Kaunas University of Technology

Faculty of Social Sciences, Arts and Humanities

Classroom Management during Remote Learning

Master's Final Degree Project

Gabrielė Ivanovaitė

Project author

prof. dr. Brigita Janiūnaitė

Supervisor

Kaunas, 2023

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prof. dr. Brigita Janiūnaitė

Supervisor

dr. Rūta Petkutė-Budrė

Reviewer

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Gabrielė Ivanovaitė

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Summary

Classroom management is an essential component of successful learning as chaotic environments are unable to support the attainment of educational goals. While management of traditional brick-and-mortar classrooms has been studied extensively over the years, technology-mediated instruction, which has especially grown in popularity following the COVID-19 pandemic, brings its own set of challenges to classroom management. In light of this, the study sought to gain insight into the ecology that develops in remote classrooms, with its challenges, and practices used to overcome them and create an environment conducive to learning. To achieve this, authentic video data from Zoom classrooms was collected and examined using multimodal conversational analysis. The key questions the study asked were: (1) what are the key parameters of the architecture of the remote learning environment studied and their features; (2) what effect do these parameters and their features have on classroom interaction; and (3) what classroom management practices emerge in response to the changes in classroom architecture and interaction patterns imposed by these changes? The study showed a gradual qualitative shift in the resources used for instruction and classroom management by replacing the resources of the physical space of the classroom (e.g. 3D models or whiteboard) with their digital equivalents (e.g. a visualiser image of teacher's notes). The data suggests that the introduction of digital tools was mainly used to re-establish the teacher's authority (compromised by failure to preserve a boundary between personal and professional selves, student association of poor IT skills with incompetence and other factors) rather than aimed at directly improving the quality of teaching. The replacement of embodied practices (e.g. walking around the classroom) with navigation of the virtual space (e.g. sharing the teacher's screen with students more effectively) was also observed and attempts to explain these empirical facts throught the processes of instrumental genesis or resemiotisation were made. A significant number of overlaps caused by the interactional pattern imposed by Zoom was also observed and linked to gradual reduction of verbal interaction as well as increase of more formal and abstract ways of gathering feedback (e.g. by using written surveys or 'thumbs up'), making it severely limited and lacking nuance, and increasing teacher workload as most of these feedback-gathering methods require much more advance preparation. Since some of these practices and tendencies can potentially have a significant effect both on student learning and on teacher job satisfaction, further research into features of remote learning environments and their effects on classroom management and learning are recommended.

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Santrauka

Efektyvus klasės valdymas yra vienas iš sėkmingo mokymosi garantų, nes chaotiškoje aplinkoje sunku siekti ugdymo tikslų. Nors tradicinės klasės valdymas kontaktiniame mokyme plačiai tirtas daugelį metų, perėjimas prie nuotolinio mokymo(si), kuris ypač išpopuliarėjo po COVID-19 pandemijos, kelia ne vieną iššūkį klasės valdymui. Atsižvelgiant į tai, tyrime buvo siekta ištirti nuotolinėse klasėse kylančius iššūkius ir klasės valdymo praktikas, naudojamas jiems įveikti ir sukurti mokymuisi palankią aplinką. Norint pasiekti šio tikslo, tyrimo metu surinkti autentiški Zoom pamokų vaizdo įrašai buvo tiriami naudojant multimodalinės pokalbio analizės metodą. Pagrindiniai klausimai, į kuriuos siekta atsakyti šiuo tyrimu: (1) kokie yra pagrindiniai tiriamos nuotolinio mokymosi aplinkos architektūros parametrai ir jų ypatybės; (2) kokį poveikį šie parametrai ir jų ypatumai turi bendravimui klasėje; ir (3) kokios klasės valdymo praktikos atsiranda reaguojant į klasės architektūros ir mokinių, mokytojų bei aplinkos sąveikos modelių pokyčius, kuriuos sukelia perėjimas prie nuotolinio mokymo(si)? Tyrimas parodė laipsnišką išteklių, naudojamų mokymui ir klasės valdymui, pokytį, keičiant fizinės klasės erdvės išteklius (pvz. 3D modelius ar klasės lentą) jų skaitmeniniais atitikmenimis (pvz. mokytojo užrašų rodymu per projektorių). Duomenys rodo, kad skaitmeninių priemonių įdiegimas daugiausia buvo naudojamas siekiant atkurti mokytojo autoritetą, nukentėjusį dėl nesugebėjimo aiškiai atskirti asmeninio ir profesinio savęs, prastų mokytojo IT įgūdžių susiejimo su nekompetencija ir kitais veiksniais, o ne tiesiogiai siekiant mokymo kokybės gerinimo. Taip pat buvo stebimas įkūnytų praktikų (pvz. vaikščiojimo po klasę) pakeitimas virtualiosios erdvės navigacija (pvz. besivystančiu vis efektyvesniu mokytojo ekrano dalijimusi su mokiniais) ir bandoma šiuos empirinius faktus paaiškinti instrumentinės genezės ar resemiotizacijos procesais. Mokiniams ir mokytojai bendraujant žodžiu buvo pastebėta daug pertaukimų, atsirandančių dėl *Zoom* primesto sąveikos modelio, kurie tyrime susieti su laipsnišku bendravimo kalbant nykimu ir didėjančiu formalesnių ir abstraktesnių grįžtamojo ryšio rinkimo būdų (pvz. rašytinių apklausų ar „pakeltų nykščių“) naudojimu. Tokiais būdais mokytojo gaunamas grįžtamasis ryšys labai ribotas, jam trūksta niuansų; tokie būdai bendrauti su mokiniais taip pat dažnai reikalauja didesnio išankstinio pasiruošimo, taip didindami mokytojo darbo krūvį. Kadangi kai kurios iš šių praktikų ir tendencijų gali turėti įtakos tiek mokinių mokymuisi, tiek mokytojų pasitenkinimui darbu, rekomenduojama toliau tirti nuotolinės mokymosi aplinkos ypatybes ir jų poveikį klasės valdymui ir mokymuisi.

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Introduction

Effective classroom management is one of the pillars of successful instruction and learning as achieving educational goals in a disorderly environment can be extremely challenging, if not impossible (van Tartwijk & Hammerness, 2011). While the processes of managing traditional classrooms in face-to-face instruction are somewhat understood with decades of studies of lesson planning, teacher vision, seating arrangements, grouping and other classroom management–related topics, the same is certainly not the case when it comes to technology-mediated instruction. Literature published during the last decade shows complete lack of consensus on what is known about how life in virtual classrooms is organised: while some scholars claim that in synchronous online instruction "nothing changes [from learning face-to-face] except for the fact that students are not in the same location" (Zhao & Watterston, 2021, p. 8), others argue that our understanding of classroom management practices and processes, such as instruction giving, in such environments is "non-existent" (Wigham & Satar, 2016, p. 70). With the lockdown caused by the COVID-19 pandemic accelerating the digital transformation in education, and completely remote or blended instruction becoming permanent options not only in post-secondary education, but also in public secondary schools (Schwartz, Grant, Diliberti, Hunter & Setodji, 2020), developing a clearer understanding of how classroom management is done in technology-mediated instruction becomes essential.

So far, it is more-or-less universally agreed that teaching remotely has its benefits; nevertheless, it remains a complex challenge. Studies carried out during the last few years have tended to highlight a number of these challenges, but the main difficulties pointed out in almost every study were related to accessibility to hardware, software and internet (e.g. Pokhrel & Chhetri, 2021) as well as teacher preparedness and ICT skills (e.g. Korkmaz & Toraman, 2020), making it appear that if these challenges were overcome, i.e. if hardware and connectivity problems were resolved and teachers developed better skills in operating platforms, such as Zoom or Moodle, online instruction would begin to significantly improve student outcomes and large-scale distance/remote learning would finally become a viable alternative for brick-and-mortar education. Some scholars, such as Selwyn (2010), have argued that similar narratives have been popular in ed-tech research for a long time now, ever promising "a better world to come" (Nye, 2007 in Selwyn, 2010, p. 69) without delivering on that promise. Such focus on the future and how technology should and could be used in an ideal scenario tends to turn scholarly attention away from the every-day reality of ed-tech practice (Selwyn, 2010). For this reason, Selwyn (2010) calls for more "academic accounts of digital technology that concentrate on developing 'thick' descriptions of the present uses of technologies in situ" (p. 65) and "address the use of digital technology in terms of 'state-of-the-actual' as opposed to 'state-of-the-art' questions – i.e. questions concerning what is actually taking place when a digital technology meets an educational setting" (p. 70). Beer and Burrows (2007) advocate a similar trajectory for research into emergent digital phenomena by stressing the necessity for "good – critical, distinctive and thick – […] descriptions […] ahead of any headlong rush into analytics" in order to "understand some of the basic parameters of our new digital objects […] before we can satisfactorily locate them within any broader frames of theoretical reference" (Selwyn, 2010, p. 70).

Following Beer and Burrows' (2007) suggestion, the project will try to contribute a description of the emergent ecology of a remote classroom by attempting to answer the following questions: (1)

what are the key parameters of the architecture of the remote learning environment studied and their features; (2) what effect do these parameters and their features have on classroom interaction; and (3) what classroom management practices emerge in response to the changes in classroom architecture and interaction patterns imposed by these changes?

Research focus: classroom management.

Research aim: to gain an understanding of emergent classroom management practices during the transition to remote learning.

Research objectives:

1. to critically review the literature on classroom management in the context of remote learning in order to provide a theoretical background for the study;
2. to develop and justify the methodology for researching emergent classroom management practices in the context of remote learning;
3. to identify and describe classroom management practices that emerged during the transition to remote learning.

Theoretical background:

- **Ethnomethodology** (Garfinkel, 1967), which stems from phenomenology and studies naturally occurring every-day social interactions in order to describe their organisation and contribution to construction of local and cooperative social life, e.g. collective achievement of workplace tasks. It challenges traditional assumptions of social sciences by insisting that social life is not governed by a particular discoverable set of rules, but is instead made up of routine practices and tacit knowledge, and is built by constant negotiation of meaning, which often cannot be accounted for using traditional methods aiming to develop clear and stable theoretical frameworks. It, therefore, advocates no formal methods of enquiry and claims that the method should be dictated by the data. The method it often relies on, however, is conversational analysis.
- **Instrumental genesis** (Rabardel, 1995), which is a theoretical approach stemming from a social constructivist idea of instrumented activity and advocating an anthropocentric study of technical objects. It builds on Vygotsky's (1978) *internalisation*. The approach proposes that humans establish relationships with technical objects and systems to achieve their goals (i.e. turn *artefacts* into *instruments*) through a two-way process, with the user of the artefact changing through the process of *instrumentation* (by being forced by the constraints of the artefact to adapt their practices, activities and utilisation schemes) and the artefact changing through the process of *instrumentalisation* (by the user's recognition of the potentials and constraints of the artefact).

Research methods:

- Authentic video data collected for this study was analysed using the methods of discourse analysis and multimodal conversational analysis.

The volume of the project is nine tables, 17 figures, 61 pages (consisting of an Introduction, three chapters, Conclusions, Recommendations and a Bibliography) as well as one annex.

In the Introduction, the context of the study has been introduced. The research aim, objectives and methods have been identified, and the value of such research argued.

In Chapter 1, the existing literature will be critically reviewed to define the key concepts used in this study and introduce the results of existing research relevant to this project.

Chapter 2 will outline research strategies and techniques employed in the study and justify their adequacy for the investigation of the research questions, provide the description of data the collection process and associated ethical concerns as well as framework for data analysis.

Chapter 3 will present and discuss the keys findings of the study.

Finally, the Conclusions section will reflect on the extent to which the objectives of the study were achieved given the data collected and analysed. Based on the findings and the analysis thereof, Recommendations for future research will be formulated.

1. Theoretical aspects of classroom management

The present chapter overviews the literature on the definition of classroom management, its features, the historical evolution of the approaches to understanding and studying it, and describes the key elements of the classroom management process in traditional environments. In the second section of the chapter, the context of this study (that of remote learning during the COVID-19 pandemic) is presented by focusing on the features of the learning environments prevalent in this new context and the changes their characteristics could bring to the way teachers make and implement classroom management decisions.

1.1. Definition, features and process of classroom management in traditional environments

Classroom management can, and has historically been, defined in rather different ways. Up until the middle of the 20th century, literature and research on classroom management focused mainly on routines and dealing with behavioural problems of pupils (Brophy, 2006). Later definitions (presented in Table 1) begin to recognise that "classroom management and discipline are not synonymous" (Martin & Sass, 2010, p. 1125) and start to broaden this concept by emphasising a wider variety of teacher actions taken to modify the classroom environment and what happens in it to increase effectiveness of instruction and learning.

Table 1. Teacher-centred definitions of classroom management

Author	**Proposed definition**
Brophy (1986, p. 182)	"ability to establish, maintain, and (when necessary) restore the classroom as an effective environment for teaching and learning"
Brohpy (2006, p. 17)	"actions taken to create and maintain a learning environment conducive to successful instruction (arranging the physical environment, establishing rules and procedures, maintaining students' attention to lessons and engagement in activities)"
Evertson & Weinstein (2006, p. 4)	"actions teachers take to create an environment that supports and facilitates both academic and social-emotional learning"

While the aforementioned definitions encompass more of the complexity of what happens in the classroom, they still appear rather one sided and teacher centred: the focus remains on the actions teachers take to control student behaviour and quickly get responses to their demands without accounting for the students' role in affecting classroom management. To illustrate that it is a dynamic and interactive process that the teacher leads and takes responsibility for, but does not dominate and shape on their own, Wolff et al. (2016) provide the following working definitions of classroom management where actions teachers take are not informed by their fixed assumption of what effective learning looks like, but rather by the needs of students, which may change multiple times throughout the lesson and require constant adjustment of instruction.

Table 2. Definitions of classroom management as interaction between students and teachers

Author	**Proposed definition**
Wolff et al. (2016)	"observing students' behaviour, monitoring interactions between students, keeping up the pace of instruction, making snap decisions about how to intervene in classroom disruptions, and other pedagogical concerns" (p. 244)
Wolff et al. (2016)	observation of "relevant cues and events, mak[ing] sense of them quickly, monitor[ing] the progression of events, and ultimately mak[ing] effective pedagogical decisions based upon this informational intake" (pp. 245-246)

This gradual expansion of the concept of classroom management has been summarised by Brophy (2006) by identifying the following dominant approaches to understanding this concept (Table 3).

Table 3. Dominant approaches to the understanding and studying classroom management

Paradigm	**Main aim and focus**
Behavioural approaches	Focus on rules and routines in the study of classroom management as well as positive and negative reinforcement to manage behaviour (Landrum & Kauffman, 2013; Brohpy, 2006)
Process-outcome approaches	Engage in scientific (often experimental) study of relationships between classroom processes and student outcomes to develop more proactive evidence-based practices of promoting engagement and achievement rather than reactively controlling behaviour (Gettinger & Kohler, 2013; Brohpy, 2006)
Ecological approaches	Propose holistic study of the organisation of classroom life as a dynamic process that is context-specific, multidimensional and unpredictable, with many events taking place rapidly, simultaneously, and shaping the classroom environment as well as learning experience over time (Doyle, 2013; Brohpy, 2006)

The holistic approach to classroom life proposed by the ecological perspective has led to the expansion of the concept of classroom management to encompass a great variety of topics that cover various ways of creating good learning environments and turned classroom management into "a broad, applied topic that cuts across [various] disciplines and cannot be addressed adequately within them" (Brophy, 2006, p. 38). The recent compilation of topics that are considered by scholars as falling under the umbrella of *classroom management* appears in the Sage Encyclopaedia of Classroom Management (Scarlett, 2015) and covers such diverse areas as assessing and modifying learning spaces, monitoring and evaluating student progress, building student-teacher relationships, organising time and work, use of assistive technology and other ways of including students with special needs in classrooms, managing attention, dealing with disruptive behaviour, managing conflicts, and many more. In spite of what this extensive list may suggest, not everything happening in classrooms can be considered *classroom management*. While "[c]onfusion exists among practitioners and researchers alike about where instruction stops and management commences" (Duke, 1979 in Evertson & Weinstein, 2006, p. 14), since "effective instruction alone is insufficient for establishing universal classroom management" (Oliver, Wehby & Reschly, 2011), it is generally agreed that the study of *classroom management* analyses the creation of an environment conducive to successful instruction, but not instruction itself (Brophy, 2006). Empirical studies have also confirmed that "general pedagogical knowledge and classroom management expertise are two different constructs" (König & Kramer, 2016, p. 148).

Even though considering all of the topics that *classroom management* encompasses individually and developing evidence-based practices in each of them is important and continues to be done by studying and recommending effective ways of grouping students, giving instructions, assessing student work, etc., to truly account for the complexity of classroom life, ecological approaches also, crucially, acknowledge that the whole of effective classroom management is more than the sum of its component parts, and focus on the *interactions* between these elements as well as the need to "balance the demands of one topic or theme against the demands of other topics or themes" (Scarlett, 2015, p. xxxi). In other words, under this paradigm, researchers and practitioners attempt to consider, for example, not only the different ways of grouping students by introducing alternative seating arrangements but, when doing so, to also take into account how rearranging desks in the classroom and asking students to move around can affect attention, task focus and classroom order

as well as the management of lesson time and other relevant factors both in the short and long term given that the teacher's permission or encouragement of certain actions and interaction patterns communicates what is and is not allowed in the classroom and gradually shapes what its environment looks like. For this reason, "ecological view opens classroom research to a range of influences from fields such as sociolinguistics, cognitive anthropology, and educational sociology" (Evertson & Weinstein, 2006, p. 6), i.e. fields that analyse how contexts, environments, social structures and cultures are shaped over time by human interaction, and how human interaction is, in turn, shaped by the environment where it takes place.

One of the fields of study that emerged as a result of these sociological and anthropological influences in the second half of the 20th century was classroom discourse research. In its narrower sense, discourse studies focus on "language in use" (Wetherell, Taylor & Yates, 2001, p. 5) and, in particular, on its linguistic features, such as style or particular lexical units present in a text. The type of discourse analysis (DA) more common in classroom studies, however, tends to be more sociolinguistically or sociologically rather than linguistically oriented and focus on social meanings, for example cultural and socioeconomic backgrounds, and resulting attitudes, conveyed using language (Kress, 2011). An even broader understanding of the concept of *discourse* has emerged more recently with the development of theories relating to multimodal discourse analysis (MMDA), which propose that "language does not carry all the meaning in a communicative situation" (Kress, Charalampos, Jewitt & Ogborn, 2006, p. 178) and looks for how social meanings are encoded not only in verbal and written texts, but in a variety of other media used for communication: images, sounds, silences, gestures, postures and virtually any other material expression of meaning that can be observed, recorded and analysed (Kress, 2011). When understood this way, *discourse* permeates all classroom interactions: it is a means to give instructions, explain rules and expectations, as well as to follow or disobey them; verbal explanations, written notes, raised hands, smiles and frowns, arrangement of objects in the physical space, etc. all communicate certain meaning about how life in a particular classroom is organised and can, therefore, be studied using MMDA.

Today, classroom discourse studies have grown so all-encompassing that they have moved far beyond their early attempts of shifting from *prescribing* how teachers should conduct their lessons to *describing* how both teachers and students come together to create classroom environments (Tsui, 2008). Contemporary understanding of classroom discourse is associated with "multiple intellectual histories" (Warriner & Anderson, 2016, p. 9), only several of which have been discussed here, and its studies use "an eclectic set of theoretical and methodological approaches to the systematic study […] discourse" (p. 10) as well as "notions of context and contextualisation, questions of power, and increasingly discussed issues of embodiment, spatiality, virtuality, and complex ecologies shaping educational contexts" (p. 10). While some authors (e.g. Warriner & Anderson, 2016) still treat discourse analysis as a method of inquiry into educational phenomena, including classroom management, i.e. a methodological tool, others (e.g. Morine-Dershimer, 2013) consider classroom discourse studies and classroom management research two different research fields in their own right, with classroom management research focusing on explicitly developing more-or-less universally effective practices and programmes, and classroom discourse studies aiming at describing localised and contextualised implicitly developed routines to solve specific problems.

The focus on thick qualitative analyses and context-specific solutions to complex problems that classroom discourse studies propose may be growing in importance as educational environments

become more and more volatile and complex, for example, by larger-scale integration of students with special needs into general education classrooms or by more instructors teaching in hybrid mode and having to manage work in virtual and physical environments at the same time. In such cases, ready-made solutions for standard problems that have proven effective in traditional homogeneous classrooms may not be as relevant as they may have been. While generalised theory about what makes classroom management effective may provide coherence and "refuge from the chaos of informational and emotional overload" (Rosiek, 1994, p. 29) that teachers deal with when facing classroom conflict, it tends to oversimplify classroom life. It might, therefore, be more useful to think of management of this classroom life as a dynamic problem-solving activity rather than a learnt skill and study it as a complex context-specific narrative rather than a set of distinct teacher actions and practices, which is why Wolff et al. (2016) suggest defining **classroom management** not as a set of individual elements (e.g. time management, grouping, etc.) but **as a process consisting in "[observation of] relevant cues and events, mak[ing] sense of them quickly, monitor[ing] the progression of events, and ultimately mak[ing] effective pedagogical decisions based upon this informational intake"** (pp. 245-246), which is the definition that will be used in this study.

These elements of teacher decision-making process (observation/monitoring, interpretation and decision-making/action) that collectively shape a well-managed classroom have been studied in great detail over the years.

The importance of the first element - gathering information about what is happening in the classroom to make informed decisions - was acknowledged by classroom management theory in its early stages. Kounin (1970) was one of the first to label "continually monitoring classroom scenes to interpret and understand cues and events" (Wolff et al., 2016, p. 244) and gave this concept the title of *withitness*. As "the sense one makes of [a] particular moment [...] depends largely on which features of the classroom one notices" (Wolff, 2015, p. 8), teachers who fail to engage in constantly monitoring their students can rapidly lose awareness of their classroom and fail to intervene in time to keep it functioning. Empirical studies have also highlighted the role of continuously paying attention to students' actions and levels of engagement. In the experiment of Whitehill et al. (2014), cues such as head pose and facial actions (e.g. raised eyebrows or upper lip and closed eyes) helped instructors make reliable evaluations of student engagement while performing a cognitive task. Interestingly, the researchers found that "inter-observer reliability [was] maximised when the length of the observed clips [was] approximately 10 seconds. Shorter clips [did] not provide enough context and reliability suffered]. Longer clips tend[ed] to be harder to evaluate because they often mix[ed] different levels of engagement" (Whitehill et al., 2014, p. 96). This finding stresses the immediacy of the process and the importance of constant classroom monitoring throughout the lessons to accurately assess student outcomes as it shows that engagement can change very rapidly, possibly as often as every 10 seconds.

In such dynamic and complex environments, it is impossible to observe all events that take place. Chen (2003) points out that the way teachers make their observations of the classroom is not by taking in the entire scene at the same time as "high-resolution visual field of the human eye spans a visual angle of only two degrees" (Wandell, 1995 in Chen, 2003, p. 555); instead they jump from one student to the next in a rapid succession. Since instructors have to shift their attention constantly, they do not all observe the same information. Studies that compared different teachers', especially novice and experienced teachers', classroom management show that not only do teachers

interpret what they see and hear differently; they actually see and hear different things, e.g. eye tracking experiments show that experienced teachers jump between students more rapidly and frequently than pre-service teachers (van den Bogert et al. 2014 in Wolff et al., 2016). Therefore, not only the ways they process these data in their minds, but also the data themselves are not the same.

Like professionals in other fields, such as doctors and chess players, teachers also possess what is called professional vision and have the ability to seek out and monitor meaningful patterns in their domain (Reingold & Sheridan, 2011; Boshuizen 2009; Lesgold et al. 1988 in Wolff et al., 2016), their rich background knowledge also helps them to recall what they see better as they contextualise it immediately (Schempp et al., 1998 in Wolff, 2015).The more experienced the teachers are, the more targeted their vision is. Studies show that experienced teachers notice different facts in their observations (Rink et al., 1994, Doyle, 1977 in Wolff et al., 2016) and show efficient information reduction abilities and blocking out details which are not relevant in a specific situation (Carter et al., 1988; Haider and Frensch, 1996; van Meeuwen et al., 2014 in Wolff et al., 2016). While novice teachers' vision is not as targeted and may not always provide information that helps manage classrooms successfully, causing beginner teachers to fail to notice important details or misinterpret them, the ability to see and hear the students clearly can be even more important for them as they "must consider the potential impact of all available information, and actively search for it, because they have not yet developed the knowledge allowing for efficient and effective cognitive processing" (Boshuizen & Schmidt 2008; Haider and Frensch 1996 in Wolff et al., 2016, p. 245).

Teachers have different sensitivity to cues and events in the classroom not only due to experience, but also because of their beliefs, attitudes and other individual differences. Hunt (1976) described teachers' attention and adaptability to the changes in the students' needs and behaviour as s*usceptibility to student-pull*. Hunt's *student-pull* is made up of two variables: reading the students (awareness) and flexing to students (modulation). In the Adaptability Index that he developed, teachers' attitudes and behaviours ranged from *completely insensitive* to *modulating and exploring for more information from listener's frame of reference*.

While it is relatively agreed upon that more experienced teachers have a better idea of what information is relevant to attend to, it is not quite as clear what features of the classroom are essential to observe to make more informed and, subsequently, more accurate judgments. Dewan, Murshed & Lin (2019) cite several authors (Whitehill et al., 2008, 2014; Ekman et al., 2002; Littlewort et al., 2011, etc.) who have hypothesised that facial expressions are an accurate indicator of student engagement. Recent research has also analysed student engagement by observing their gestures and posture (e.g. Grafsgaard et al., 2013) and tracking their eye movements (e.g. Krithika & Lakshmi, 2016). While analysing isolated features, such as eye movements, is convenient when designing an experiment or testing automatic systems to recognise student engagement, when observations are made by human teachers, what appears to be more important to observe is not a particular objective event, but rather an event that the teacher in questions considers more valuable in the context where they are working.

All the above findings show that classrooms are environments where the flow of information that teachers need to process is constant and dynamic, and therefore requires constant attentiveness. As it is impossible to observe all classroom events and there is no clear consensus about what

classroom events are the most essential to observe to make accurate judgments about factors such as student engagement, teachers' experience and their judgment on what information is the most salient, where they expect to find it, encourages them to make choices about what they see, hear or otherwise perceive and will subsequently use to decide what action to choose.

As teachers gather data in the aforementioned ways, they process it to make decisions about actions they should take to promote student engagement, understanding or otherwise ensure that the classroom environment is conducive to learning. Calderhead (1981) defines teacher decision-making as "an information processing activity (e.g. McDonald, 1965; Shavelson, 1973; Shulman & Elstein, 1975; Peterson & Clark, 1978), where teachers identify problems, extract relevant cues from their environment, evaluate the pros and cons of different strategies and, selecting the relevant criteria, 'decide' upon the most appropriate action" (p. 52).

To make decisions, teachers must use their judgement, or "ability to infer, estimate and predict the character of events" (Hastie and Dawes, 2001, p. 48 in Brooks & Highhouse, 2006, p. 40). Brooks & Highhouse (2006) refer to the mechanism of situational judgment as being quasi-rational, i.e. combining elements of both intuition and rational analysis (Hammond, 1996 in Brooks & Highhouse, 2006). Kahneman (2003) defines the former type of judgement as "fast, automatic, effortless, associative, implicit (not available to introspection) and often emotionally charged," and the latter type of judgment as "slower, serial, effortful, more likely to be consciously monitored and deliberately controlled" (p. 698 in Milewski, Erickson & Herbs, 2021, p. 128). While it may appear from the definitions that in high-stakes environments, decisions would be made in a more careful and rational way, studies cited by Milewski, Erickson & Herbs (2021) show that experienced professionals in medical (Elstein et al., 1990), educational (Berliner et al., 1988) and criminal investigation (Brooks and Highhouse, 2006) contexts characterised by a high degree of ambiguity rely heavily on heuristics, i.e. mental shortcuts based on previous experience, to make decisions that achieve a desired result. Therefore, the majority of decisions teachers with solid prior experience make are made in automatic and implicit ways.

The studies summarised above present some of the features of the main elements of the classroom management process in traditional environments (Table 4).

Table 4. Elements of the classroom management process

Elements of the classroom management process	**Description and key features**
Observation/ monitoring classroom events	Information search performed by scanning the dynamic classroom environment to identify events, details (e.g. student gestures and poses) indicative of levels of engagement and other features of classroom activity relevant for making classroom management–related decisions
Information processing and interpretation	Pattern recognition and interpretation based on the teacher's background knowledge (including classroom management scripts), experience, beliefs, attitudes and expectations
Decision-making and action	Choosing the right course of action based on the interpretation of the events observed to preserve order, increase student engagement or achieve other classroom management–related goals, and implementing it

The following section will present the context of this study, namely that of the remote learning caused by the COVID-19 pandemic in the spring of 2020, and the changes this new setting brought

to how teachers saw, heard and otherwise interacted with their classrooms, to set the background for the empirical part of this study, which will analyse the practices teachers developed in the remote setting to build an environment conducive to learning.

1.2. Remote learning, its features and effects on classroom management

Remote learning that started in 2020 due to the global COVID-19 pandemic was conducted using the same tools that are present in what has traditionally been called distance education, online learning or e-learning by different authors. However, Russell (2020) suggests the use of the term remote learning to describe the context in question and points out that remote learning differed from all of the above as it did not allow for careful preparation of materials and tools in advance and relied on whatever resources were available. What is more, remote learning courses were no longer carefully structured and voluntarily chosen by students who chose to enrol due to their personal circumstances or preferences, such as improving work-life balance, avoiding unnecessary travel or due to other personal reasons. Russell (2020) also predicted that students, who did not voluntarily choose to study in such a setting, may lack the motivation, sense of responsibility or simply skills to structure their study process, as well as generally develop negative feelings towards the learning mode that was imposed on them. Apart from that, remote courses in this period were no longer designed and conducted by highly IT literate and well-prepared teachers enthusiastic about computer-mediated learning; they involved the overwhelming majority of students and teachers, who were bound to differ in their personality, skills, beliefs and computer literacy. In short, even though not completely unheard of, this situation of teaching remotely relying exclusively on ICT tools was a challenge for an overwhelming majority of teachers and students who attempted learning remotely for the first time.

While teachers who were only used to working face-to-face previously had to deal with a number of challenges described above, teachers who had previously taught traditional distance learning courses also faced difficulties. One of the fundamental differences between what had historically been referred to as distance learning or e-learning and the remote learning situation during COVID-19 pandemic was the number of synchronous meetings and communication that is included in the courses. Bower et al. (2014) observed that up until recently "remote students have tended to be supported in their learning primarily through asynchronous activities and resources such as recorded lectures, electronic documents, and discussion forums provided within a learning management system" (p. 261) and notice the increasing use of web and video conferencing or 3D virtual worlds. In the remote learning during COVID-19, however, this pattern was reversed, and the use of synchronous video conferencing became the dominant mode of instruction with asynchronous activities pushed into the background. This shift created remote classrooms with a high degree of diversity and ambiguity where constant classroom monitoring and adjustment based on cues and events observed was as relevant as in traditional brick-and-mortar education. However, research on how exactly teachers achieve their classroom management goals remains very scarce. Wigham and Satar (2016) go as far as to say that research on certain aspects of this process, such as instruction-giving practices in synchronous online contexts, is "non-existent" (p. 70). So, in essence, regardless of whether they had experience with distance/e-learning prior to COVID-19 pandemic, most teachers found themselves in equally challenging circumstances during the remote learning in 2020.

In order to fully understand the challenges teachers faced, it is important to note that the sudden shift to teaching remotely affected all aspects of classroom life on the most fundamental level.

While traditional studies of classroom management assumed that teachers and students shared the same space, or that teachers could see and hear their students, such basic assumption could no longer be taken for granted in remote learning, and many teachers found their mental models they relied on to make classroom management decisions to have become obsolete overnight. Studies that were carried out to see how teachers and instructors managed to understand what was happening in their remote learning classrooms during the COVID-19 pandemic and act accordingly reported that teachers found it difficult and often impossible to perceive students' emotional and cognitive signals and adjust their teaching accordingly (Yarmand et al., 2021). Six out of seven experienced instructors in the study conducted by Yarmand et al. (2021) highlighted "limited understanding of students in their classes, because they did not share their videos and audios" with one of them describing these feelings as "talking into a void" (p. 3). They also reported failure to "identify[y] specific types of cues that they needed to understand their students: engagement and confusion" (Yarmand et al., 2021, p. 3), inability to "read their classrooms and understand students' changing needs in real-time, since their students appear as only a grid of black rectangles" (Yarmand et al., 2021, p. 2).

While teachers appear to have been expecting to obtain very similar information to manage their teaching successfully in remote classrooms as they did in physical ones, in this new context, students were given the tools that enable them to choose whether they wished to share this information, including their image and audio, or not. This put teachers in a rather different position to that they used to occupy in a traditional classroom (in terms of the control and authority they held) as the tools of classroom management that they used to take for granted were no longer available. Faced with this new setting, teachers chose different approaches: while some continued to insist on obtaining similar visual and auditory information as they did in physical classrooms (e.g. by requesting that students turn on their videos and cold-calling them to answer questions (Yarmand et al., 2021)), others acknowledged that this new environment significantly reduced or altered input they were used to receiving and chose to adapt to the new environment and allow students to use the options of engagement that the virtual environment supported, such as asking them to type answers or opinions in the chat or using the polling feature to give short quizzes.

One reason why teachers were reluctant to cold-call students or require that they have their cameras on at all times was, potentially, their intuitive understanding that this visual and auditory input, which appeared to be relatively similar to what they hear and see in traditional classrooms, was, in fact, fundamentally different in subtle but critical ways.

The first of these differences is that being observed by the teacher in the classroom produces a significantly different psychological effect on the student than having a camera pointed at one's face, which appears to be an anxiety-provoking experience and has potential to significantly alter behaviour. MacIntyre & Gardner (1994) illustrated this when they chose to use a video camera as an anxiety-inducing technique in an early experiment analysing the effect of anxiety on the input, processing and output stages of foreign language vocabulary learning. A camera was introduced during a vocabulary learning task and the participants reported that their anxiety significantly increased as a result, which, in turn, affected their immediate performance. It should be stressed, however, that the researchers conclude that "the subjects eventually were able to cope with the state anxiety aroused by the camera. The groups did not show differences in their levels of anxiety and they did not differ in performance either" (MacIntyre & Gardner, 1994, p. 15).

While anxiety induced by being filmed may not have produced long-term effects on learning and retention in MacIntyre & Gardner's study, it did affect students' anxiety levels and behaviour, which is what teachers observe to make classroom management decisions. In a later study, Steinberg and Horwitz (1986) also made use of an audio recorder and a video camera, coupled with 'brusque', 'cold' and 'formal' treatment of students in order to examine the effects of environmentally induced anxiety by "foster[ing] a stressful environment" (p. 132). As they expected, the researchers found that the number of interpretative, as opposed to denotative, descriptions of images given to students was lower in the anxiety group, which suggests that the lack of friendly and encouraging attitude the teachers/examiners as well as the presence of recording equipment were responsible for the difference in results and encourage students to talk less.

Schoenenberg, Raake & Koeppe showed (2014) that the abovementioned factors, namely being recorded and treated formally or brusquely, not only cause negative feelings when they co-occur, but one can serve as a cause for another. That is to say, certain features of ICT used for video-conferencing can create an impression of the interlocutor's (albeit the teacher's or another student's) inattentiveness or hostility and thus cause anxiety not only directly, when the speaker is filmed, but also indirectly, when he/she perceives unfriendly and unsupportive attitude of peers and teachers due to the peculiarities of the software in use. Schoenenberg's et al. experiment measured the "misattribution of the technical impairment delay to personality and behaviour-related attributes of the conversation partners" (p. 477). Their findings suggest that being so used to immediate real-life communication, people tend to interpret the signals and problems in distance communication the same way they would face-to-face, often failing to notice and account for technical impairments. Therefore, delayed reactions, in reality caused by poor internet connection, tend to get attributed to the interlocutor. In the experiment, Schoenenberg et al. asked their subjects to rate not only the quality of their video call but also their interlocutors and found that in instances of such delayed reactions, there was a trend to rate the person on the other end as less attentive, also "tired, not listening for a moment, insecure or mentally slow" (p. 477) as well as "less friendly, active, cheerful, self-efficient, achievement-striving, and self-disciplined" (p. 485). The transmission delays (one-way) did not exceed 1200 ms, which suggests that even when they are nearly imperceptible, such delays can cause perceptions of unsupportive environment and negative social evaluation, which, as discussed previously, can be a major anxiety-triggering factor. This once again highlights the problem of inability to rely on one's intuition and existing mental models to decode computer-mediated signals.

While it may appear that with the growing presence of technology in everyday lives, such psychological effects of recording equipment would have reduced significantly, recent evidence shows that being placed in front of the camera is as uncomfortable now as it was in the 80s. Students and teachers continue to perceive remote classrooms as formal contexts where joking and informal conversation do not belong (Yarmand et al., 2021); students report feeling self-conscious and uncomfortable even when taking notes or eating in front of the camera and report feeling that they might distract others if they moved around while researchers observe that "eating and taking notes are common activities in physical classrooms" (Yarmand et al., 2021, p. 5), let alone moving around once in a while. Students report feeling self-conscious about their appearance on camera and concerned about other people being seen behind them (Castelli & Sarvary, 2021). The term Zoom fatigue has recently been coined to refer to the detrimental effects of the cognitive load imposed on

participants by constant online meetings (Fauville, Luo, Queiroz, Bailenson & Hancock, 2021), which is affected by a number of factors, such as being exposed to a digital mirror for a prolonged period of time, feeling trapped due to inability to move away from the screen and hyper gaze (i.e. constantly having direct eye contact with others).

Apart from being placed in front of the camera, other features of remote learning also contribute to changes in student behaviour. For example, inadequate familiarity with ICT tools used for communication can cause techno-stress and cognitive overload (Lamy & Hampel, 2007). Therefore, in remote classrooms, students can appear confused or frustrated not because of the content of the class and the way it is being delivered, but due to a variety of technical difficulties that can occur during the course of the class or lecture (Hara & Kling, 2003 in Tuncay & Uzunboylu, 2010; Sotillo, 2006 in Wang & Chen, 2007).

In addition to psychological and technical considerations, features of this environment carry particular social meaning as they are associated with formal contexts. Being recorded and communicating in a written chat are associated with formal interviews or tests, and thus make students act and speak in less natural ways for a classroom setting. Elliott (2020) points out that processes in online environments, even things as mundane as asking a question, may require an email or message, i.e. the use of communication channels which are normally dedicated to bigger issues (Molnar, Kearney & Molnar, 2017 in Elliott 2020). Students may, therefore, choose to stay silent and not voice their questions if they deem them too trivial for the setting.

In short, this new context created a significant number of obstacles when transmitting and interpreting messages that ensure effective interaction to the point that certain scholars venture to call it “a bio-social crisis” affecting “the fundamentals of our sociality” (Mondada et al., 2020, p. 442). Rothwell (2004) classifies these obstacles, commonly referred to as communication noise, as physical (e.g. equipment malfunction interfering with communication), physiological (e.g. distraction due to increased anxiety), psychological (e.g. preconceptions arising from existing mental models which are no longer accurate) and semantic (e.g. misunderstandings arising from failure to understand the words or meaning of the message), all of which can be identified in the challenges teachers faced in remote classrooms. As cues teachers could rely on were significantly reduced and/or distorted, they could no longer be certain of the meaning of messages they received and subsequently could not choose the course of action intuitively. This absence of certainty about the correct interpretation of signals received tends to instigate a co-construction of meaning with others to create new mental models. As this process relies heavily on one’s interlocutors or counterparts, it requires high frequency feedback (Kasper, Légaré, Scheibler & Geiger, 2012).

CMC scholars who analysed mediated communication (including video conferencing) prior to the pandemic, had already come to similar conclusions, namely that the lack of non-verbal, social and emotional cues over virtual communication media can result in increased instances of misinterpreting messages, emotion and intentions. However, the set of theories that use the absence of physical and social cues as their basic argument for highlighting the inferiority of CMC compared to face-to-face interaction (commonly referred to as cues-filtered-out-theories) (e.g. Sproull & Kiesler, 1991) are not the only way to view interaction patterns in computer-mediated communication.

Another set of theories, referred to as adaptation theories, consider how people interact with, creatively expand or make use of the limitations, rules and resources in CMC systems to achieve their goals and prefer to see the lack of embodiment in remote learning environments "as a design challenge, rather than a principal constraint of distance learning" (Ward, 2018 in Shvarts & van Helden, 2021, p. 2). The capabilities and limitations of CMC technologies that cause said design challenges are referred to as affordances (Gibson, 2014). While adaptation theories explicitly recognise that CMC is devoid of the nonverbal communication cues that accompany face-to-face communication, they refrain from claiming that the reduced number of paralinguistic cues impedes communication. Instead they suggest that individuals adapt their mechanisms for encoding and decoding messages to fit into the constraints of the medium they are using (Walther, 2011).

Table 5. Key elements of the classroom management process and their features in face-to-face and remote instruction

Stage	**Description and key features in traditional face-to-face learning**	**Associated challenges and features in remote computer-mediated instruction**
Observation/ monitoring classroom events	Information search performed by scanning the dynamic classroom environment to identify events, details (e.g. student gestures and poses) indicative of levels of engagement and other features of classroom activity relevant for making classroom management–related decisions	Many of the essential cues vanish with students becoming a "grid of black rectangles" (Yarmand et al., 2021, p. 2).
Information processing and interpretation	Pattern recognition and interpretation based on the teacher's background knowledge (including classroom management scripts), experience, beliefs, attitudes and expectations	- Mental models relying on a constant flux of sensory input are challenged and teachers struggle to interpret the levels of student engagement, understanding and other relevant patterns. - Construction of new mental models more relevant in this context is challenged by the absence of high-frequency feedback.
Decision-making and action	Choosing the right course of action based on the interpretation of the events observed to preserve order, increase student engagement or achieve other classroom management–related goals, and implementing it	- Students are provided with the tools (and often the right) to withhold the signals required by teachers to make decisions thus challenging traditional classroom roles. Therefore, asking to turn video and audio on and off becomes a way to regain authority and sensory information needed to make decisions for some teachers. Others, however, prefer to use alternative ways to gather responses (e.g. polls, chat and quizzes) due to being conscious of the anxiety caused by being placed in front of a camera, zoom fatigue and other factors that can render student behaviour seen on camera more misleading than helpful. - Many of the embodied classroom management-related actions (e.g. standing up, walking around the classroom, etc.) are no longer possible in their familiar form and their equivalents in the new environment need to be found and added to the repertoire of actions and practices the teacher is able to apply.

Against this background, the purpose of this study is to develop an understanding of emerging classroom management practices and tendencies in the context of remote learning, characterised by different affordances and ways to make meaning.

2. Research methodology

This part of the work outlines the methodology of the research in the following sequence: the first section titled *Research Design* introduces the overall logic and structure of the research study. The second section focuses on the *Data collection* method chosen, and the final section presents and justifies the methods of *Data analysis*.

2.1. Research design

The empirical research methodology of this project was developed on the foundation of the notions of the interpretivist philosophy that studies human-created meanings, does not seek to obtain data about the social reality as if it were independent of the researcher and acknowledges that scientific construction of reality necessarily entails deformation of said reality, which at the same time does not automatically mean deformation of the truth (Santos, 1987 in Pires, 1997).

This paradigm almost always leans towards an inductive research approach, where facts are not treated as secondary to the initial ideas they are used to support, and are instead approached as a research subject themselves using them to generate ideas and interpretations (Durkheim, 2001 in Valantiejus, 2012).

To choose a more specific research strategy and methods, previous studies into classroom management were first reviewed to identify and evaluate methods and strategies commonly used in them.

Approaches and methods used to study classroom management practices have differed greatly over time (see 1.11.1). However, Brophy's (2013) historical review of classroom management research shows that "observation has been the most consistent and important data collection procedure for classroom management research" (Morine-Dershimer, 2013, p. 130). Based on this fact, the same author suggests that "[t]he research approach most likely to pay off […] [in future studies] probably will be the same one that has yielded the richest sets of findings […] [so far]: identifying teachers who handle […] challenges most successfully and then observing and interviewing them to identify the policies and principles that appear responsible for their success" (Brophy, 2006, p. 39).

While initial classroom observations were conducted by the observer physically present in the classroom and taking notes of the unfolding events, this direct method made it difficult to capture all minute and simultaneously-occurring detail to produce rich and reliable analysis. Today's technology allows for ways of gathering more precise naturalistic observational data, in particular, "video offers a means of close documentation and observation and presents unprecedented analytical, collaborative, and archival possibilities" (Derry et al., 2010, p. 5). While recordings for the video-based observation research are often made by researchers themselves, "[t]he use of existing videos as data is increasingly common for research […] [and includes] broadcast media (Chouliaraki, 2006), automated CCTV recordings (Goodwin, 1994), and YouTube videos (Adami, 2010)" (Jewitt, 2012, p. 3). This study will also employ video-based observational data in the form of existing recordings of remote lessons retrieved from the YouTube online video sharing platform where they had been uploaded by teacher who recorded them. This data collection strategy was chosen because the data collection was conducted in autumn of 2022, when most schools in Lithuania (where this study was carried out) had already returned to face-to-face instruction, and

institutions planning to reintroduce distance/online or hybrid learning into their set of instruction modes offered were still at the stage of developing policies and practices, and preparing for the second wave of implementation; therefore, direct observation or recording of remote lessons was not possible in natural settings.

Multimethod approaches, such as pairing observations with subsequent interviews or surveys (as suggested by Brophy (2006)), is a common approach in qualitative research aiming at in-depth understanding of a particular phenomenon as these methods generate different data sets and can use different analysis techniques, which help ensure triangulation and, supposedly, increase reliability and validity of the conclusions drawn by the researcher. However, while combining different methods "can add range and depth […], [it does] not [add] accuracy" (Fielding and Fielding, 1986 in Blaikie, 1991, p. 117) and, in fact, can be rather detrimental to the quality of the study. One of the reasons why is the fact that surveys and interviews rely on the assumption "that participants have privileged insight into the social interactions of which they have been a part" (Jewitt, 2012, p. 9), which is often questionable. Therefore, researchers tend to tailor their interpretations to converge with interpretations of the participants when, in fact, "lack of convergence [of interpretations of data by different social actors or groups] may reflect legitimate and different views of reality, or the habitation of different social worlds" (Blaikie, 1991, p. 123). In other words, researchers' interpretations of the events they observed and the memories or interpretations of the same events by their participants are equally valuable, but should not be expected to reinforce each other, and differences between them cannot be used to attribute bias to any method. For this reason, in this study it was decided to apply a single-method approach of data collection and analysis.

Another reason why following Brophy's (2006) suggestion of complementing observations with teacher interviews and surveys may not be applicable for this study is the fact that the literature review showed that teacher situational judgment is a largely implicit and quasi-rational process (Brooks & Highhouse, 2006), which suggests that teachers who make and implement classroom management decisions may not be completely aware of how and why they make the decisions that they make and may not be able to articulate their implicit reasoning. Asking teachers to justify actions and decisions that they had already made and the researcher observed may also feel like an attack or criticism of the teacher's judgement or competence, especially considering the novel context which is studied and lack of teacher preparation for it. For this reason, it was decided to use discourse analysis (DA) to approach the observational data as this method has a long history of application in educational research (see 1.1), but is, crucially, "scrupulous in ensuring that [it does] not imply that individual speakers intentionally use discourse in particular ways" (Harper, 2007, p. 56). While it can be assumed that in this new context the teacher is trying to co-*talk into being* an environment conducive to learning where needs of participants and classroom management-related topics are in balance, they are not necessarily doing so in a premeditated, rational and intentional way.

As previously explained in the literature review (see 1.1Definition, features and process of classroom management in traditional environments), DA uses a broad and "eclectic set of theoretical and methodological approaches to the systematic study […] discourse" (Warriner and Anderson, 2016, p. 10). While some of these approaches focus on written texts, this study will mainly employ a method of conversational analysis (CA), which studies talk in interaction, and expand it with also performing the analysis of embodied resources, such as gestures and use of artefacts in line with the current trend in discursive studies to account for how meaning is made

through a combination of modes. This data analysis method will be described in more detail in section 2.3.

The final point important to consider before concluding this section aimed at explaining the logic and design of the study are the criteria used to assess its quality considering that some of the widely-accepted methods used to increase the trustworthiness of research studies will not be applied here. The absence of one such technique, namely, triangulation, to ascertain the validity and reliability (i.e. the accuracy and consistency of the findings respectively) has already been explained earlier in this section. Instead, the study will aim at meeting the criteria summarised by Harper (2007) as follows: "[r]eaders of good quality discourse analyses often comment on their internal coherence (they tell a good clear story), which have face validity (it resonates with them), which also offer new theoretical insights and generate fruitful further questions" (p. 55). In short, the study will attempt to use discourse analysis as a "rigorous way of directly studying human practices" (Potter, 1998, p. 139 in Harper, 2007, p. 56) in order to provide a possible reading of the situations studied (one of many) (Harper, 2007) and do so transparently by reporting the data so that readers can judge the interpretations for themselves without transforming it "into inferred mental constructs (e.g. 'personality', 'beliefs' or 'attitudes')" (Harré, 2004 in Harper, 2007, p. 55), or labelling isolated classroom management topics, such as 'giving instructions', in the case of this study. This resistance to mechanistic treatment and introduction of coding instruments, and proposal instead to approach the data with sensitivity, and struggle with it in search of insight into the organisation and order of the particular interaction (ten Have, 2007) should not be viewed as limitation of the study as they are an inherent feature of CA as a method that ten Have (2007) summarises as follows: "[t]he basic reasoning in CA seems to be that methodological procedures should be adequate to the materials at hand and to the problems one is dealing with, rather than them being pre-specified on a priori grounds" (p. 1).

2.2. Data collection

As already explained in the previous section, data to be analysed in this study was obtained from YouTube online video sharing platform. The main factor influencing its choice was convenience as these were some of the few full-length recordings of remote lessons available for the public to access at the time of data collection. As Derry et al. (2010) note, there are two may types of logic for selecting video clips for research in learning sciences, namely "to locate and analyse data for the purpose of finding patterns within and across events" and "to use video clips more holistically to support an evolving narrative" (pp. 14-15). To observe emergence and development of classroom management practices in this new context, this study will lean towards the latter, and therefore it was decided to choose recordings of lessons with the same teacher and students covering the first semester (the three initial months) of remote learning: March-May of 2020 (one for each month) without pre-established requirements for their content.

The three videos analysed in this study were recordings of online mathematics (Advanced Placement Calculus) lessons taken from the YouTube channel created by mathematics teachers at a secondary school located in the United States, in the state of California. Background document analysis[1] also revealed that the teacher is a very experienced one, having worked in this school

[1] www.wscuhsd.org; https://www.facebook.com/ElMolinoHS/?ref=page_internal

teaching mathematics since 1999. Further inquiry into the context of the interactions, e.g. the state's educational system or the school, was not performed since it is generally accepted that "CA limits inferences to what can be validated by reference to what is observable in the discourse being analysed" (Hammersley, 2002, pp. 1–3). The total number of participants of the course is never clear: some of the recordings seem to be tutorials with only several students present, but in one of the recordings the teacher wonders if she would be able to see all participants at once in a regular class since, from her experience, the maximum number of participants visible on Zoom is 60, which suggests that the entire class could be as large as that. As mentioned previously, recurrent themes of final exams and several students who are present in all three recordings indicate that the group and content of the course are the same throughout the three recordings, which provides some control over the variables and allows to compare the teacher's behaviour across the recordings and see them as a continuum. Students in this course are referred to as seniors (with some juniors also taking the course), which makes their age 17-18.

The first remote class of this course took place on March 24, 2020, which is also the first recording analysed. The second recording of 22 April was produced four weeks after the start of remote learning. The final recording of 20 May was recorded another four weeks later. All students had worked with the teacher in a physical environment before the quarantine started. Although it is not immediately clear from the beginning of the analysed extract, students are informed that they are recorded by the teacher so that they can revisit the lesson in the future if they need to.

Table 6. Date and duration of the recordings analysed, and participants present in them

Category	**Recording 1**	**Recording 2**	**Recording 3**
Date	24 March, 2020	22 April, 2020 (R1+four weeks)	20 May, 2020 (R2+four weeks)
Duration	42.43	36.32	18.24
No of participants	Seven	16 (visible on zoom screen), but certainly more	15 (visible on zoom screen)

The fact that the students are aware of being recorded and the fact that recording will be uploaded onto the YouTube platform does not, however, necessarily mean that they (or the teacher) automatically accept that their voices and images will be used for research, which can raise certain ethical concerns.

2.2.1. Ethical considerations of the data collection methods used

One of the most important ethical principles in human subject research is informed consent. In theory, it means that whenever human subjects take part in the study, they "should know that they are being researched, receive relevant information on the planned research in a comprehensible format, and should then voluntarily agree to participate, or decline to do so" (Legewie & Nassauer, 2018, p. 7). In case of observational research, strictly adhering to this principle should not allow the existence of covert naturalistic observations at all. However, when research ethics are viewed as a continuum instead of a set of rigid rules, failing to obtain informed consent does not always render the research unethical if by doing so researcher collects data that "offer unique opportunities for studying a given phenomenon" (Legewie & Nassauer, 2018, p. 8). Some scholars suggest that, on the contrary, if a researcher abandons a project that could offer unique insights into an issue for the sole reason of failing to obtain informed consent where it is difficult to obtain or where asking for consent may compromise the scientific value of the study, dropping a project altogether might in

fact be an even more unethical decision (Salganik, 2017 in Legewie & Nassauer, 2018) and in such cases "conducting the research despite lack of consent may be the more ethical option, given that potential benefits outweigh possible risks" (Legewie & Nassauer, 2018, p. 8). In the case of this study, the two recordings of remote lessons organised using Zoom videoconferencing software were recorded in April-May of 2020 by teachers and were available to the public on YouTube at the time when data were collected for this study. As mentioned in the previous section, the data collection for this study took place when large-scale emergency remote learning had already been revoked in most schools and direct observation and recording of remote lessons was no longer possible in natural settings. As a result, refusing to continue the research using historical data without informed consent of the participants would have put an end to the study altogether. Attempting to identify and trace all people recorded and contact them to obtain consent was deemed virtually impossible as the majority of students recoded in the videos (who were in the final year of study at the time of recording) would have graduated school at the time this study was conducted and would therefore be extremely difficult to reach.

Even without obtaining the participants' consent, disguised naturalistic observations are generally considered ethically acceptable "if the participants remain anonymous and the behaviour occurs in a public setting where people would not normally have an expectation of privacy" (Jhangiani, Chiang, Cuttler & Leighton, 2019, p. 169). At the time of data collection, the videos used in the study were publicly available online without registration, joining a private group or other restrictions that legally require obtaining consent to use the data (Rat Marktforschung, 2014 in Legewie & Nassauer, 2018) and had collected up to 400,000 views (numbers varied depending on the video). It is assumed that the user who uploaded the data had the consent of the persons filmed to do so.

However, while the teacher who recorded the videos must have obtained consent from the participants (or parents in case of minors) to upload the video on YouTube, there is no way to be sure what type of consent was obtained and if it involved allowing to reuse the data for future research. As the teachers who uploaded the videos did not clearly indicate what the data could and could not be used for, it was decided to treat YouTube as the data provider and observe the limits placed on the use of data by it. According to YouTube Terms of Service, by uploading their content on YouTube, users grant "non-exclusive, royalty-free licence to access [their] Content through the Service, and to use that Content (including to reproduce, distribute, modify, display, and perform it) only as enabled by a feature of the Service" (YouTube, 2022). In case the videos were removed by the author from the Service in the future, where screenshots were used in analysis, reasonable steps were taken to anonymise participant data by following Guichon's guidelines (2017), but otherwise the Terms of Service did not appear to include any indication that the rights of the participants of the study would be violated in any way by using the recordings for the research.

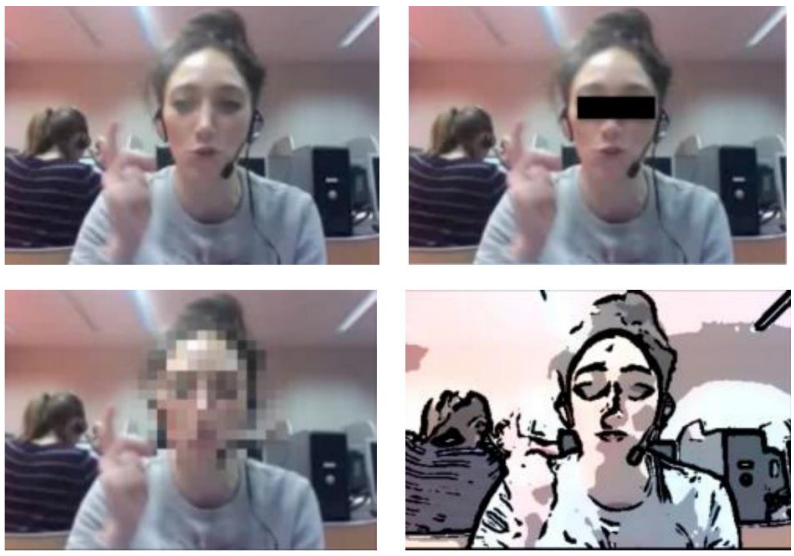

Fig. 1. Guichon's ways of anonymising participant data (2017, p. 63)

In case of educational settings, informed consent may be dispensed with to conduct observation research in order to study "normal educational practices, curricula, or classroom management methods conducted in educational settings" (Jhangiani, Chiang, Cuttler & Leighton, 2019, p. 68) as opposed to targeting individuals or identifiable groups as long as the "research would not reasonably be assumed to create distress or harm" (Jhangiani, Chiang, Cuttler & Leighton, 2019, p. 68). Since the aim of this study was to analyse a general phenomenon and not behaviour of specific individuals, this condition also appears to have been met.

Finally, while many researchers would likely classify analysing videos with people appearing in them as 'human subject research', institutional review boards of universities that have developed clear guidelines on the subject argue that the type of data that were used in this study do not, in fact, constitute human subject research. The IRB of the University of Iowa, for example, states that "[o]bservational studies of public behaviour […] do not involve human subjects [...] when there is no intervention or interaction with the subjects and the behaviour is not private. Also, studies based on data collected for non-research purposes may not constitute human subjects research if individuals are […] identifiable but [the data] are also publicly available […]. However, the term "publicly available" is intended to refer to record sets that are truly readily available to the broad public, such as census data, or federal health, labour, or educational statistics" (Human Subjects Office of the University of Iowa IRB, n.d.).

2.3. Data analysis

As presented in the earlier sections, this project will study the classroom management process as it appears in the recordings produced during the transition to remote learning by using discourse analysis.

According to Wooffitt (2005) DA, and its related field, conversational analysis (CA), reflect and develop the concerns of ethnomethodology. Pioneered by H. Garfinkel (1967), ethnomethodology makes sense of social action by analysing "the participants' use of tacit, practical reasoning skills and competencies" instead of "'rules' or norms of behaviour which we could consciously articulate, or on which we would routinely reflect" (Wooffitt, 2005, p. 73).

Wetherell, Taylor and Yates (2001) define discourse analysis as a "close study of language in use" (p. 5), which has been used to research classroom events in the fields of education, sociology, anthropology, applied linguistics, psychology and others since the 70s and aims to expand the understanding of how teaching is shaped by communication in the classroom and by events external to the classroom, and seeks to provide empirical observations and pedagogical suggestions for teacher education (Jenks, 2020). By studying classroom discourse, researchers can gain insight into classroom management practices, such as "rules and routines that are implicitly followed by both teachers and pupils" (Morine-Dershimer, 2013, p. 129), which they would not necessarily be aware of or be able to verbalise. Therefore, this research strategy focusing on the often "seen but unnoticed" (Garfinkel, 1967) often provides an alternative to interviews and surveys that record only what the respondents are aware of and can articulate.

While discourse analysis works with texts (written or spoken) at a broad level and looks at their structure and organisation, themes, metaphors or figures of speech appearing in them (Wooffitt, 2005), conversational analysis (developed in the 60s and 70s by Sacks in collaboration with Schegloff and Jefferson) examines interactions of speakers much more closely and is able to grasp much finer detail as well as examine "how participants manage interaction as it proceeds" (Wooffitt, 2005, p. 79) and makes it possible to analyse "reasoning […] involved in understanding and producing courses of intelligible interaction, […] speaker[s'] […] own behaviour and [letting them] understand and deal with the behaviour of others" (Heritage, 1988, p. 128). Conversational analysis typically focuses on the following areas.

1) Organisation of turn-taking (alternating between speakers' contributions to a conversation), e.g. their timing, overlap, lapses in conversation, ways for next speaker to be selected and announced;
2) organisation of longer sequences, e.g. pairs of offer-acceptance/refusal, question-answer, etc.;
3) organisation of repairs (who, when and how resolves the problems in speaking, hearing, or understanding);
4) formation of action (e.g. giving instructions, getting students to do what the teacher wants them to do and otherwise *talking the talk* (Seedhouse, 2008)).

While initial studies of conversational analysis studied audio recordings and focused mainly on verbal interaction, the increasing presence of video recording equipment that makes documentation of everyday practices possible has led scholars to observe that human interactions are in fact shaped not only by what is said, but also, crucially, by the use of a variety of paralinguistic and non-linguistic resources, such as gaze, facial expressions, gestures, movements as well as creative application of a virtually infinite number of artefacts, such as diagrams, maps, physical objects or even furniture (Nishino & Atkinson, 2015 in The Douglas Fir Group, 2016). This reviewed outlook towards communication has led to a less logocentric conception of language and communication, and attempts to include embodied conducts into video transcription conventions to create multimodal transcripts with rich data documenting meaning created using a variety of resources. In extracts analysed using multimodal conversational analysis techniques, talk was transcribed using Jefferson's (2004) conventions and multimodal annotations follow Mondada's (2018) conventions (Appendix 1).

Since stretches of interaction analysed using CA are generally up to a minute in length, the fine level of detail CA engages in is impossible to maintain in the analysis of longer interactions.

Therefore, the three recordings will first be analysed using more generic discourse analysis to identify the general structure of each lesson and learn about the progression of the course evident from the three recordings. It will give an overview of the patterns and themes present in the teacher's style of classroom management and the evolution of their classroom management process across the three recordings.

The second stage of analysis will take a deeper look at the interactions identified in stage 1 as particularly impactful to the overall organisation of the course where adoption of new or abandonment of the old classroom management practices takes place. Following their transcription, a data driven analysis of how classroom management is accomplished in interaction will be performed. The analysis of how actions are produced in situ, how they are interpreted by the participants of the interaction as they happen and how they are repaired or accounted for will give an understanding of the emerging tendencies and trends in the process of managing a remote classroom.

3. Results

3.1. Overview of the recordings

The first recording of 24 March is the very first remote lesson of this course after the break the students had. It is, therefore, very rich in spontaneous discussions about the pandemic; a large share of the time is also dedicated to trying out various features of Zoom. In this first class, the students talk by far the most compared to other recordings (with approximately 14.08 minutes of student talking time amounting to around 1/3 of the total duration of the recording). The recording starts with one student's exclamation 'Oh yay!' and everyone's laughter, and is overall characterised by a lively and open atmosphere and conversation. The summary of the stages of Recording 1 are provided in Table 7.

Table 7. Stages of the first remote lesson (24 March, 2020)

Time	Description
00.00 - 4.45	Teacher answers a question about an assignment one of the students asks before the recording starts
4.45 – 5.55	Determining if students can see shared screen and teacher's writing on a board
5.55 – 7.08	Discussing homework submission
7.08 - 10.32	Answering a student's question (demonstrating a solution to the problem the teacher had worked out previously)
10.32 - 19.12	Answering another question (spontaneously solving a problem) – interrupted by discussions about how to make the teacher's image more visible
19.12 - 24.15	Experimenting with the 'raise hand', 'thumbs up' and chat functions
24.15 - 25.30	Teacher answering another question from a student
25.30 - 26.23	Students' discussion about their final day at school before the quarantine and graduation
26.23 - 32.58	Teacher answering another question from a student (cont.)
32.58 - 34.19	Answering questions about project submission
34.19 - 34.45	Discussing future class schedule
34.45 - 36.35	Teacher taking time to read an email and students discussing their quarantine experience
36.35 - 37.40	Discussing future class schedule (cont.)
37.40 - 38.10	Students sharing their experiences of the pandemic
38.10 - 38.50	Suggesting some solutions to problems related to remote learning students raised
38.50 - 41.01	Discussing future class schedule (cont.) and the purpose of next class
41.01 - 41.50	Students discussing other classes
41.50 - 42.43	Conclusion

The second recording is somewhat an antithesis of the first. The number of students is much larger than in the first recording and the lesson starts with recording attendance, which is then followed by a teacher's monologue lasting almost 30 minutes. The teacher also follows a clear plan she has written down to avoid deviations. Following that, the students who do not have questions are allowed to leave while others stay to have their questions answered. The atmosphere in this recording is much more formal, structured and business-like compared to the first one.

Table 8. Stages of the second lesson (22 April, 2020)

Time	Description
00.00 - 02.24	Checking attendance and talking about course organisation related matters
02.25 - 04.15	Discussion about students' future plans after graduation
04.18 - 05.22	Encouraging students to regularly check their email inboxes
05.22 - 11.02	Sharing exam preparation materials and giving some tips for the exam
11.02 - 12.06	Offering additional support
12.07 - 13.26	Talking about the plan for future classes
13.31 - 14.40	Reminding students about the time and date of the exam
14.40 - 24.10	Reviewing/explaining the tasks students had to complete
24.10 - 25.18	Encouraging students to come to 'office hours'
25.18 - 27.14	Discussing future assignments
27.14 - 28.00	Concluding the class for students who do not have any questions
28.00 - 35.10	Answering remaining students' questions
35.10 - 36.23	Inviting students to ask extra questions that would be answered later during office hours
36.23 - 36.32	Conclusion and goodbyes

To complete the narrative, the third and final recording provides a synthesis of the other two: the teacher invites students to share some of their experiences of the exam they took, there is much more dialogue in this recording compared to the previous one, but students no longer share their experiences unrelated to the course as they did at the beginning of the remote lessons; albeit warm, the interactions are shorter, more efficient and to-the-point.

Table 9. Stages of the third lesson (20 May, 2020)

Time	Description
00.00 - 0.28	Introduction (describing the purpose of the class)
0.28 - 2.50	Discussion about a recent exam
2.50 - 4.38	Planning the next class
4.38 - 5.30	Discussing future plans of students after graduation
5.30 - 8.35	Planning the next class (cont.)
8.40 - 8.49	Conclusion and invitation to ask questions
8.49 - 13.25	Questions from students about submitting assignments
13.26 - 13.40	Planning the next class (cont.)
13.40 - 16.45	Questions from students about submitting assignments
16.45 - 17.50	Planning the next class (cont.)
17.50 - 18.24	Conclusion and goodbyes

One theme that emerges from this overview of the structure of the recordings is the process of how the teacher faces the mild chaos that occurs during the first class in this new format and progressively (re)builds her authority, imposes order and structure on the class and how students

respond to her actions and accept their role. The following sections will document the progression of this process in more detail.

3.2. Analysis of the disruptive events of the first remote class

As indicated in the summary of the stages of the first remote class in the previous section, the majority of the lesson time is spent for productive activities, such as reviewing homework tasks and future assignments as well as experimenting with features of Zoom that will be necessary in future meetings. However, during the final ten minutes of the class, the teacher struggles to keep students on task as they start sharing their holiday experiences, discussing other teachers, their grades and otherwise behave in a way that is not helping achieve the aims of the lesson. This section will analyse the events leading up to the final stages of the class, which encouraged the students to behave in a way that disrupted classroom order.

To begin with, a panoramic view of the overall classroom management practices and style during this lesson will be provided. The first feature of teaching and classroom management that becomes evident from the recording of the first remote lesson is the frequent use of teaching tools and aids present in the physical classroom as well as the physical space of the classroom where the teacher finds herself at the time of the meeting. During the lesson, the teacher moves away from the screen several times: first, to retrieve models of shapes she would like the students to make as an assignment; then, to search for her copy of the coursebook and to find some colour markers (fig. 2).

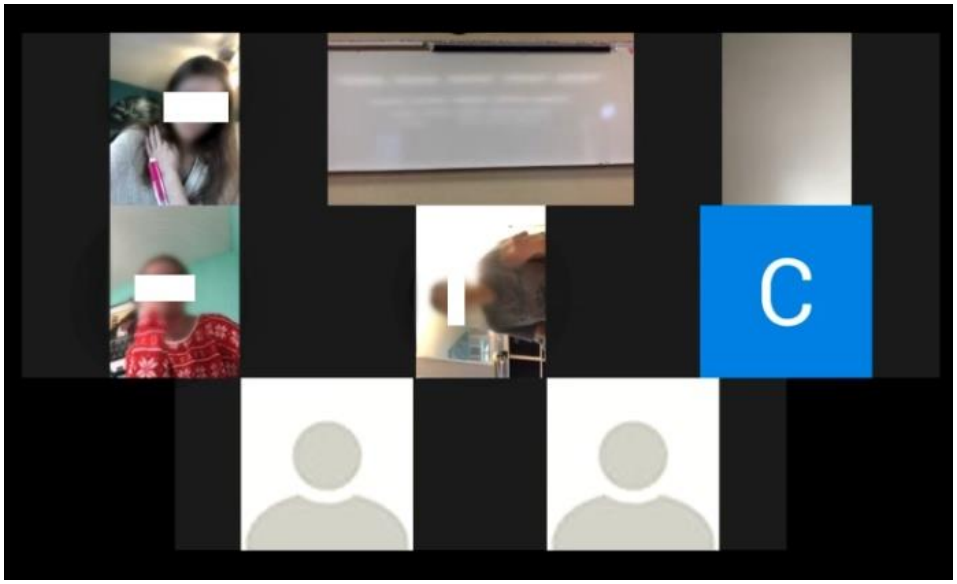

Fig. 2. Teacher's movements around the classroom space that make her disappear from the students' view

The teacher also makes frequent use of physical aids and features of the classroom by showing models, demonstrating a solution to a problem handwritten on a piece of paper, and solving problems on the board of the physical classroom (fig. 3).

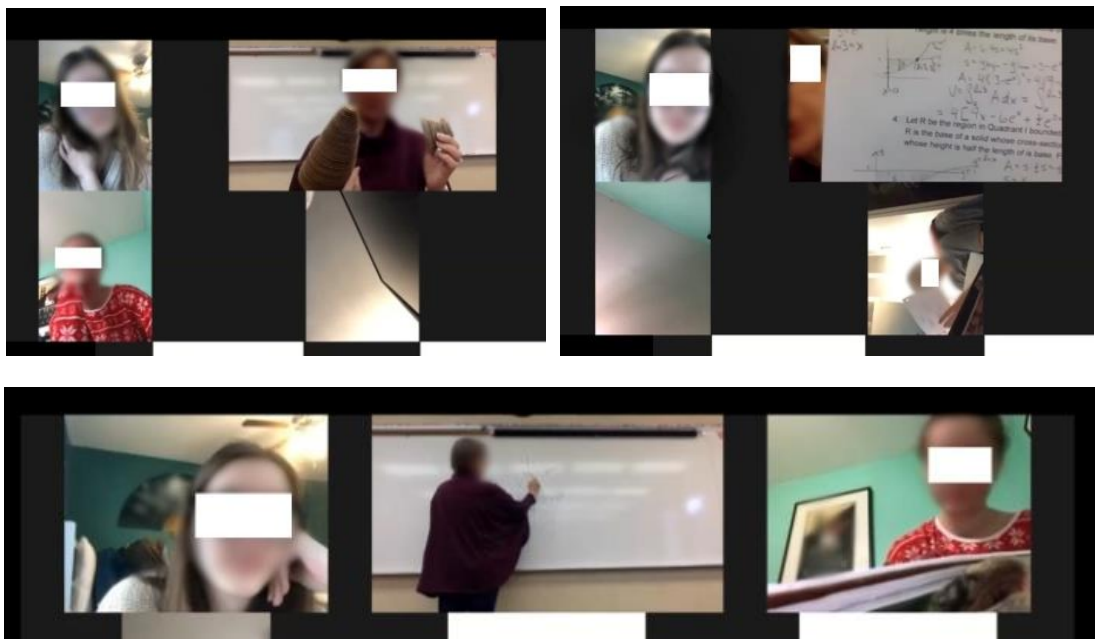

Fig. 3. Teacher's use of the physical classroom space and objects in it

The teacher's way of using the computer and Zoom software makes it evident that she treats these tools as means to *broadcast* what she is doing in the physical classroom (and see the students transmit their image from their homes), but does not appear to see the Zoom environment as a shared space itself; at this point, the classroom for the teacher is outside of the computer, not inside it. While the teacher appears tech savvy as well as relatively well-versed in the use of software, which is demonstrated by her knowledge of its features (e.g. 'raise hand', 'mute all', etc.), she has not quite adjusted her ways of thinking and methods of teaching to this new environment. According to Rabardel (1995 in Charlier, Nizet & Van Dam, 2006), for any technological object to perform a useful function, it needs to be turned into an instrument, which is a term used by Rabardel to describe a composite entity made up of two components: the material object itself and the schema that accompanies its use. In the first recording, the teacher appears to rely on the old schemata of what teaching should look like and how tools and spaces should be used, which she must have developed during her professional education and practice. Her classroom is, therefore, stuck in between the physical and the virtual, neither here nor there.

As the class progresses, it becomes evident that avoiding the architecture of the virtual space of Zoom and behaviours imposed by it will not be possible for long. In the same way that architects of physical spaces in schools design them on the basis of the perceived goals and practices of the users of those spaces, software developer also "necessarily make critical assumptions about how teachers and students will act" (Jamieson et al., 2000, p. 227 in Kuntz, 2012, p. 448) in a certain virtual learning environment and what features they will need. Far from being neutral and uniform, these critical assumptions and choices made on their basis are strikingly different across different systems (Burbules, 2013) and affect the way users and communities interact by imposing certain social norms and values (Taylor, 2003 in Sköld, 2012). In the recording in question, it becomes evident that while Zoom grants certain privileges to the host of the meeting, it is otherwise a very *democratic* piece of software incapable of discriminating between those with more and less power and authority. All voices are of equal value to it, and it gives screen time to whoever speaks the loudest thus treating every sound from a different speaker as a turn-competitive incoming. This

feature of Zoom is illustrated in the following extract from the first remote class where students cannot focus on the teacher's image while she is writing on the board as any sound made by another participant takes the camera off of the teacher.

```
1.  Tea:   can you guys see that (2.0)
2.  Chr:   kind of (1.0)
3.  Sop:   yeah
4.  Mag:   if any of us speak the the screen goes off of you writing $(0.5) $
    tea                                                              $laughs$
5.  Chr:   no one speak
6.  Tea:   i'll bet you can change that maybe (.) can you [change (it)]
7.  Sop:                                                  [if you     ]
8.         ^swipe over you can just see the screen of miss (teacher's name)
           ^makes swiping motions with hand and fingers --->
9.         %that's what i did (.) if you get our of the (.) multiple screens^
10.                                                                  --->^
    mag    %presses her screen--->
11. Chr:   that doesn't work for me 'cause ^whoever speaks just ends up there^
    sop                                   ^shrugs                          ^
12. Sop:   $i can just see miss (teacher's name) no matter what  $
    tea    $walks to the screen and starts pressing keybord/mouse$
13. Sar:   you have to just swipe it over (student name)
14. Chr:   i did:
15. Sop:   [^(swipe it the other way)    ]   ^
            ^waves a hand in a swiping motion^
16. Tea:   [O.K. i'm 'onna mute everybody] i'm 'onna mute everybody (.) you
17.        guys are currently all %muted% so that you'll only see me i think%
    mag                        --->%
    mag                                %covers mouth and laughs soundlessly%
18.        (2.0)$and now you guys can't$ talk to each other so you i won't be
    tea          $retreats to the board $
19.        able to hear your questions so i'm not sure $this is a good thing$
    tea                                              $turns to the board  $
20.        but at any rate %we'll just go with this for a second em: (2.0)%
    mag                    %waves hand in dismissal and speaks soundlessly%
21.        O.K. so the cross-sections are perpendicular to the x axis[2]
```

This extract shows that the architecture of the virtual space of Zoom does not provide any physical division between the teacher and the students such that the teacher's image no longer stands out. The software confuses all speakers and ignores their status as well as the teacher's right to be listened to and heard first and foremost. This is seen as a problem by both the teacher and the students. The students point it out and try to adjust their own behaviour by encouraging their peers not to speak thus demonstrating their implicit understanding that *they* are under the obligation not to steal the teacher's spotlight (lines 4 and 5).

Since staying completely quiet is not a practicable solution, the teacher and students then engage in a collective effort to negotiate the teacher's exceptional status with the software. One of the students tries to explain to others the function of spotlighting the teacher's video that she had accidentally come across (l. 7-9). After a few unsuccessful attempts by other students to move to this setting, the teacher steps in and mutes everyone. This rather abrupt top-down action, which would appear exceptionally rude in other circumstances, produces amused reactions from students (l. 16 and 21). Everyone appears to understand that this was an efficient and necessary solution enabling the

[2] Tea – teacher (gestures marked $ and ~); Chr (gestures marked ∞), Mag (gestures marked %), Sop (gestures marked ^) and Sar (gestures marked √) – students.

teacher to continue the process of instruction. In lines 18-20 the teacher acknowledges that this step is an accountable action and goes on to explain that this was not an ideal solution thus transferring some of the responsibility for *shutting the students up* to the imperfect software that forced her to do it; she also presents her action as a working arrangement rather than a final solution to the problem thus also mitigating the effects of abruptly muting her students. Following this extract, the teacher periodically unmutes the students to see if they have questions and subsequently teaches them how to use the 'raise hand' and 'chat' functions while muted.

Teacher-student conversations, just like all others, follow the rules of turn taking that help ensure that only one person speaks at a time and that there are few gaps and overlaps, thus ensuring that everyone has a right to speak and to be heard. One point that is important to note about organisation of conversations is that the "turn-taking system provides a systematic basis for speaker-change and its recurrence, while not making them automatic" (Sacks, Schegloff & Jefferson, 1974, p. 706). In this extract, it could be observed how the software was initially given the right to allocate turns leading to an automatic speaker change based on the algorithm the software used, which led to unsuccessful classroom management outcomes. This automatic speaker change was seen as an issue by everyone as it went against the natural ways of organising conversations and disrupted the process of instruction. Initially, one of the students suggested spotlighting the teacher's video, which is somewhat similar to a classroom situation where the students would be looking at the teacher and would not see their peers sat behind them even if they started talking. This kept both options for selecting the next speaker open: the teacher could address one of the students and the students could also speak up themselves. However, this rearrangement of visual classroom space turned out to be problematic to perform with some students unable to locate this function on their devices, so the teacher decided to implement a faster solution of muting everyone that proved more efficient in achieving her immediate goal. While effective, this decision also created a pattern of organising conversations that was not completely natural as it eliminated the right of students to self-select as the next speaker (as the teacher went on to mute and unmute the students every time, it could be assumed that the students did not know how to do it themselves yet and could not speak up when they wished or needed to). The process of muting and unmuting also created large and unnatural gaps in conversation and is a burdensome task for the teacher who has to manage both sides of the conversation: always speaking herself and selecting students as speakers. This solution was, indeed, not used for very long, and after about two minutes the teacher stopped muting the students and subsequently only did it once more during another lengthy instruction phase where she demonstrated a solution to a problem and student contributions were unlikely.

This, only somewhat successful, attempt to negotiate the interactional pattern to be used in the lessons sets the scene for other disruptive events later in the lesson, which start with one of the students asking the teacher about the class schedule for the following day. The question leads to the teacher's walking back to the computer from the board. While looking for information about the timetable on her computer, she comes across an email from the person she refers to as Rachel, who, she explains, is the current superintendent of the district.

1. Tea: oh there's a message from rachel about her (median visa) (.) the
2. superintendent right now
3. Chr: oh funsies
4. Tea: i know (.) i want to see what it$ says (.) $hold on $
>>looks at the screen$ $leans in$
5. Mag: %tell us the results↑ %

```
            %leans back and lifts her arms to cheer%
6.    Tea:  $O.K., hold on (.) you can't see me right now can you
            $places her chin on her hands--->>
7.   (Chr): [no we can(’t)]
8.   (Sop): [yes we can   ]
9.   (Mag): [yes          ]
10.   Tea:  O.K.(4.0)
11.   Chr:  so how's everyone's break so far $^%(1.5)$^ %
      tea                                    $smiles $
      sop                                     ^laughs ^
      mag                                      %grimaces%
12.   Sar:  i literally haven’t done anything
13.   Chr:  oh good (.)~my dad has made me run at least like five times
                       ~stretches her arm--->
14.         throughout this whole break~
                                    --->~
```

It is unclear why the teacher decides to read the email there and then given that its content does not appear to be related to the class or the schedule they were discussing. The only account that the teacher gives to justify her action is that the email is from (or about) the superintendent and that she would like to read it. One of the students expresses her interest in what the email says by asking the teacher to *tell them the results* (l. 5), but it is not clear whether her interest is genuine or she merely helps the teacher account for her action. Since the teacher lets herself engage in an activity that does not appear to benefit the process of instruction in any way, at least at face value, the students see it as encouragement to engage in activities that are not linked to learning either and start sharing their holiday stories. This leads to collective ignoring of the goal of classroom management, which is to benefit instruction and learning and makes everyone move off-task.

This movement from the shared interaction space of the class into individual spaces where different participants start to deal with personal activities unrelated to the content of the lesson could be an indication of the beginning of the closing stage of the lesson. When analysing closings of conversations, Schegloff and Sacks (1973) found that conversations come to an end when one of the parties in interaction uses their turn to indicate that they have nothing more to say. By engaging in activities unrelated to mathematics, all participants are demonstrating that they are tired and wish to have a break, or that they have other business to attend to and the class should, therefore, come to an end.

Looking in more detail at how all of this occurs, the teacher’s body language shows that she is preparing to follow her intention and read the email when she leans in to her screen and puts hands on her cheeks (fig. 4).

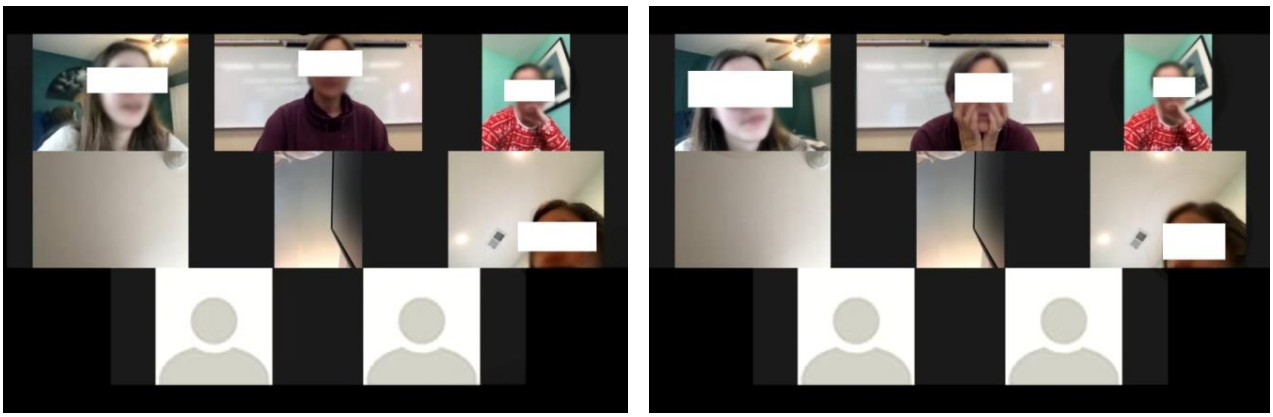

Fig. 4. Teacher's body language when interacting with students and while reading an email

She then addresses the question *you can't see me right now, can you* to the students, which is an interesting one from the pragmatic point of view. It might appear as irrelevant at first. Afterall, reading an email does not require that students do not see her. When the students reply to her question, their voices overlap, so it is impossible to make out whether they answer that they can or cannot. To this the teacher replies *okay*, thus indicating that the answer to her question is of no importance and signalling that her goal when asking this question was, in fact, not to get the factual information, but rather to request some privacy, to suggest that students make an effort not to see her while she reads the email.

The teacher's final *okay* is followed by a lapse. As Sacks et al. (1974) suggest, one of the principles of organising conversations is that gaps be kept to a minimum, so one of the students steps in to fill the prolonged silence and asks her peers how their holidays were. By doing so, she not only follows the patterns of organising conversations highlighted by Sacks et al. (1974), but also responds to the teacher's request of making her invisible, which is in line with Hoey's observation that the "sequence immediately preceding the lapse furnishes the most accessible tools for resolving it" (2018, p. 334). As described in the analysis of the previous extract, Zoom allows for speaker' video to disappear from view when they are not speaking. While the student is the active speaker, those who have their Zoom video layout set to *speaker view* will see only her image and not the teacher's. Those who have their view set to *gallery* will see up to four speakers on their phone, which most of the students appear to be using. As there are four students who rapidly engage in a conversation, the teacher's image gets pushed out of two of the most common video layouts on Zoom.

The success of this disappearing act backfires when the teacher tries to return to the classroom after she has read her email. Once she has passed the turn to speak to one of the students and the sharing of holiday experiences has started, all students wish to have their say. From the beginning of the extract below, the teacher's gaze is no longer fixed on the screen to read and we can see her reacting to the students' conversation with non-verbal signals, such as smiles, nods and laughs, thus indicating that she has finished reading the email and wishes to return to the shared interaction space.

```
1.   Sar:                                          [that's nice]
2.   Chr:   run uphill like eight times$ (2.0)$$    it was horrible
     tea                                $laughs$$smiles--->
3.   Mag:   [(you have to stay in shape)]
4.   Sop:   [(have given me)             ] yard work this whole time my mom's on
```

5. **like a rampage to like get like the outside looking good and the**
6. **lawnmower isn't working so [we have to use] the ( )**
7. **[and %i]don't like it%^ ^**
8. **Chr: [((gasps))]**
[ew]
mag %grimaces-------%
*sop ^covers face^*
9. **Tea: ((lau$ghs)) $**
$sits up straight$
10. **Chr: gross (.) my dad was so bored yesterday he organised my mom's**
11. **cabinets $(1.0) and my mom got really annoyed so she just walked**
tea $nods several times and smiles--->
12. **away from him [(.) so that was really funny]$**
tea --->$
13. **Mag: [((laughs))]**
14. **Sar: i've been so bored that i've literally cleaned my room like 30**
15. **times and i don't think i've never seen my room so clean**
16. **before$ $**
tea $nods and smiles$
17. **Sop: [sa:me]**
18. **Mag: [my parents made a] patio [(.) in] our back yard**
19. **Chr: [((gasps))] oh my $gosh fu::n$**
tea $nods twice$
20. **Tea: [that's good] cause you're gonna be spending some time back there**
21. **Mag: [i]**
22. **((laughs))$**
$smiles--->
23. **Sop: ((laughs))**
24. **Mag: [right because there's no:]where else to go**
25. **Chr: [i didn't do] i didn't do anything i organised my**
26. **drawers i put up my flag and that was that was about it (1.5)**
27. **Tea: [O.K.$ (.) so]**
--->$
28. **Sop: [i got my own $room]**
tea *$fixes hair--->*
29. **Tea: [em: (you)] tomorrow (.) [i don't know details about] i**
30. **Chr: [you got your own room]**
31. **Sop: [ya (out of my room)$]**
tea --->$
32. **Tea: don't know details about tomorrow (.) em (1.0) we don't have a set**
33. **schedule yet i think we'll probably if we get a set schedule it**
34. **will start next week i'm guessing%(.) em%(.) and so maybe i'll send**
mag %nods %
35. **Tea: out a message to everybody today**

While she demonstrates engagement through non-verbal signals from the start of the extract, the teacher only interrupts the conversation (l. 20) when all four girls engaged in conversation have had an opportunity to have a turn to share their story. This interruption, where she reacts to the story of one of her students, puts her image back into everyone's view and subtly announces that it is time to give the floor back to the teacher. The teacher's next attempt to take the lead again and close the students' conversation (l. 27) overlaps with another student's utterance and she lets the student continue. The fact that the student won the competition for a turn here can be explained by what Sacks calls "latching on" (1992, p. 315): as her utterance is more related to the current state of the

talk than what the teacher has to say, it is more likely to keep the conversation topically connected and secures its overall structural organisation.

The second time the teacher starts in a more insistent fashion, determined to continue talking (l. 32) even when she has to repeat herself three times because she keeps overlapping first with one student and then with another.

The transcript below illustrates the events that follow this exchange and lead to the conclusion of the class. Once the teacher has regained control over the interaction, she steers it back towards discussing class schedule.

```
1.   Tea:  don’t know details about tomorrow (.) em (1.0) we don't have a set
2.          schedule yet i think we'll probably if we get a set schedule it
3.          will start next week i'm guessing%(.) em%(.) and so maybe i'll send
     mag                                      %nods  %
4.   Tea:  out a message to everybody today ~you know let me see i know mr
                                           ~frowns, takes her phone and
          starts scrolling --->
5.          dunkel has a meeting for the staff scheduled for tomorrow so let
6.          me make sure i don't schedule a meeting for us at the same time
7.          (2.0) em:
8.   Sop:   (so) we’re not gonna [have (         )       ] meetings right so
9.   Mag:                        [yeah are you gonna have]
10.  Sop:   you’re all are gonna make sure that like english isn’t at the same
11.         time as like math and [i don’t have two things (open) at $once   ]
     tea                                                              $smiles-->
12.  Mag:                          [that’s what i was saying (.) you might
13.                                                    wanna send an email]
14.         to the other teachers too$~ being like my ap calculus seniors and
     tea                          --->$~
15.         some $juniors are gonna be (.) busy at this time$
     tea         %nods several times and mouths ‘yeah’      $
16.  Sop:   ^this is my slot (.) don’t schedule %anything in this slot^%
          ^shows a space with her thumb and finger while smiling    ^
     mag                                      %smiles               %
17.  Tea:   ((laughs))
18.         do you guys have you gotten anything from anybody ye:t
19.  Sar:   √ehm [my] [(culinary][teacher) √ emailed us and like] literally it
          √flips the screen of her phone √
20.  Chr:        [no]
21.  Mag:             [no:      ]
22.  Chr:                         [nothing from school (.) nothing
23.                                          from anybody but you]
24.  Sar:   makes no sense she emailed us and like
25.  Tea:   ↑who (.)$↑what
                  $frowns--->
26.  Sar:   my culinary$ [tea]$cher like emailed us (.) ms (teacher’s name)
     tea           --->$      $looks away from the screen--->
27.  Tea:                [aha]
28.  Sar:   and then she assigned as a quiz but you can't even like$ (1.5)
     tea                                                        --->$
29.         write or like access on the quiz and i tried to like tell her in a
30.         class comment and she made it to where you can't comment at all
31.  Mag:   ((laughs))
```

32. Sar: and so ehm √i don't really know√ but yeah
√shrugs √
33. Chr: yeah i'm the ta and she sent me the quiz all that stuff and i'm
34. like $↑i ↑don't ↑do that
tea $connects the palm of one hand to the fingers of the other--->
35. Tea: hey time out (.) $ so ∞you guys have to keep in mind∞ as we go
to make a T shape$
chr ∞copies teacher's hand gesture∞
36. through all of this that there £are a lot of£ teachers that have no
37. idea what we're doing right now
38. Sar: ((laughs))
39. Chr: 'kay [fair]
40. Tea: [and] we're trying things that we've never had to try before
41. and so you have to be patient and eh (.) yeah probably sending (.)
42. private messages so that you're not embarrassing the teacher in
43. front of everybody would be good em (.) she
44. Sar: it won't even like let you like it won't even let
45. Chr: just email her
46. Tea: yeah [that's what i was saying] just send [her an email]
47. Mag: [ms (teacher's name)] [i have to go] now
48. Tea: £'kay£
49. Mag: (for a call) but it was nice being in class %in class %
%air quotes%
50. Tea: $thank you $
$smiles and shows thumbs up with both hands$
51. Mag: with all of you guys
52. Tea: O.K. i'll send a message about our time for tomorrow
53. Mag: O.K.[bye]
54. Chr: [can you] make it not early in the morning i like to sleep
55. Tea: ((laughs)) it will not be early

While the talk returns to a topic area more suitable for a classroom interaction between a teacher and students, the roles of the participants have visibly shifted. According to McHoul (1978 in Sert and Seedhouse, 2011), who performed one of the first important CA studies into classroom interactions, differences in teacher and student identities become evident in interaction in terms of differences in participation rights and obligations. In other words, the difference in their interests leads to differences in the grasp of the occasion's relevancies as well as the *talkables* and *tellables* they are oriented to introducing into the talk (Schegloff, 1986). One would expect the teacher to be interested as well as have the right and obligation to set the time for the next meeting and inform her colleagues that the students would not be available for other lesson at that time. In this interaction, however, it is the students who dominate the discussion about lesson times and start giving teacher advice about how to inform her colleagues of the arrangements (ll. 8-23). Towards the end of the interaction (l. 54), a student asks the teacher to schedule the class late because she wishes to sleep in. Decisions about timetabling and teacher communication are not those students would expect to have any say in in a physical school. However, the events taking place in this extract show that learning remotely makes students assume that they have the right to expect a say in a significant number of classroom management decisions that would normally be left to the teacher.

As the students claim more authority in the classroom and feel free to influence decisions they would hardly have expected to be consulted on previously, the teacher starts to lose some of her

authority. The culmination of the distortion of teacher-student roles unfolds in lines 23-43, where the students start oversharing information about other subjects and openly gossiping about the teachers who are not as tech savvy as remote learning requires them to be. In lines 44-45, the teacher interrupts the student conversation to justify the mistake made by her colleague. She acknowledges her and her colleagues' role as learners in this unprecedented situation and asks for students to understand that it will take time for teachers to learn how to work in this new environment. This sequence highlights that teachers as learners are not an image students easily tolerate and respect: a teacher's not being quite sure of something and needing time to learn it is seen as a weakness and something to make fun of by students.

After another few minutes, the lesson ends overall positively with students and teacher waving, smiling and laughing. However, the events of the following lessons show that the teacher has reconsidered some of her strategies and approaches and makes an effort to avoid compromising her role and a tech savvy leader and manager of the classroom by employing a number of digital tools and imposing a much stricter programme in order to keep the students on task, reduce distractions and deviations, and preserve her authority in the classroom.

3.3. Analysis of the reconstruction of the teacher's authority and establishment of order in a remote classroom

The second video analysed in the project was recorded in April of 2020, four weeks after the first remote class. There are some notable changes in the overall classroom management strategy that immediately become evident.

First of all, instead of relying on pen and paper, the teacher employs a wide variety of digital tools. Instead of writing on the board of her classroom, she shares the solutions to problems by using a projector/visualiser, shows an educational video from YouTube, asks the students to complete a shared spreadsheet and presents a formula sheet by sharing an image from her computer (fig. 5).

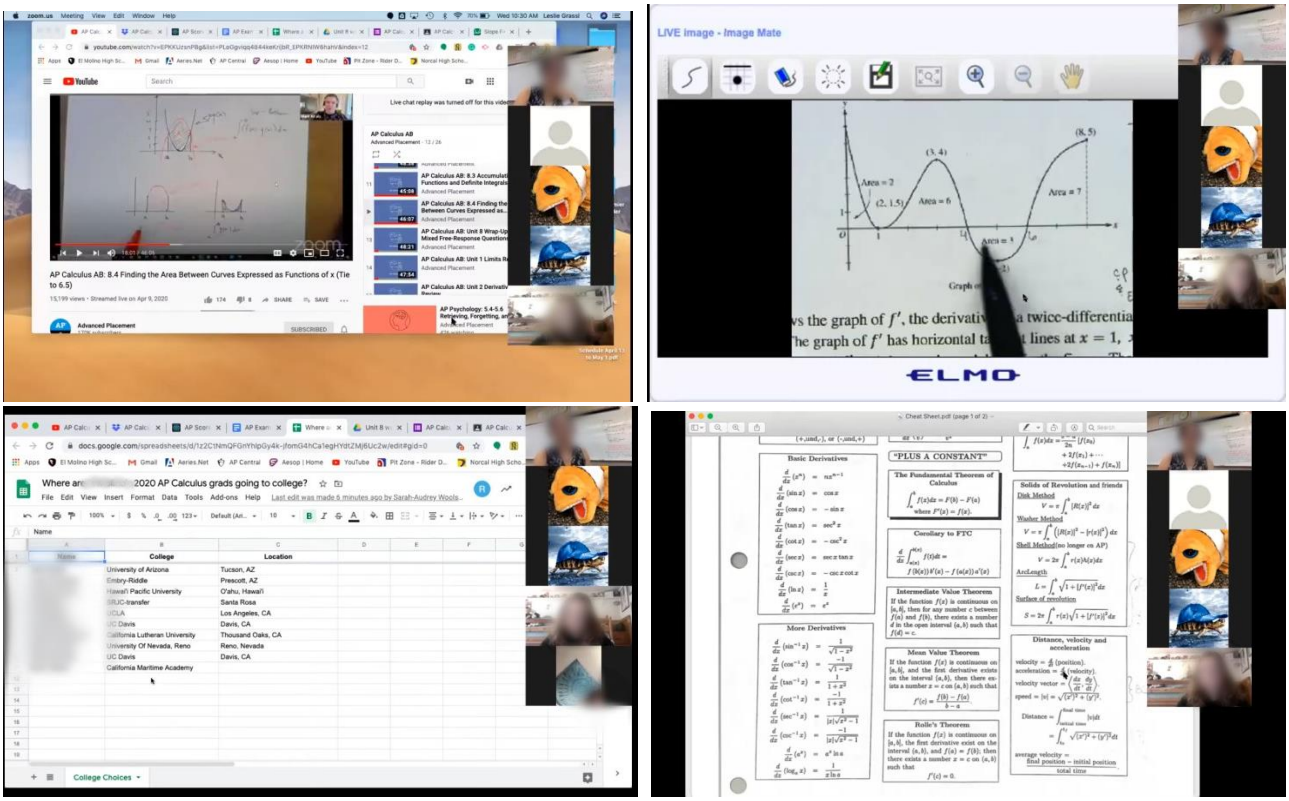

Fig. 5. Tools used by the teacher in the second recording

While the tools she used in the first lesson did not appear to be inferior in terms of how they contributed to the quality of teaching (students in the first class saw the writing on the board and on paper, and had their questions answered successfully), the teacher saw some reason to experiment with alternative ways of presenting information to the students. One interpretation of this shift could be the teacher's attempt to establish her authority in this new classroom environment by demonstrating the ability to successfully adapt to this situation and knowledge of the tools of her trade. This reflects a pattern observed back in the 80s, where teachers who did not engage in the use of high-tech gadgets that overly technophilic institutions imposed on them were viewed as technophobic rather than reasonable professionals who chose the methods and tools, including low-tech ones, that were best suited for the purpose (Connor, 1984 in Lam, 2000). The shift to using higher-tech versions of instruction and classroom management tools then, as here, was influenced by an attempt of the teacher to help build their image and authority rather than due to their direct improvement of instruction.

The teacher is also no longer seen getting up and moving away from the screen. She does twist her camera a few times to show the students her schedule written on the board behind her, but otherwise her image never moves (fig. 7). This reduces the number of pauses and other disruptions in the lesson and does not make space for students to take their turn to speak and move off-task.

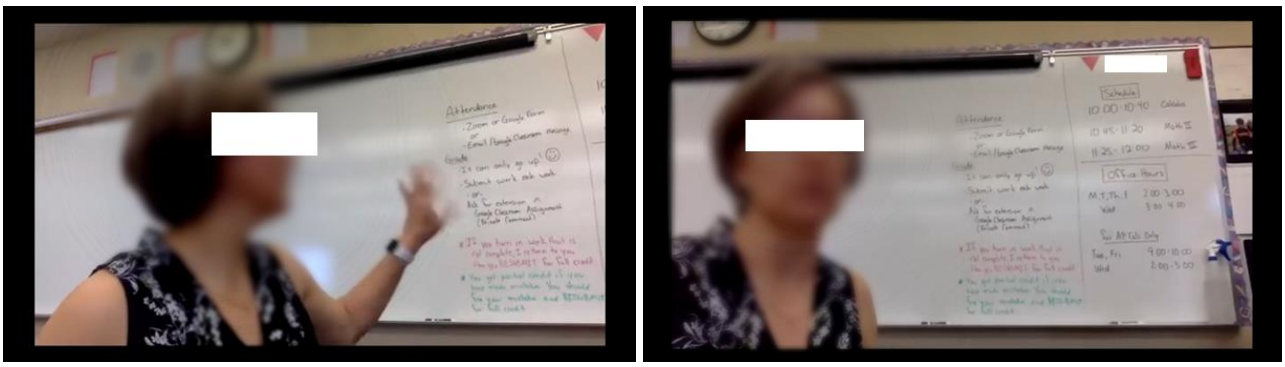

Fig. 6. Dynamics in the teacher's image in the second recording

While the teacher starts the class in *gallery view*, as soon as she has finished recording attendance, she switches to *speaker view* (fig. 8) 26 seconds into the recording thus showing her understanding that the students watching the recording will most likely wish to see the image of her (especially when she is explaining homework problems) rather than their peers, or that the images of peers could be distracting and by keeping the focus on herself and the board, she will manage student focus better. The next switch back to gallery view occurs only after around half an hour, when the teacher invites students who do not have questions to say their goodbyes and leave the meeting.

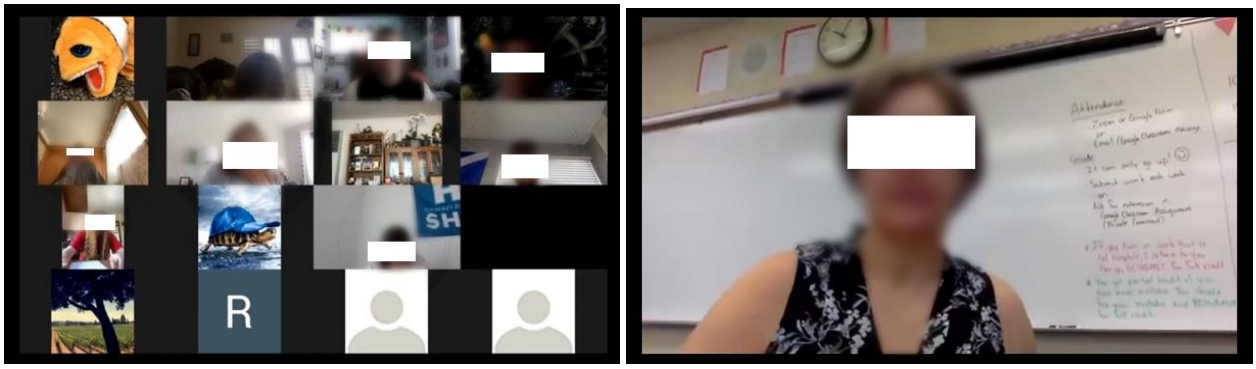

Fig. 7. Switches between gallery and speaker view in the second recording

Mondada (2006) suggests that "[w]orking with videos produced by members within their professional activities allows to take into consideration […] how they are materialised and embodied in particular ways of shooting" (p. 64). These changes that can be noted in the way the teacher treats the visibility of her image show a much greater awareness of how students see her in the recording, which undoubtedly results from a month of recording her lessons, editing the recordings and uploading them on YouTube.

Another set of changes from the first lesson can be observed in the distribution of talking time among the participants of the meeting. While the interactions in the first recording had multiple speakers exchanging speaking turns, this recording is very much a pre-planned monologue up to the final stage where only a few students are left to ask questions. The teacher often looks down to her desk when shifting from one topic to another suggesting that she has a plan of her monologue written down (fig. 8).

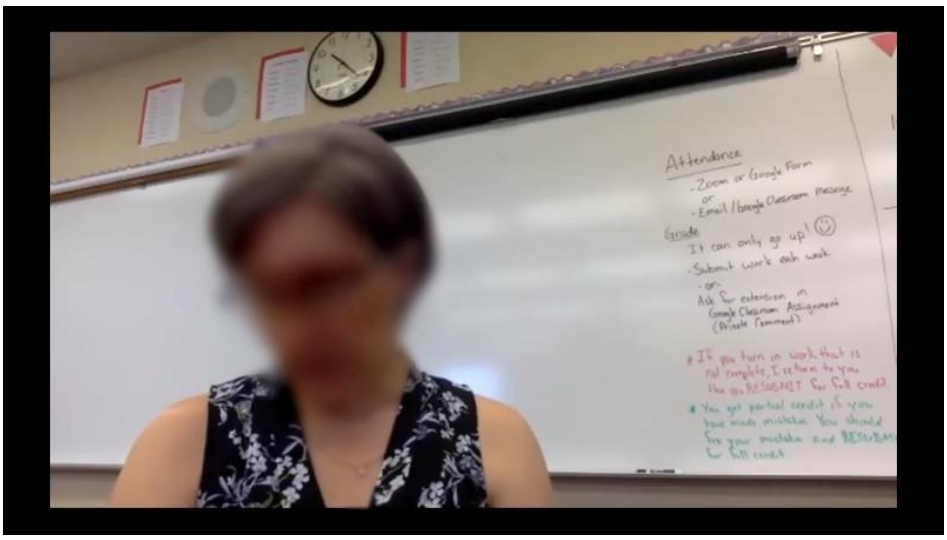

Fig. 8. Teacher (presumably) consulting her notes during transitions between lesson stages

This interactional pattern does not emerge on its own. As soon as the recording starts, the teacher is calling the students by name to record their attendance, which immediately sets a rather formal tone (especially compared to the first recording, which starts with laughter and an 'oh yay').

```
1.  Tea:   too: let's see i don't see mael is mael here anywhere (1.0) or:
           $teacher's video not visible--->
2.         (1.0) lilith dawson coleman shane wesley am i missing you guys
3.         (1.0) all right (.) you are welcome to turn off your video now i've
4.         i've seen everybody□                                  □
     stu                          □start turning off their video□
5.         um so we're good to go there now
6.         and:$ $                                                        $
           --->$ $switches to speaker view to make only her image visible$
7.         let's see there's a few things i wanted to to check in with you
8.         guys about
```

As soon as recording attendance has been completed, students are allowed to turn off their video (l. 3). The teacher's stating that the students *are welcome* to turn their video off transmits the message that their visible presence will not be required for a while. Once it has been verified that everyone is present, it is assumed that the students will continue to be present until the end of the class when they are once again asked to turn on their video to say goodbye. The teacher's overall treatment of the presence of her students is presented by her as a response to a formal requirement by the school rather than something she personally needs from the students.

```
1.  Tea:   i have everything up on the board there again you know i've got the
2.         $office hours if you$ ever need to see those (.) just you know if
           $points to the board$
3.         you can't make the zoom meeting just to make sure that you watch the
4.         recorded version later $hopefully this week that works         $
                                  $crosses her fingers and lifts her hands$
5.         and then fill out the google form because i am supposed to report
6.         that i've had contact with with everybody and so that's a nice easy
7.         way to make sure if you $don't make                $the zoom meeting
                                  %points down with her finger$
8.         which is an easy way to prove that you made contact with me you can
9.         just fill out that google form for me real quick
```

The teacher's permission for students to turn off their video could be interpreted as a way to reduce the imposition on the students' personal space, avoid making them self-conscious, subjecting them to hyper gaze and causing Zoom fatigue, which studies have found to affect participants of online meetings (Fauville et al., 2021). However, considering that the teachers in previous studies report feeling like they are talking into a void in remote classes (Yarmand et al., 2021), it is curious that the teacher herself suggests that the students turn off their video. By giving this permission, she is giving up her right to see whether the students are listening to her or not, to read their facial expressions, gestures, note-taking and other non-verbal signals to identify whether instruction needs to be adjusted in any way, and sacrificing the students' right to send such signals in a non-verbal way so as not to disrupt instruction. Given her heavy use of negative politeness strategies to avoid imposing on the students (e.g. the 'real quick' in l. 9 and 'nice easy way' in l. 6-7 stress the teacher's awareness that filling out the form will take up students' time and effort), this permission to stop sharing their video should also be viewed as part of the same repertoire of politeness strategies that the teacher must believe to be effective in maintaining a positive classroom climate, and as a strategy that will benefit student learning more than the alternative. However, when viewed from another angle, what results from this arrangement is a group of muted and invisible students is a paradox where the approach to teaching that is *student-centred* takes the focus *off* of the students for their own benefit.

Student engagement is encouraged in the lesson only in written form when the teacher asks them to complete a spreadsheet she shares by entering the information about their college plans (fig. 6). This type of interaction keeps the students on task, allows minimum deviation from the question and does not take away the turn to speak from the teacher, all of which lead to problems in the earlier lesson. Verbal interaction with students begins only when a much smaller group is left to ask questions at the end of the class, but even then, it is immediately characterised by overlaps, so the students remain muted through most of it.

```
1.   Tea:   O.K. so for those of you that are left whatchu got for me what
2.          kind of questions do you guys have (.)
3.   Mag:   i was wondering if you could go over a the second or at least one
4.          of the many questions in the second question$∞[(.)(from)] the eight
     chr                                                ∞points at the screen
            in agreement∞
5.   Tea:                                               [wait     ]
                                                        $presses both hands
            palms down in the air$
6.   Mag:   point       ∞
7.   Tea:   eight point three    $
8.   Mag:   yes (1.0)
9.   Tea:   [um:                  ]
10.  Mag:   [((inaudible))        ]
11.  Chr:   [(could you do a and b)]
12.  Tea:   $what    $
            $leans in$
13.  Chr:   you could do a and b for tha one
14.  Tea:   $O.K. (.)             $ eh so
            $leans back and smiles$
```

The practices of muting the students, encouraging them to turn off their video and asking them closed-ended questions in writing to avoid their deviation from the topic reduces the amount and quality of classroom interactions. While this removal of on-going reciprocal construction of the classroom environment removes some of its complexity and allows the teacher to control student

behaviour and task focus, it is also likely to negatively affect the classroom climate and relationships.

3.4. Analysis of the final meeting: putting it all together

The third lesson from May, 2020 has some of the practices from both previous lessons combined thus indicating a further development of the teacher's classroom management practices and routines.

The duration of this recording of just over 18 minutes, which makes it significantly shorter than the previous meetings (of 42 and 36 minutes respectively). It is also better described by calling it a *meeting* instead of *lesson* as its purpose appears to be to remind the students about the submission of their final projects and sharing experiences of taking school-leaving examinations. No instructional content is presented or discussed.

The recording is in *gallery view* throughout (fig. 9) indicating the teacher's engagement with the class present on Zoom rather than an intention to give a pre-planned speech or engage with the viewers who will watch the recording on YouTube later.

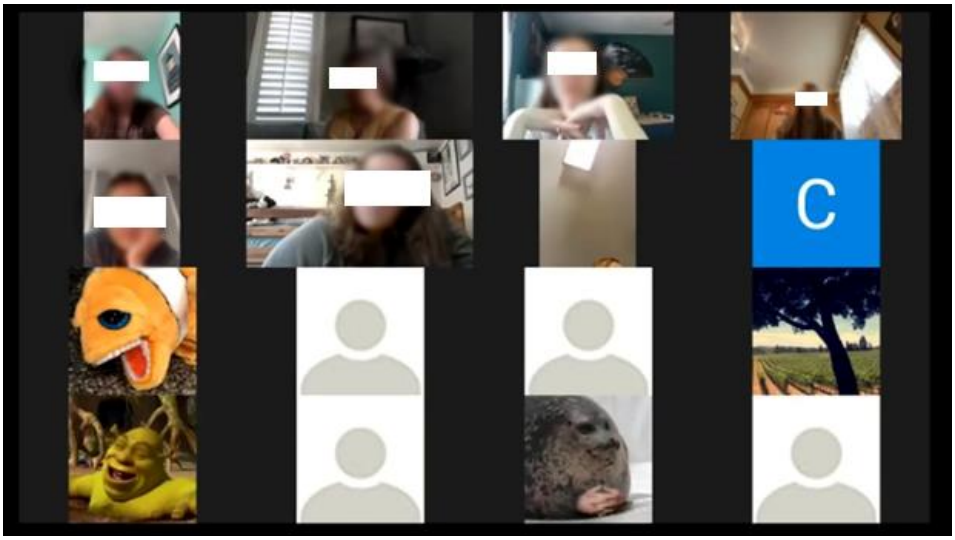

Fig. 9. Video layout used in the final meeting

The first stage of the meeting is dedicated to a conversation where students are invited to share some of their experiences of the exam they recently took. Most students stay muted during this exchange with those invited to speak answering in short sentences. Where students start developing longer answers, the teacher interrupts them without hesitation.

```
1.    Tea:   and I forget which one it was
2.           $(student name) which one was it for you$
             $looks away-----------------------------$
3.    Chr:   (.)ehm (.)mine probably was question two that it $didn't get (1.0)$
4.    tea                                                    $nods-----------$
5.           [but (         )                                                ]
6.    Tea:   [and then (student name) and $(student name)do you remember which]
                                        $looks away--->
7.           one it was for you that they told you$ they didn't get your
8.                                              --->$
9.           submission
```

The discussion picks up a little towards the end of the meeting but student questions and remarks remain succinct and to the point. The students overall appear well used to staying muted when they are not speaking, so there is almost no interference and overlaps. When the meeting ends, only three students say goodbye verbally with everyone else remaining muted and waving their goodbyes.

The teacher's shift from a monologue of the previous lesson to more interactive format of this meeting could be explained by growing familiarity with the remote learning setting but also by the fact that the course has effectively finished at this point and there is almost no pressure for the teacher to keep the students focused on learning something. At this stage, the students have already taken their external final exams, so the achievement of the learning outcomes of the course has already been evaluated. Students still have a final project to submit, and the teacher gives final instructions about submissions and answers questions. The reduced task focus and formality also become evident from the environment in which the teacher finds herself, which appears to be her home rather than her classroom or office.

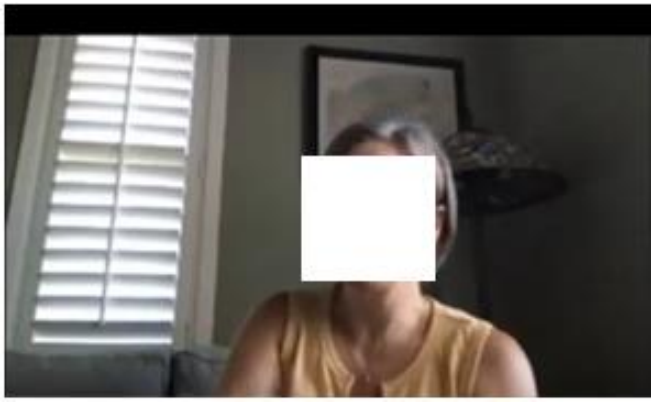

Fig. 10. Teacher's background environment during the final meeting

While most of the interaction during the meeting is verbal, written feedback gathering remains common with the teacher's making use of some surveys in a shared excel spreadsheet and google forms.

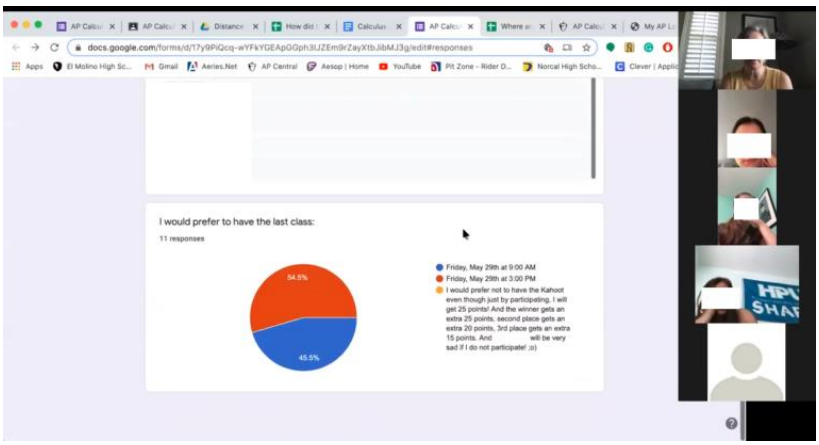

Fig. 11. Use of feedback-gathering forms and spreadsheets during the final meeting

The use of a greater variety of resources and interactional patterns by the teacher and their efficient orchestration shows her growing familiarity with the environment. In this meeting she lets the students speak up much more than in the previous one, which shows her growing confidence in how to manage her audience in this setting. While lacking in the organic spontaneity of the first lesson, this meeting reintroduces the students more into the interaction compared to the previous class.

The role of the teacher is also more similar to what it was in the first meeting than in the second one here. While in the second meeting she was a well-prepared business-like teacher through and through, the first and final meetings show her as more human: in the first meeting she shifted to her personal out-of-school self when she started reading an email unrelated to the class, which led to significant disruptions. In this final meeting, she shifts to her role as a parent, but since this shift was necessitated by what was happening in the classroom and directly related to its content, it could be viewed as a positive choice.

1. Tea: (name) did you have your hand up did you have a question too
2. Sop: eh: do you (.) if we're doing a poster with like your partner
3. do you want us to like drop it off at $school of something$
4. tea $nods----------$
5. Tea: yeah so there is you guys probably got information about ehm
6. There's a pickup and dropoff day at school em so you can just drop
7. it off on that day so that's the day when you're supposed to bring
8. in your em like bring in your textbooks and any library books

This interaction develops for several minutes until the teacher understands that the students have received no information about the pickup and drop-off day, so she goes into her email inbox and finds the email about it that she received as a parent (presumably because one of her children also studies at this school) and proceeds to share it with the students to find the date when they need to come to the school. While the situation is very similar to what happened during the first lesson at face value, the fact that the teacher does not disappear into her own space leaving the students unattended, shares her screen while reading the email and the fact that the students remain muted leads to a significantly different result compared to first lesson, and the class continues normally.

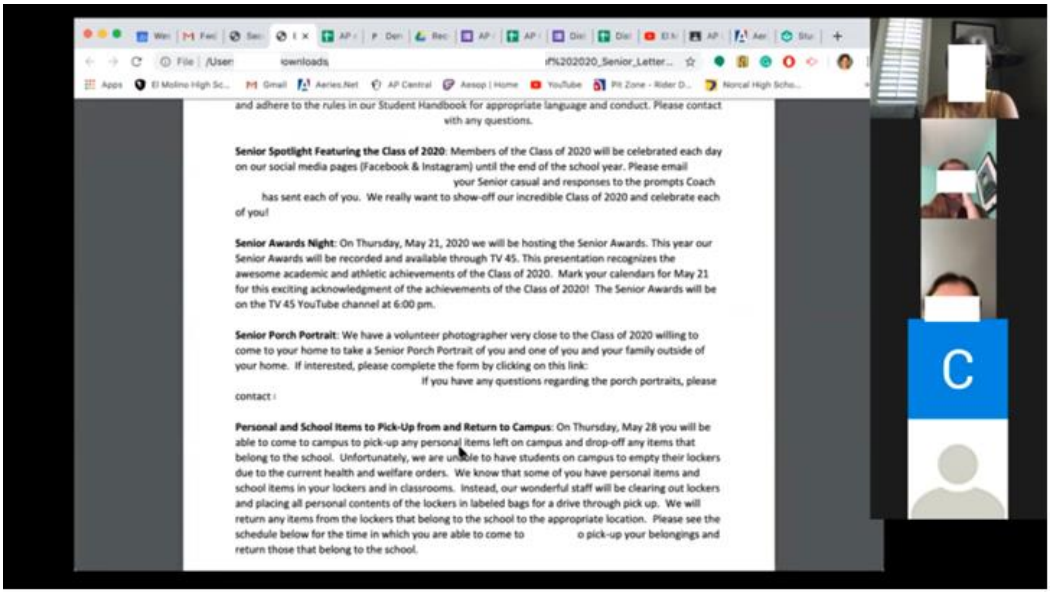

Fig. 12. Teacher sharing information about pickup and drop-off of personal items at school

3.5. Summary of key findings about emergent classroom management practices in the shift from face-to-face to remote instruction

The teacher's gradual shift from using the resources of the physical space of her classroom (such as the board) to the use of their digital equivalents (such as the visualiser image of the teacher's notes) is evidence of the process of instrumental genesis (transformation of artefacts into instruments by building personal relationships and discovering ways in which the user is comfortable employing the available tools) taking place. While modalities cannot be counted or treated like discrete units to identify whether their number has changed, the appearance of video material shared during the class, introduction of written feedback collection methods, disappearance of the teacher's physical movement around her classroom space, etc. show the qualitative change in the resources the teacher uses to make meaning as remote instruction progresses.

The teacher's growing use of digital tools can also be explained as a reaction to the way students talk about the teacher's colleague's failure to correctly set up an online quiz during the first remote class. The colleague's poor choice of resources, inability to handle them effectively and general lack of familiarity with the rules of this new workspace gives sense of incompetence, which makes her authority drop in student's eyes. Since the teacher is free to choose the resources she uses, certain meaning is attached to her choices, and her failure to introduce more digital resources would most likely also be interpreted by the students as incompetence or technophobia as opposed to personal choice. Even though the students clearly state that they can see the teacher's writing on the board of the physical classroom well during the first meeting, the teacher shifts from using the board in the second meeting and uses a visualiser instead. It is not clearly evident what pedagogical benefit this has, but the use of digital resources does make the teacher appear more tech-savvy and helps her build her image as an authority figure. While the teacher acknowledges her role as a learner in this situation, the students' treatment of her colleague's mistake seems to make her realise that it is part of her role as a teacher to give appearance of competence even when she is not quite sure what she is doing in this unprecedented chaos that all schools and educational systems globally had to face.

The teacher's design of her image described in the previous paragraph is clearly intentional, but it is hindered by the way she is compelled by the remote learning environment to shift between roles and thus compromise the integrity of her image. During the first meeting, spurred by the combination of the good mood everyone is in, the novelty of the situation and the interaction pattern that Zoom imposes (with all speakers treated as equal without anyone being given a priority to speak), the teacher appears to momentarily lose focus of the instructional goals of the lesson, forget that she is the manager of the process and leader of the classroom and start having a personal conversation with students. Her leaving the students without any work to do while she reads a personal email leads to a very chaotic remainder of the lesson. The fact that students find themselves at home, where they normally behave and interact completely differently to how they would at school, leads to blurred roles, rights and obligations, examples of which include students eating and drinking in class (see red rectangles in fig. 13) or giving teacher suggestions about scheduling lessons, which they would not likely do in a classroom at school. The data show that this tendency of both the teacher and students to mix their home and professional selves is something that has potential to compromise instruction and learning, and should therefore be consciously avoided.

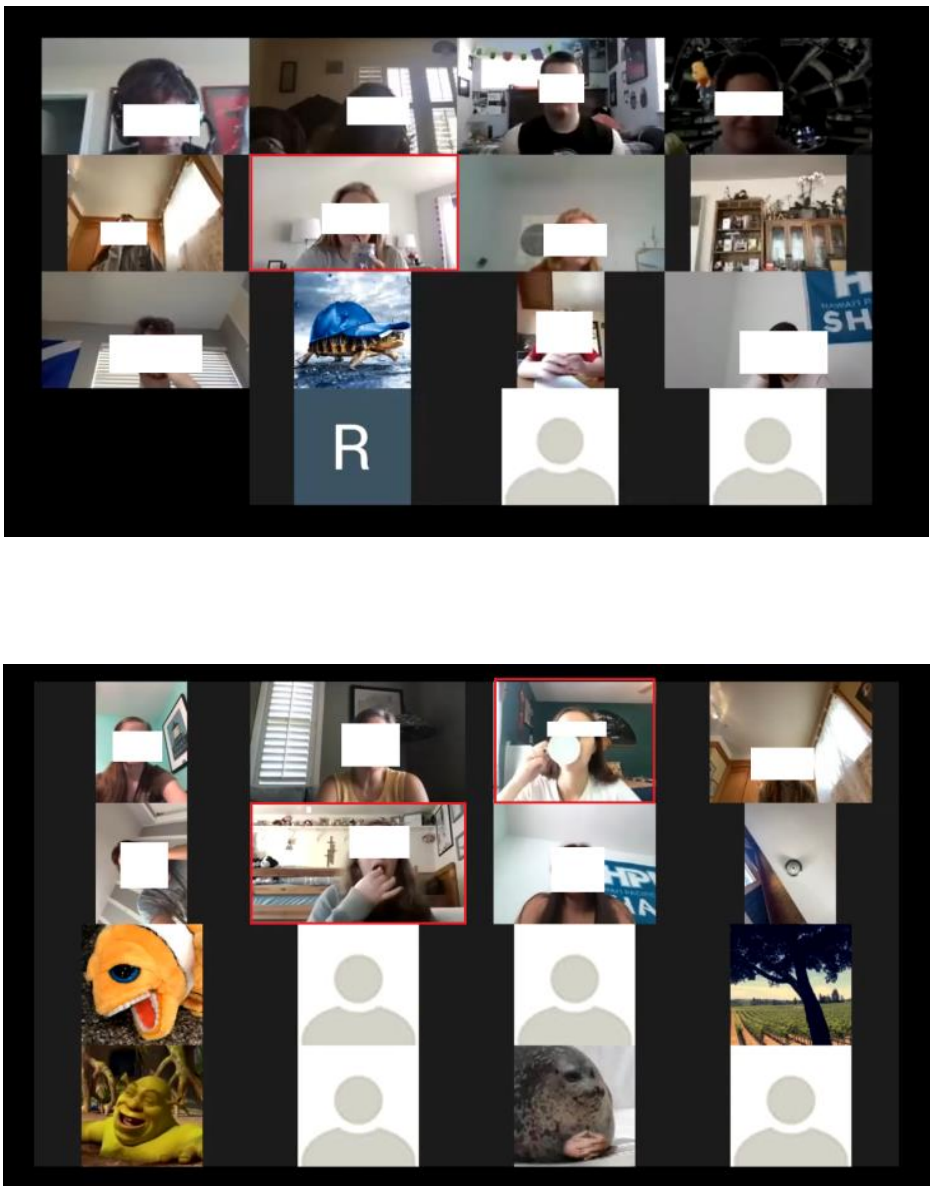

Fig. 13. Students eating and drinking during lessons

The teacher achieves task focus by gradually reducing the duration of the meetings, keeping the students muted, limiting conversation to short contributions that are to the point, and gathering feedback in written form through surveys. The nature of questions changes to more closed-ended as the teacher grows more aware of what answers she can process: long animated discussions create overlaps and other technical difficulties and when students are given too much talking time, they tend to veer off-task.

However, some of these practices, especially the tendency to encourage the students to turn off audio (in all recordings) and video (in one of the recordings) leads to the situation where sensory information available to teachers to get feedback from students and adjust their instruction is severely restricted, which is bound to lead to less informed decisions in classroom management. To supplement the cues she receives, the teacher asks the students to use Zoom features, such as raise hand, physically give 'thumbs up' when they are muted, and gathers feedback about times when students would be available for the next meeting using google forms (fig. 14).

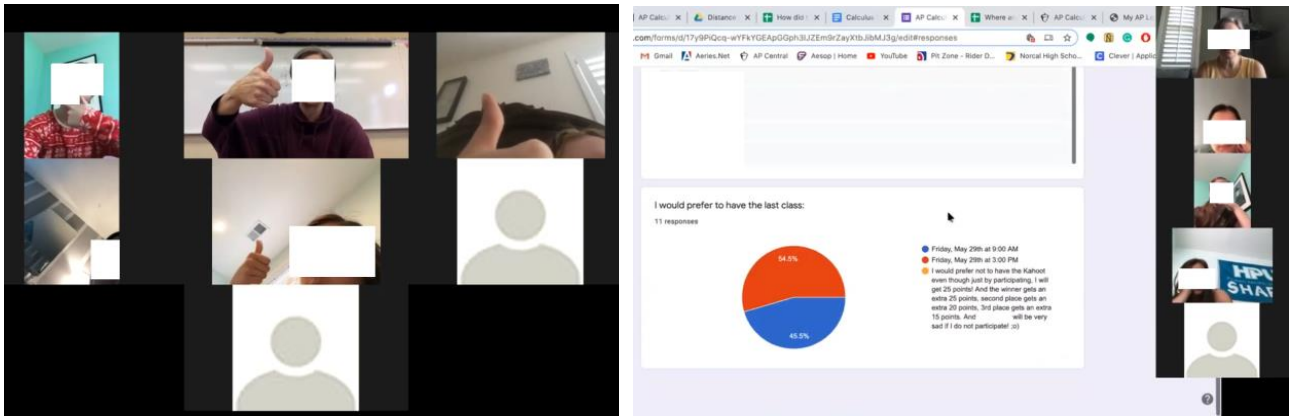

Fig. 14. Ways of gathering student reactions and feedback common in the recordings

This progressive replacement of ways in which students can give feedback with more and more abstract forms is an interesting development, which has been explored in studies focusing on resemiotisation. *Resemiotisation* (Iedema, 2003) also called *transduction* (Kress, 2010 in Culache, 2015), *intersemiotic translation* or *transmutation* (Jakobson, 1959 in Culache, 2015) or *semantic reconstruals* (O'Halloran 2005 in Culache, 2015) means, in simple terms, replacing one mode or set of semiotic resources with another (e.g. using an image instead of speech to create the same (or at least very similar) meaning). Studies that explore the semiotic history of artefacts and practices include, among others, Latour's (1992) analysis of movement from talk, to writing, to technological device in a situation where initially "someone ask[s] those arriving to shut the door behind them, to a written notice saying 'please keep this door closed', to a hydraulic door-closing device" (Iedema, 2003:42) and Mehan's (1993) study of how "a teacher's initial interaction with a student-child leads to the teacher's formal recording of the child's deviant behaviour, […] a reconstruction of the child as a test result which finally ends up as a report in a file […] where the child becomes a social category – 'intellectually disabled'" (Iedema, 2003:41). In studies that analysed similar processes in remote communication, Timonen & Vuori's (2018) noted increased verbalisation used by service staff working remotely (either on the phone or a computer) to counteract the absence of shared space and visual information with their clients (e.g. by talking the client through what the attendant was doing on their computer screen). These and many other examples show how through this process, situated concerns and social relations turn into material expressions and how those expressions evolve to become mechanical devices, fossilised, ritualised practices and rules, and also how they change shape depending on the affordances of the mediums in which social life takes place. Examples of resemiotisation are numerous in the three recordings analysed. Teacher's initial solution of problems where she answers local questions from specific students is replaced with sharing links to YouTube videos that give generic explanations to a generic audience (fig. 15).

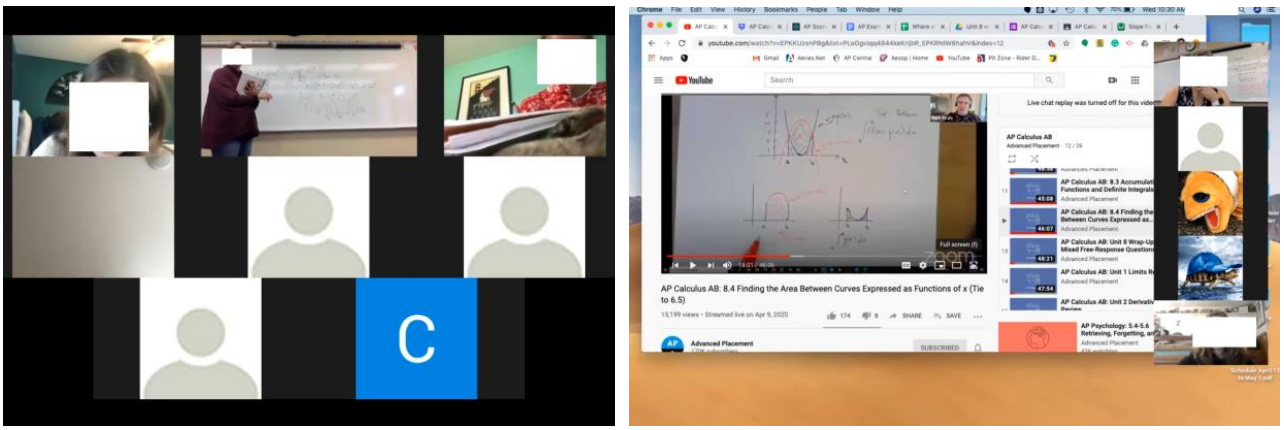

Fig. 15. Evolution of the way teacher gives explanations of mathematics concepts and problems

While the teacher reads an email on her screen without involving the students at the start of remote learning, during the final meeting, she demonstrates awareness of the fact that the students do not share physical space with her and cannot see what she sees by sharing a document she is reading with the students. Similarly, to how Timonen & Vuori's (2018) service staff verbalised what was on their screens to bring the customers into a shared reality and interaction space, the teacher here invites the students to see what she is looking at by using 'share screen' function on Zoom.

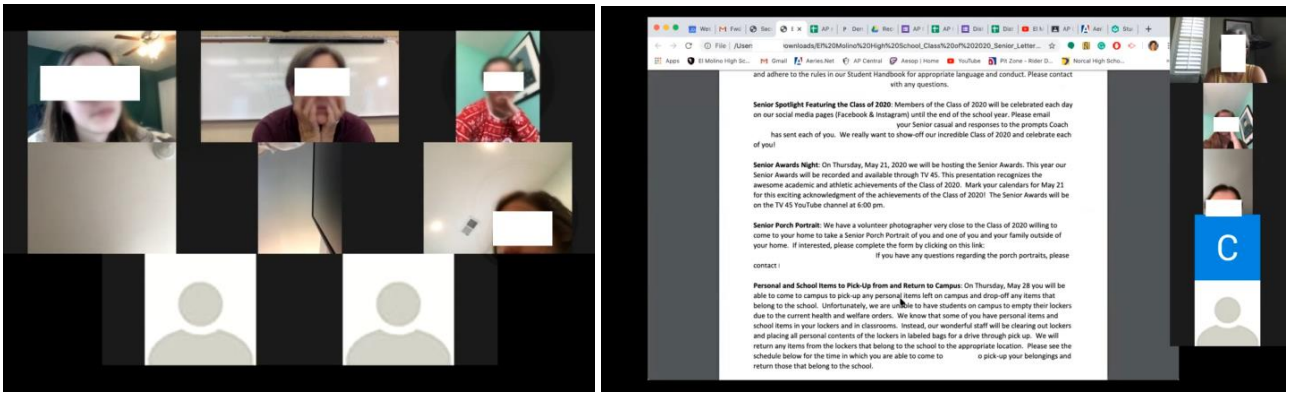

Fig. 16. Evolution in awareness of how to create a shared space in a remote classroom

Numerous such transitions from one type of practice to another occur across the three recordings. While some (including the one described in the previous paragraph) prove very pertinent, the potential for success is questionable with others. In the third recording, the teacher asks the students when they would be available for their final class using a google form (Fig. 11). It is impossible to image a teacher in face-to-face instruction preparing and distributing questionnaires to collect student answers to the question "When should we meet for our next class?". The procedure immediately strikes anyone trying to imagine it as too labour-intensive and unnecessarily complicated. The teacher would simply discuss it with the students and make a note of the time. The process of looking for YouTube videos and evaluating their suitability and quality instead of explaining something yourself also seems similarly much too elaborate and time-consuming. In these cases, the choices made by the teacher to elect these resources could be explained by a sort of technological determinism summarised by Burbules (2013) in his observation that while software used for learning management and instruction is often somewhat customisable, generally, "teachers follow the implicit design assumptions that are built into [the systems], as a path of least resistance

[...], they [..] cede important judgments they need to be making as teachers to the designers of the application" (p. 174). As Zoom makes open discussions extremely complicated due to overlaps and distortions, and students need to remain muted most of the time, this makes the teacher instinctively go for more ways of gathering the reactions she needs from students that do not require getting into a discussion with them, such as asking them to raise hands, give the thumbs-up or check a box in google form. However, this leads to a number of potentially detrimental effects, such as increasing teacher workload and limiting classroom interaction: if the only answers that student can give to a question need to be a raised hand or a thumbs up, then questions also have to follow suit and be stripped of nuance: when all one has is a hammer, everything looks like a nail; when the only answer is a 'thumbs up', every question is a binary one. A reflection of these practices that are dictated by popular and easy to use technological tools is the way the teacher records attendance. Figure 17 and the dialogue in the second recording show that the teacher keeps track of attendance by asking students to log on to Zoom meetings or tick a box on a Google form, which appear to be a rather flawed way of ensuring that students are following the curriculum. Afterall, the list of student names and dates does not mean that they were, in fact, present or engaged in the lesson.

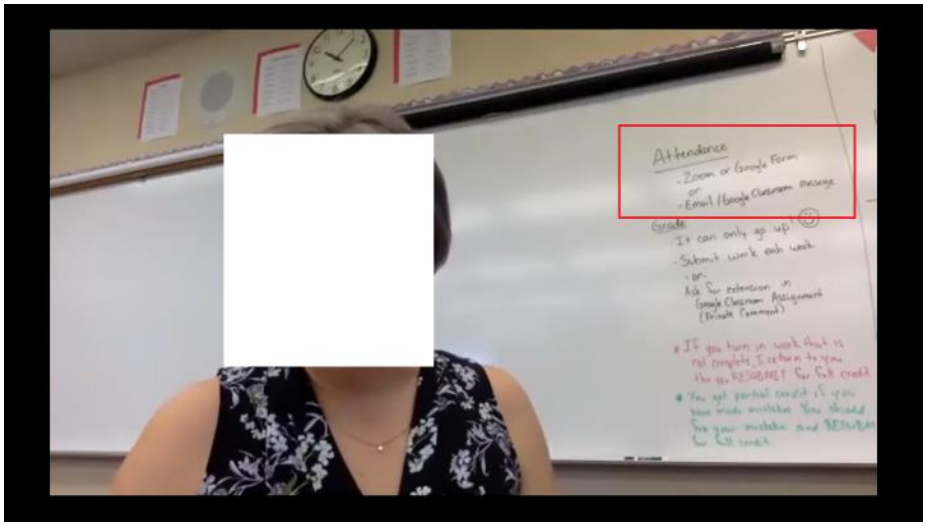

Fig. 17. Ways of recording attendance during remote learning chosen by the teacher

The logic of these choices is evident, and they do solve a number of problems. However, not without creating others. This continuous problem-solution sequence that the teacher undergoes and her consistent experimentation in search of better approaches to communication and classroom management make it evident that the changes brought about by COVID-19 lead to a significant amount of teacher workplace learning. Apart from the most obvious and easily observable growth in proficiency of digital resource use, teachers also developed their ways of interacting with students and making meaning by adapting their classrooms from 3D to 2D space and finding alternative ways of focusing student attention, keeping them on-task, etc. to those traditionally available in face-to-face instruction.

What is important to stress, is that while teachers' efforts to adapt to the remote learning environment initially started as an effort to become a better teacher, they tended to veer towards an ambition to become a better user of Zoom (and other technology) used in the process. This study showed that teacher's image could suffer if the students perceived that they were not using the technology confidently and competently. This, among other factors, may have caused teachers to

overuse digital tools even when they were not completely indispensable, increasing their workload and also imposing certain interactional patterns with students saying less and less. While this technology gave students access to education during the crisis and made everyone assume that it will be a good way of making education accessible when and where access to it is limited, Sunstein (2001 in Audunson et al., 2020) warns that this alleged openness and collaboration that online distance learning offers might, in fact, lead to the contrary, i.e. “technologically advanced ways of “talking to ourselves” in increasingly closed circuits of communication or “echo chambers” (p. 1), which, this study shows, it does. Whether the interactional patterns that develop in remote classrooms are detrimental or beneficial to learning remain something that future studies will have to determine.

Conclusions

1. Critical review of relevant literature undertaken as part of this project showed that classroom management is a broad concept whose definition changed significantly over time shifting from focusing exclusively on behavioural control to the current broader, more ecological understanding of it as all decisions made and actions taken to build an environment conducive to learning. As classroom management relies heavily on monitoring student behaviour and interactions, the new interactional landscape brought about by remote learning had a significant impact on how teachers could see their students, monitor engagement, foster fruitful interactions between students, keep them on-task, etc. Ways in which teachers adapted their classroom management practices to fit the constraints of the medium they were forced to use was the object of analysis in this project.

2. To gain an understanding of emergent classroom management practices during the transition to remote learning, authentic video data from Zoom classrooms was collected and analysed using a combination of multimodal discourse and conversational analysis methods. The recordings were first analysed using more generic discourse analysis to identify patterns and themes present in the teacher's style of classroom management and describe the evolution of their classroom management process across the three recordings. Then, conversational analysis was applied to provide a more detailed account of how classroom management practices identified were accomplished in interaction.

3. The study of classroom management practices that emerged during the shift to remote learning highlighted the following.

- A gradual qualitative shift in the resources used for instruction and classroom management has been observed. Instead of relying on the resources of the physical space of the classroom (e.g. whiteboard) the teacher begins to use more of their digital equivalents (e.g. a visualiser image of her notes); lengthy verbal interaction with students is reduced, students are kept increasingly muted, short or closed-ended questions and feedback-gathering in written form (e.g. by using surveys) become prevalent. Apart from the easily identifiable tools and resources introduced, there are also more subtle changes, such as sharing the screen more or spotlighting one's image, making evident the teacher's changing understanding of the functioning of the Zoom environment and how she and the students can productively come together in it to learn.
- (Re)negotiation of teacher and student roles and fluctuation in the teacher's authority observed appear to be triggered by the teacher and students failing to preserve a boundary between their personal (home) and professional (school) selves. The teacher's authority is mainly re-established by increased use of digital resources (making her appear more competent) and greater control of the lesson by reducing opportunities for students to talk and otherwise get distracted.
- More formal and abstract ways of collecting feedback (e.g. written surveys to verify attendance) replace more direct and embodied methods used in face-to-face instruction (e.g. seeing students or asking a question), reducing verbal interaction with students, making feedback received from them (e.g. by a 'thumbs up') severely limited and lacking nuance, and increasing teacher workload as most of these methods require much more advance preparation. While this shows successful teacher adaptation to the immediate challenge of constant overlaps when students engaged in discussions, it also highlights an alarming trend in the longer term. As social

interaction plays a major role in learning in many learning theories, especially social constructivism, such changes in the use of talk in interaction could potentially have significant effects on learning and development if remote learning is used as a dominant mode of instruction, especially in younger children.

Recommendations

Based on the findings of this study, researchers are recommended to carry out further micro-level descriptive studies into the complexity of social interaction in remote learning environments to increase the understanding of who, when and where could benefit from this mode of instruction thus providing institutions with ways of increasing access to learning and conserving resources without sacrificing quality.

Researchers, teachers and software developers are also recommended to collectively produce more design-based research studies in order to develop remote learning environments with features that meet the needs of teachers and students.

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Appendices

Appendix 1. Transcript conventions used

Conversations have been transcribed according to conventions developed by Gail Jefferson. Only the symbols used in the project have been provided below.

[*A left bracket* indicates the point of overlap onset. ((The currently-used alternative to the double obliques. Note also, a change in descriptive language.))

Louise: 'N how tall [are you, Al,
Roger: [How tall 'r you Al.

] *A right bracket* indicates the point at which two overlapping utterances end, if they end simultaneously, or the point at which one of them ends in the course of the other. It also is used to parse out segments of overlapping utterances.

Louise: 'N how t[a l l u h r] you]↓A:]l,
Roger: [How tall 'r] ↓you] Al,]

= *Equal signs* indicate no break or gap.
A pair of equal signs, one at the end of one line and one at the beginning of a next, indicate no break between the two lines.

Maggie: ...en 'e weighs about a hunnerd 'n thirdy five pounds.=
Ronald: =AAUUGH! WHADDA L-LIE!

(0.0) *Numbers in parentheses* indicate elapsed time by tenths of seconds.

Al: ...j's be a lot'v (shh) lotta work- lotta hassle.
(0.2)
Al: =[Well,
Roger: [Well if yer goin' t' all that trouble,

(·) *A dot in parentheses* indicates a brief interval (± a tenth of a second) within or between utterances.

Mrs A: 'Ello:?
Guy: 'Ello is Curly there?
→ (·)
Mrs A: → Oo jis (·) ė-Who:?
Guy: Johnny?h An[sin?]
Mrs A: [Oo j]ist ↑a minnih,

:: *Colons* indicate prolongation of the immediately prior sound. The longer the colon row, the longer the prolongation.

Mike: ↑i̲Yeh it's all in the ↑cha̲ir=
Mike: =↓all th[at °junk's in the chair.°↓]
Vic: [W̲ o : : : : : : : : : :]↓: : : w: .=
Vic: =I̲ di̲n' know tha̲t?

:_ *Combinations of underscore and colons* indicate intonation contours. Basically, the underscore 'punches up' the sound it occurs beneath.

wo̲:rd If a letter preceding a colon is underscored, the sound represented by that *letter* is 'punched up', i.e., an underscored letter followed by a colon indicates an 'up-to-down' contour.

Kalmbach: Hi̲:.=
Ehrlichman: =How'r you̲:.

wo:̲rd If the colon is underscored, then the sound at the point of the *colon* is 'punched up', i.e., a letter followed by an underscored colon indicates a 'down-to-up' contour.

Emma: Is SA:M there with [yuh?]
Lottie: → [Y e :]a̲ h,=
Emma: → =Uh ha[:̲h,
Lottie: [Uh huh

wo̲:rd If underscoring occurs prior to the vowel preceding the colon, then the *entire word* is 'punched up', i.e., the colon indicates prolongation only; there is no mid-word shift in pitch.

Vic: 'M not saying he works ha̲:rd.

In *multi-syllabic* words, if the consonent is underscored, then all syllables thereafter are 'punched up'.

Ehrlichman: He said ė-I came dih you̲:,hh fr'm Mi̲tchell,hh
en I sai:d,h uh↓ : Mi̲tchell needs mo̲ney?

Here, the first mention of "Mi̲tchell", with only the initial consonant underscored, is produced with the entire word 'punched up', while in the second mention, "Mi̲tchell" with the underscored vowel, pitch drops at the second syllable. Likewise, the entire word "mo̲ney" with only the initial 'm' underscored, is 'punched up'.

↑↓ *Arrows* indicate shifts into especially high or low pitch.

Dan: °Thet's a good ↑ques↓tion.°
(0.6)
Louise: ↑↑Tha̲nk ↓you.

£ *The pound-sterling sign* indicates a certain quality of voice which conveys 'suppressed laughter' (various transcripts have other symbols, e.g., the Dutch guilder-sign which no longer exists).

Ken: ahh ha £I̲ don' kno̲w who's payin' fer thi(h)s I
↑think ih my fa:-ther.£

( ) *Empty parentheses* indicate that the transcriber was unable to get what was said. The length of the parenthesized space reflects the length of the un-gotten talk.

Mike: No.
(0.4)
Mike: ( ),

In the speaker-designation column, the empty parentheses indicate transcriber's inability to identify a speaker.

Roger: Paz'm z'm Miller Highlit*e.h
(0.5)
( ): hnh Yhehh

(word) *Parenthesized words and speaker* designations are especially dubious.

(Mike) [(Lee me alone.)]
Carol: [Mike I know yu]h' love' m

(blerf) *Nonsense syllables* are sometimes provided, to give at least an indication of various features of the un-gotten material.

Nixon: Jerry sh'd talk to ↑Witnaw. (0.5) And uh: (·) jis brace eem 'n tell 'im tih (·)(offih sebbatikiss)...

(( )) *Doubled parentheses* contain transcriber's descriptions.

Ray : ehh-heh-heh-heh-heh-he:h-eh=
Maggie: =((dainty snort))
...
Vic: ((dumb slob voice)) Well we usetuh do dis

Multimodal details have been transcribed according to the following conventions developed by Lorenza Mondada. Only the symbols used have been explained and exemplified below.

* * + + Δ Δ	Descriptions of embodied actions are delimited between two identical symbols (one symbol per participant and per type of action) that are synchronized with correspondent stretches of talk or time indications.	(7a) Example: 1 CUS **que±ria un pasie±go** *I'd like a Pasiego* ±points------±
---> ---->	The action described continues across subsequent lines until the same symbol is reached.	(9) Example: 1 CUS **+°eh oui°** *°eh yes°* +points-> 2 **(0.5)** 3 CUS **j'aimerais+ un bout de Saint-Nectaire** *I would like a bit of Saint-Nectaire* ->+
>>	The action described begins before the excerpt's beginning.	1 CUS **e mi +da' una bufala +di quella± là** *and you give one buffalo (Mozzarella) of those there* >>looks at the Mozzarella------± +points---------+
--->>	The action described continues after the excerpt's end.	2 SEL **vuole una bufala?** *you want a buffalo (Mozzarella)* 3 CUS **sì. quella soli±ta** *yes the usual one* ±looks at a passer-by->>
ric	Participant doing the embodied action is identified in small caps in the margin if it is not the same person as the one speaking at the time.	(4) Example: 1 CUS **•°ah oui° je• sais** *°oh yes° I know* sel •looks CUS-•