cognitive and interactive environments.

This essay combines two sociological viewpoints, half of Garfinkel's ethnomethodology and Erving Goffman's dramaturgical sociology, to examine these interactions. According to Goffman's (1959) theory of social life as performance, people regulate their impressions to preserve their "face" and convey the impression that they are a cohesive person to others. Garfinkel (1967) concentrated on the routine behaviours that people employ to interpret one another's behaviour, especially when there is uncertainty or disturbance. Together, these frameworks provide a powerful lens through which to view how teachers and learners navigate the challenges of teaching mathematics online. This study utilises data from live Zoom and Microsoft Teams meetings, LMS chat archives, student focus groups, and one-on-one interviews with instructors. The analysis examines how participants manage visibility, demonstrate competence, respond to breaches of classroom norms, and collaborate to restore order when misunderstandings occur. In doing so, the study offers a more detailed understanding of online pedagogy, focusing on the interactional work necessary to sustain learning in a medium that constantly challenges traditional notions of what a classroom is or should be.

The paper first examines the body of research on online learning in mathematics education, pointing out any inadequacies in the performative and social elements of virtual classrooms. Managing visibility, performing understanding, restoring order after breaches, and negotiating emotional labour are the four key themes that emerge from the studies. In addition to offering implications for philosophy, policy, and practice, the discussion connects these findings to the existing literature. Ultimately, this article argues that online mathematics classrooms are not passive vessels for content delivery but are staged social environments in which every participant, lecturer and student alike is engaged in an ongoing performance of legitimacy, understanding, and order.

LITERATURE REVIEW

Over the past five years, educational research has focused on the global shift to online learning during the COVID-19 pandemic. The psychological effects of loneliness and screen fatigue, as well as the structural obstacles caused by unequal access to devices and reliable internet, have been explored in this corpus of work (Bozkurt et al., 2020; Czerniewicz et al., 2020). South African higher education institutions, already marked by stark digital divides, were among the most severely impacted by the shift to emergency remote teaching. The micro-level interactional and performative aspects of virtual classrooms are another crucial aspect of online learning that has received relatively little attention, despite concerns about access, equity, and infrastructure remaining vital.

Online Mathematics Education: Gaps and Shifts

In the field of mathematics education, the online transition introduced unique complications. Mathematics is a discipline often reliant on visual representations, symbolic notations, real-time problem-solving and high levels of instructional clarity, which make it challenging to adapt to platforms like Zoom or Microsoft Teams. The delayed interactions, connectivity issues and visual fragmentation make it difficult to provide timely feedback and coherent mathematical explanations (Engelbrecht et al., 2020; Borba et al., 2021). Furthermore, student

performance and content delivery strategies have been the main subjects of study on online mathematics training. Engelbrecht and colleagues (2020) investigated how the conceptual knowledge of online algebra and calculus courses was enhanced by technologies such as Desmos, GeoGebra, and Moodle-based quizzes. The use of synchronous and asynchronous platforms to support inquiry-based tasks in online mathematics was investigated by Borba et al. in 2021. Her studies gave insight into the cognitive and technological facets of instruction. However, they often overlook or downplay how social dynamics, such as authority, identity, participation and face-saving, manifest in online environments.

Interaction in Virtual Classrooms

The extensive literature on computer-mediated communication (CMC) and online pedagogy offers valuable but incomplete insights into interaction within digital classrooms, extending beyond mathematics education. For instance, Hampel and Stickler (2012) show that multimodal features, video, audio, chat, and annotation tools, can enhance participation in online language classrooms. Herring (2004) claims that computer-mediated discourse analysis demonstrated how online venues are used to negotiate misunderstanding and turn-taking tactics. However, instead of treating interaction as the creation of order, these studies treat it as the transmission of information.

In contrast, recent sociocultural studies have begun to consider how online interaction is not only functional but also performative in nature. Bayne et al. (2020), for example, use social topology to explore how distance students "perform presence" in asynchronous online courses. However, such analyses rarely intersect with mathematics education or with South Africa's unique sociotechnical context. There remains a pressing need for studies that integrate performance theory and ethnomethodological insights into the everyday mechanics of online teaching and learning, particularly in disciplines with rigid symbolic systems, such as mathematics.

Goffman's Dramaturgy in Digital Education

Erving Goffman's (1959) dramaturgical framework has been increasingly applied to digital contexts, particularly in studies of online identity, self-presentation, and social media. His concepts of "front stage" and "backstage" behaviour have been applied in educational research to understand how students negotiate video-based interactions, choose when to speak, and control the visibility of their personal lives (Green et al., 2021). Students frequently blur the lines between public and private settings when learning online, carefully choosing their locations, contributions and appearances to adhere to academic decorum standards.

For example, turning off a webcam is a strategic act of impression control rather than just a technical choice. Goffman's idea of "face", the positive social value a person effectively claims for themselves, helps explain why students may avoid speaking unless specific about their answer, or why they hesitate to show themselves in noisy, crowded, or insecure home settings. Similarly, even while speaking into what seems like a silent void, lecturers use performance work to retain control and authority. The upkeep of what Goffman refers to as "interactional order", meaning the implicit, mutually accepted norms that facilitate social interactions, depends heavily on these performative actions.

Ethnomethodology and the moral accountability of talk

Harold Garfinkel's (1967) ethnomethodology complements Goffman's work by focusing on how people produce mutual understanding and social order in real-time interaction. While Goffman emphasised structure and role, Garfinkel studied method and the tacit procedures people use to interpret actions, repair misunderstandings and restore interactional continuity when norms are breached. This includes the concept of background expectancies, the unspoken assumptions that underlie interactions. When these are violated, participants engage in "repair work" to re-establish order.

In online classrooms, such breaches occur frequently. A participant may misunderstand a mathematical phrase on a shared screen, a lecturer may forget to unmute, or a student may speak out of turn because of lag. Others are forced to explain the disturbance in each instance, frequently by using comedy, diversion, or casual conversational corrections. These behaviours are essential to classroom life and are not merely incidental.

Thus, ethnomethodology enables us to view online learning as a sequence of micro-negotiations that develop, in which all participants are ethically responsible for maintaining order and intelligibility, rather than just as the transmission of prepackaged knowledge. This is especially salient in mathematics education, where meaning is highly indexical ("this step," "that value," "here we divide"), and misunderstandings can snowball quickly.

Toward a Performative-Social Lens in Online Mathematics

While Goffman and Garfinkel have been individually applied in digital education research, few studies have combined them to examine how teaching and learning are enacted as performances and social accomplishments in online mathematics classrooms. Such an integrated lens enables us to understand the virtual classroom not just as a cognitive or technological environment, but as a moral, spatial, and interactional construct.

When this viewpoint is applied to the South African setting, where differences in experience, access, and space are apparent, it becomes clear how lecturers and students negotiate legitimacy, presence and participation in limited and frequently uncertain circumstances. This article contributes to filling this gap by providing an empirically grounded, theory-rich analysis of how mathematics classrooms are made socially recognisable and interactionally coherent in digital form.

THEORETICAL FRAMEWORK

The study frames the online mathematics classroom as a socially created, performative, and morally accountable space by drawing on the intersecting theoretical contributions of Harold Garfinkel's Ethnomethodology and Erving Goffman's Dramaturgical Sociology. The microstructures of everyday life, the unspoken norms, customs, and strategies by which individuals create and maintain social order, are of interest to both viewpoints. Despite their emergence from distinct schools of sociology, when combined, they offer a well-balanced analytical framework for understanding how lecturers and students jointly create coherence, legitimacy, and meaning in online learning settings.

Goffman's Dramaturgical Perspective

Erving Goffman first presented a theatrical metaphor for comprehending social interaction in his groundbreaking 1959 book The Presentation of Self in Everyday Life. Goffman argues that people perform to control how others perceive them. He refers to the locations of these performances as "front stage" and "backstage." On stage, people follow the rules and control their behaviour, speech, and appearance to maintain a consistent social identity. People can play out of character, think, or get ready for more performances backstage.

In online classrooms, especially on platforms like Zoom or Microsoft Teams, the divide between front stage and backstage blurs and transforms. Students join class from their bedrooms, kitchens, or shared living areas. Their cameras reveal glimpses into their private spaces, and their choices about visibility, sound, and participation involve careful impression management. Likewise, lecturers must project authority, care, competence, and control, all while dealing with fragmented attention, students with cameras off, and a lack of physical feedback.

Performative actions that express identification, alignment, and emotional commitment include choosing to stay off camera, speaking or not speaking, and using signs in the chat. Particularly important is Goffman's idea of "face," or the positive social value an individual asserts during engagement. Students may risk "losing face" if they answer incorrectly or if noise in their environment undermines their academic image. Lecturers also risk losing face when technical failures or miscommunications disrupt their objective performance. Through his work, Goffman helps to establish the online mathematics classroom as a stage where participants must continually negotiate visibility, authority, legitimacy, and a sense of belonging rather than as a neutral space for cognitive exchange.

Garfinkel's Ethnomethodology

A contrasting perspective is provided by Harold Garfinkel's ethnomethodology, which focuses on the strategies individuals use to create and sustain social order in the present. Garfinkel is interested in the mechanics of social life, specifically how participants understand, respond to, and correct each other's actions to maintain intelligibility. In contrast, Goffman examines the dramaturgical structure of social life. The concept of reflexivity, which states that actions are not only observed but also assessed within a shared normative framework, is central to Garfinkel's approach. Moment by moment, participants collaboratively construct a system of meaning that is embedded in every statement, pause, gesture, and silence. Garfinkel introduced the concept of background expectancies, referring to the unspoken assumptions people bring to interactions. When these expectancies are violated (a breach), participants generally engage in repair work to restore order.

In online classrooms, these breaches are common and often technical in nature. A lecturer might share the wrong screen. A student might respond out of sync due to lag. Chat messages may arrive late and seem unrelated. These disruptions require participants to interpret what has happened and restore coherence to the situation. For instance, a student typing "You are muted, sir" is not just sharing information; they are also performing an act of moral accountability, helping to uphold the legitimacy of the instructional interaction. Ethnomethodology highlights these "small repairs" that enable classroom life. These include clarifying instructions, rephrasing misunderstood questions, summarising peer comments, or reassuring someone who made a mistake. Far from being minor, these practices are fundamental to the classroom as a recognisable social scene.

Combining Goffman and Garfinkel in the digital classroom

Although Goffman and Garfinkel wrote in different styles—one using metaphor and dramaturgy, the other based on empirical detail- they both share a commitment to situated analysis. Both assume that social order is not imposed but is instead locally created through the actions and interpretations of participants. This common belief makes their theories highly compatible for analysing online teaching environments, especially in mathematics, where clarity, precision, and shared understanding are essential.

In combining these frameworks, this study considers three core analytical dimensions:

Performance and Impression Management (Goffman): How do students and lecturers present themselves in the online classroom? How do they manage visibility, silence, tone, and perceived competence? Interactional Order and Repair (Garfinkel): How do participants respond to breakdowns in communication? What methods do they use to re-establish shared understanding when norms are breached?

Moral Accountability and Identity (Both): How is the legitimacy of teaching and learning maintained through morally significant actions, such as correcting someone, remaining silent, or encouraging a peer? These aspects help us see online classrooms as interactionally fragile yet morally rich environments, where the success of a lesson depends as much on social performances and interpretive practices as on content mastery.

Relevance to Mathematics Education

Mathematics is a highly codified discipline. Its language is symbolic, its logic formal, and its instruction often linear. However, the act of teaching mathematics is inherently social. Explaining a subject, correcting a misperception, or helping a pupil through a difficulty requires both mathematical reasoning and interactional coordination. In online courses, the cooperation becomes even more difficult. Students may misinterpret deictic references (e.g., "this value," "over here") due to lag or missing visuals. Lecturers may feel uncertain about whether students are following. Peer-to-peer clarification becomes a vital context for meaning-making. Goffman and Garfinkel help frame these issues not as failures of instruction but as interactional achievements that demand ongoing, situated effort. By applying these two frameworks to the online mathematics classroom, this study highlights that teaching and learning mathematics are socially embedded and influenced by the affordances and constraints, as well as the moral economies of the spaces where they occur.

METHODOLOGY

This study adopts a qualitative interpretive research design, situated within a sociological perspective informed by Goffman's dramaturgical theory and Garfinkel's ethnomethodology. These theoretical approaches necessitate a methodological strategy that highlights everyday practices and meaning-making processes through which participants co-construct social reality, specifically the interactional order of online mathematics classrooms. The aim is not to quantify predefined variables, but to explore the lived experiences of digital teaching and learning, with a particular emphasis on how participants perform, interpret, and maintain order in a constantly evolving communicative environment.

Research context and sites

The study was conducted at three South African universities, each differing in its traditions, research focus, and historical background, all of which were visited during the 2021 academic year. Due to the COVID-19 pandemic, all three institutions implemented hybrid or fully online teaching models. Although digital infrastructure varied across sites, each used a combination of synchronous tools (e.g., Zoom, Microsoft Teams) and asynchronous tools (e.g., Moodle, Vula, Blackboard). The mathematics modules selected from both science and education faculties at the undergraduate level included first-year calculus, introductory algebra, and mathematics for future primary teachers. These modules provide a comparative perspective on how interactional order is created and maintained at varying levels of mathematical complexity and educational objectives.

Participants

The sample included nine mathematics lecturers and 27 undergraduate students, recruited through purposive sampling. Lecturers were invited via institutional emails and departmental referrals. Students were recruited through class announcements and follow-up messages on platforms such as WhatsApp and Telegram. The final group of participants showed a diverse range of linguistic, socioeconomic, and geographical backgrounds, with students attending online classes from rural, peri-urban, and urban areas. All participants gave informed consent, and the institutional review boards of the participating universities approved the study ethically. Pseudonyms were used throughout to maintain anonymity.

Data Collection

Multiple forms of qualitative data were collected to enable triangulation and ensure a rich, multi-perspectival account of interaction in online mathematics classrooms. These included: Recorded synchronous sessions: A total of 21 live sessions were documented across the three institutions. These sessions, lasting between 40 and 90 minutes, included lecture-style teaching, problem-solving exercises, group work, and periods for student questions and feedback. Chat logs and LMS transcripts: Exported chat histories from Zoom and Teams provided additional insight into real-time interactions, informal side comments, and student-to-student clarifications. WhatsApp groups: Several lecturers and students voluntarily shared WhatsApp transcripts used for class updates, peer support, or question-answering. These formed part of the "backstage" communicative space.

Semi-structured interviews: Nine lecturers participated in interviews lasting 45–60 minutes. They reflected on their experiences, perceptions of student engagement, challenges, and strategies for maintaining interaction. Student focus groups (six) were conducted via Zoom, each with three to five participants, exploring themes of presence, participation, confusion, and collaboration.

Fieldnotes and reflexive memos: The researcher kept a fieldwork journal throughout the data collection, recording impressions, anomalies, and interpretive hunches that guided iterative coding and analysis. All data were collected between June and December 2024, during periods of sustained online instruction.

Data Analysis

The data were analysed using a thematic coding framework based on the key concepts of Goffman and Garfinkel.

The analytical process took place across three iterative stages:

Open coding involved an Initial reading of transcripts, chat logs, and interviews, generating descriptive codes based on observable interactional patterns (e.g., "camera off," "lecturer joke," "student repair," "WhatsApp clarification").

Axial coding: These descriptive codes were then grouped into broader categories aligned with theoretical constructs such as "face work," "breach and repair," "backstage coordination," and "performance anxiety."

Theoretical integration: Key extracts were analysed using micro-interactional analysis. This involved careful attention to turn-taking, language use, timing, and platform effects (e.g., chat lag, breakout room sequencing) to uncover the situated practices through which interactional order was established or disrupted. Throughout the process, the researcher returned to fieldnotes and memos to ensure that emerging themes were grounded in empirical observation and not overly abstracted. Peer debriefing with two co-researchers was used to strengthen analytic reliability.

Findings

The findings are organised into four interconnected themes, each illustrating how participants, students, and lecturers actively constructed interactional order in online mathematics classrooms. These themes emerged through iterative coding and were analysed using the conceptual frameworks of Goffman's (1959) dramaturgical sociology and Garfinkel's (1986) ethnomethodology.

Managing visibility: cameras, muting, and self-presentation

One of the most recurring themes was how students and lecturers negotiated what became visible within the constraints of digital platforms. Visibility, or the lack thereof, emerged not merely as a technological decision but as a social and moral act, influenced by issues of self-presentation, home privacy, and performative risk. While many lecturers expected students to keep their cameras on as a sign of attentiveness, students described intense anxiety about being seen in domestic environments they considered inappropriate for academic display. One student commented during a focus group:

"Sometimes I am learning from the kitchen. My siblings are running around, and I do not want people to think I am unserious just because they see my background."

Another added:

"It is not just about data. Even if I had unlimited data, I would still feel uncomfortable showing my space."

These responses reveal that camera-off practices were not necessarily indicators of disengagement but rather acts of impression management. Students act in a way they see fit. They selectively chose when and how to present themselves, often opting to remain invisible to avoid social embarrassment or judgment. This resonates with Goffman's (1959) notion of backstage behaviour, where individuals avoid performing for an audience due to perceived lack of control over the environment or the potential for face-threatening situations. Lecturers, on the other hand, expressed feelings of disorientation and performance fatigue in classrooms where the cameras were off. One mathematics lecturer noted:

"It is like I am performing to ghosts. I do not know if anyone is with me or if I'm talking into a void."

To manage the discomfort of this performance void, lecturers developed rhetorical and humour-based strategies. Some narrated imagined student responses used mock affirmations ("I hope you're all nodding"), or

inserted jokes to coax interaction. These performative cues served not only pedagogical functions but also emotional stabilisation, reinforcing their sense of control in an otherwise ambiguous social setting.

Mute functions also contributed to a fragmented interactional field. According to the students, they experienced anxiety about accidentally interrupting, speaking over others, or being misheard. As one student put it:

"You don't want to unmute and say the wrong thing at the wrong time. It's safer to listen and send a message in the chat."

This scenario led to delays in preferred text-based communication and diminished spontaneity, both of which are vital in mathematical reasoning. Overall, these practices illustrate how visibility is carefully managed in online classrooms, influenced by moral judgements, emotional risks, and deliberate silences.

Maintaining "Face" and Repairing Breaches.

The online classroom also served as a space for continuous micro-repairs, with lecturers and students actively working to prevent, minimise, or recover from social and cognitive errors. Significant educational failures were not always evident in such cases; instead, minor mistakes in interactional expectations needed careful handling to maintain social order. Garfinkel's (1967) concept of breach and repair was clear in cases where misunderstandings, incorrect replies, or technical disruptions occurred. For example, when a student suggested a wrong step in a problem, professors usually avoided immediate correction. Instead, they employed softening strategies, such as hedging ("Not quite…", "Let's try to look at that again") or rephrasing the statement in a more acceptable form.

Instead, they employed softening tactics such as hedging ("Not quite…", "Let's try to look at that again") or revoicing the response into a more acceptable form. This strategy preserved the student's face, avoiding public embarrassment while guiding the class back toward correctness.

One lecturer explained:

"I never say 'no' in these spaces. Students are already nervous to speak up. If you correct too harshly, they won't say anything next time."

Similarly, students demonstrated collaborative repair practices in the chat. When one student asked a question that others had also misunderstood, the responses were empathetic:

"Same here," "I thought the same," or "Thanks for asking; I was confused too."

These affirmations created a social cushion that made confusion publicly acceptable and encouraged further questioning. When technological issues arose, repairs were necessary. The lecturer started to describe a proof observed in one class, but she failed to show the whiteboard screen. "We can't see your screen yet," a student typed, followed by a laughing emoji. Rather than causing a disruption, this incident evolved into a light-hearted discussion that enhanced group cohesion. Later in class, students made light of the glitch, and the speaker chuckled, "At least someone is awake!"

These exchanges demonstrate how the delicate nature of mediated education can be managed through humour and civility as repair mechanisms. Here, Garfinkel's repair techniques and Goffman's concept of face work converge, as both lecturers and students recognise the common risk of exposure. They establish subtle customs to protect each other's honour. The lecturer was explaining a proof in one class, which was visible, but she forgot to reveal the whiteboard screen. "We can't see your screen yet," a student typed, then added a laughing emoji.

Platform effects and background expectancies.

The influence of online platform design, including Zoom, Microsoft Teams, and WhatsApp, on classroom interaction norms and failures was one of the study's main conclusions. Implicit assumptions about what participation, attention, and comprehension were held by these platforms, but they were often violated in surprising ways.

In Garfinkel's terms, background expectancies refer to the taken-for-granted norms that people rely on to interpret their surroundings. In face-to-face classrooms, students anticipate a specific rhythm: questions are followed by answers, silences indicate confusion or contemplation, and instructors respond visibly and promptly. However, in online environments, these background rhythms are often disrupted by latency, interface opacity, or asynchronous chat.

A typical breach involved a lecturer solving a problem aloud but forgetting to share their screen with the class. The class stayed silent for nearly 30 seconds before a student typed: "Sir, we cannot see the example." In this case, the student's correction contradicted the lecturer's authority, and the silence went against the lecturer's expectation of visual feedback, yet both were necessary to restore order. Apologies and laughter followed, helping to ease the tension. The reaction from one student was, "It's like we're helping him teach sometimes." We must tell him what we cannot see or hear.

This co-management of classroom flow demonstrates a flattened accountability structure in which students take on informal obligations to maintain readability. These moments are more than just bug fixes; they symbolise the communal building of intelligibility in real time.

Moreover, platform features themselves changed classroom behaviours. For instance, the "raise hand" function introduced turn-taking protocols not usually needed in small face-to-face tutorials. Similarly, private chat channels allowed students to confer with each other while the lecturer spoke, creating parallel backchannels similar to whispering in class, but now typed and persistent. WhatsApp groups became vital in maintaining interactional order. In one class, a group of students created a "shadow classroom" on WhatsApp where they explained content, discussed confusion, and assisted each other in rejoining the main platform after connectivity issues. One student shared:

"There are two classes: the real one and the WhatsApp one. Sometimes I understand better in the WhatsApp one."

These backstage spaces reveal how students engage in reflexive coordination; not simply consuming knowledge but actively recontextualising it for one another. The platforms thus did not merely host interaction but shaped, constrained, and redistributed the social work of learning.

Emotional Labour and Role Performance

The final theme identified focused on the emotional and identity efforts needed to maintain a sense of classroom order and self-worth within the digital mathematics environment. Participants, particularly students, described high levels of emotional vigilance, self-monitoring, and anxiety linked to being present in online learning spaces.

One student confessed:

"You're always watching how you sound, how you look, if people are judging you. I want to ask questions, but I'm scared of looking stupid."

Such remarks reflect Goffman's (1959) insights into face-threatening acts; interactions that carry the risk of social discrediting. The fear of appearing confused, especially on a public platform with recorded sessions, constrained many students from speaking freely. The permanence of recordings meant that errors could be replayed, increasing the perceived stakes of participation. Additionally, lecturers reported feeling emotionally

strained while "performing into silence." Fatigue and self-doubt resulted from the inability to read the room due to the lack of instant input. As one speaker stated,

"When no one reacts, I start to question myself. Was my explanation poor? Do they exist at all?"

Many lecturers discussed making extra efforts to modulate their voice, add humour, ask rhetorical questions, and repeat instructions to compensate. Despite its educational value, this activity still required a significant amount of affective labour, the deliberate regulation of emotions to present a professional image (Hochschild, 1983).

It is interesting to observe that some pupils responded by subtly signalling their presence. Emojis ("□□", "□") and brief affirmations ("Got it!" and "Thanks!") were among their responses. Alternatively, some even changed their profile pictures to maths-themed memes. These acts, though seemingly trivial, were meaningful efforts to signal attentiveness, align with group norms, and soften the emotional atmosphere of the classroom.

One student elaborated:

"Even if I don't say much, I try to put something in the chat just so the lecturer knows I'm here."

These micro-performances of presence showcase a moral commitment to the classroom community. Despite the alienation of the medium, students did not fully withdraw; instead, they modified their expressive repertoire to maintain relational proximity and instructional validity. In this sense, both students and instructors were constantly fulfilling their roles within limited possibilities, adjusting their behaviour in response to an unseen and often confusing audience. Their ongoing participation, despite technological failures and social concerns, shows the resilience and adaptation of classroom identities in online maths education.

DISCUSSION

This study aimed to explore how undergraduate online mathematics classes in South Africa function as performative and interactionally ordered spaces, drawing on the theoretical insights of Erving Goffman and Harold Garfinkel. The findings demonstrate that these digital environments are not neutral containers for transmitting mathematical content, but rather social fields shaped by visibility, accountability, and performance. By examining how students and lecturers manage presence, coordinate meaning, and repair breakdowns, this research contributes to a deeper understanding of online pedagogy as a sociologically informed practice.

An important feature that arises from the findings is the concept of impression management, which is evident in the students' engagement. Students navigated their presence by choosing when to speak, show their faces, or remain silent. These actions were all based on complex calculations. Such behaviours align with what Goffman (1959) describes as the theory of face work and front-stage performance. Students aimed to protect their academic identity while avoiding embarrassment, especially in environments where errors could be recorded and revisited.

This indicates that participation in online mathematics classrooms involves more than just cognitive readiness or technical access; it is also influenced by emotional labour and social risk. When lecturers interpret camera-off behaviour or silence as disinterest, they may misjudge actions that are attempts at social preservation. Instead of viewing such behaviours as resistance, educators should see them as forms of adaptive performance, shaped by socio-economic circumstances and emotional vulnerability.

Conversely, the lecturers were focused on their own performance as they presented their lessons, which balanced their positionality, authority, clarity, and the encouragement they provided to students in the absence of feedback. Their use of humour and questioning facilitated subtle repair strategies, demonstrating a high level of discursive awareness. Goffman's (1959) concept of interactional order is especially relevant here. Lecturers were not only content-driven experts, but also interactional choreographers who maintained the rhythm and coherence of a dispersed and asynchronous group.

Garfinkel's (1967) concept of reflexivity and repair was also evident throughout the data. The everyday classroom featured numerous minor breaches: missed screenshares, misaligned chat responses, and lag-induced interruptions. These were not irregularities but inherent aspects of the digital environment. What was significant was how participants responded to them. The routine use of polite corrections, humorous interjections, and supportive peer comments shows that students and lecturers were collectively committed to maintaining interactional clarity.

This suggests that online mathematics classrooms depend not only on platform design and pedagogical content but also on mutual moral responsibility. Every act of clarification, every emoji of affirmation, and every backchannel WhatsApp group represent a form of cooperative effort, a shared commitment to making the class socially and educationally "work." Such insights challenge familiar narratives that depict online learning as isolating or disembodied. This study demonstrates that digital classrooms are interactionally rich environments, although different logics and constraints govern their operation.

An additional implication concerns the role of digital affordances in shaping classroom norms. Platform features such as mute buttons, raise hand icons, camera toggles, and breakout rooms serve not only as technical tools but also as interactional scripts, guiding participants on how to orient themselves to each other and the lesson. These features establish new rules of engagement that require interpretation, learning, and navigation. Digitally fluent students may quickly master these rules, while others might struggle to read cues or fall behind in coordination. This highlights a new digital stratification within classroom participation, where interactional literacy becomes as vital as subject-matter knowledge.

The findings also highlight the emergence of backstage spaces, particularly WhatsApp groups and peer-to-peer chats, where students seek emotional support, clarification, and a sense of solidarity. These sections serve as semi-private counter-publics where students can practise concepts, voice misunderstandings, or discuss classroom dynamics. Although teachers may not be able to see these, they are essential for demonstrating that students understand and manage risk. Teachers' conceptions of community and involvement in online learning can be enhanced by recognising and valuing these areas as valid extensions of the classroom. When combined, these observations necessitate a more comprehensive re-evaluation of digital mathematics education. Improving exams, ensuring connectivity, and refining instructional design are often the focus of current discussions. The social dramaturgy of learning, which involves how identities are negotiated, standards are upheld, and meaning is co-produced under unpredictable conditions, is overlooked by these, despite its crucial importance. A sociologically sensitive pedagogical approach would acknowledge that online teaching involves more than merely transferring information; it also involves a sense of community and engagement. Although teachers may not be able to see these interactions, they are vital in demonstrating that students understand and manage risk effectively. Professors' views on community and participation in online learning can be developed by recognising and appreciating these areas as legitimate extensions of the classroom. An approach to teaching informed by sociological sensitivity would recognise that online education is not just about transferring knowledge but is also a sustained social performance involving trust, interpretation, and affective regulation.

This also has policy implications. Institutional metrics of "engagement" based on login data, screen time, or microphone activity might misrepresent the actual dynamics of learning. A student who does not speak may still be deeply involved in WhatsApp discussions or listening attentively with their microphone off. Conversely, active camera use may hide disengagement. Policies that require visibility or vocal participation without recognising the situational constraints students face risk alienating those who are already marginalised.

The discussion highlights that online mathematics classrooms are socio-interactional spaces, shaped by micro-practices of presence, performance, and repair. These dynamics are not epiphenomenal but central to the educational experience. By applying the combined lens of Goffman and Garfinkel, this study foregrounds the invisible labour that makes online education possible and offers a framework for supporting more inclusive, relational, and socially attuned pedagogies.

CONCLUSION AND IMPLICATIONS

This study aimed to investigate how order, participation, and legitimacy are socially constructed within online undergraduate mathematics classrooms in South Africa. Drawing on the intersecting theoretical frameworks of Goffman's dramaturgical sociology and Garfinkel's ethnomethodology, the research demonstrates that virtual classrooms are not merely technological solutions for disrupted learning but are highly performative and interactionally delicate spaces that require continuous interpretative and emotional labour. The shift to online learning during the COVID-19 pandemic necessitated a rapid transformation in how teaching and learning occurred. In mathematics education, a field already characterised by abstraction, formality, and symbolic reasoning, this transition was particularly complex. However, as this study shows, the most significant changes were not only technological or pedagogical but also social. Every online mathematics class became a space where participants had to renegotiate norms, performances, and relationships, often without the benefit of physical cues or shared spatial context. Using a combination of screen recordings, chat logs, interviews, and ethnographic observation, this study identified four key areas of interaction: managing visibility, repairing breaches, navigating platform features, and performing emotional labour. Each of these areas illustrates how students and lecturers collaborated, both intentionally and unintentionally, to sustain a sense of classroom order, legitimacy, and shared understanding.

For students, visibility was both a burden and a choice. Decisions to turn off cameras, remain silent, or participate in WhatsApp groups were not signs of disengagement but acts of strategic impression management, shaped by material constraints and emotional risks. For lecturers, maintaining authority and coherence in "camera-off" environments required ongoing performative recalibration as they navigated uncertainty, silence, and the absence of nonverbal feedback. These dynamics echo Goffman's (1956) notion of the front stage, where individuals manage impressions for others, and the backstage, where identity work and self-regulation occur without public scrutiny. Similarly, the study draws on Garfinkel’s framework of ethnomethodology by interpreting the notion of repairs as evidence of participants’ reflexive competence as classroom actors. This is evident in the way participants engaged in constant micro-repairs to restore order, mainly when miscommunications and misunderstandings of mathematical content occurred. Rather than passively receiving knowledge, students and lecturers alike took responsibility for maintaining intelligibility, mutual accountability, and the flow of interaction. From correcting screen-sharing errors to softening peer misunderstandings with humour, these practices formed the moral backbone of the digital learning environment.

The implications of these findings are important for both teaching methods and educational policies. First, teachers need to gain a better understanding of online engagement spaces. In other words, indicators such as camera use, microphone activity, or the frequency of student speech may be misleading or insufficient. Teaching approaches that recognise alternative ways of participation, such as chat interactions, emoji responses, or peer-supported WhatsApp communication, can promote more inclusive and accurate assessments of student presence and involvement. Second, professional development for lecturers should include training that enhances sociological awareness, equipping educators with the conceptual tools to understand the performative and emotional aspects of online teaching. This includes recognising how their practices of explanation, correction, humour, and repetition contribute not just to learning outcomes but also to the social cohesion of the classroom. Third, institutions must reconsider policy frameworks that govern online classroom behaviour. Uniform requirements for camera use or strict participation quotas might limit students' agency and ignore the emotional and material conditions under which they learn. A more flexible, context-sensitive approach that respects students' privacy and allows them to choose their modes of engagement can support fairness without compromising quality. Lastly, this study makes a theoretical contribution to the field of mathematics education. By viewing the classroom as a performative social encounter instead of a purely cognitive space, it encourages a re-examination of mathematical learning as not only the acquisition of concepts but also the coordination of understanding among moral actors. This opens pathways for further research into how classroom identities, power relations, and interactional norms influence learning in both online and blended environments.

In closing, the findings of this study affirm that digital classrooms are not less human; they are differently human. They are spaces of risk, creativity, resilience, and negotiation, where students and lecturers co-produce meaning through subtle, situated, and often invisible practices. In recognising and supporting this interactional labour, we move closer to designing online education that is not only effective but ethically and socially responsive.

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