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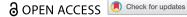
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ABSTRACT

This paper investigates the material complexity and relational emergence of 'teaching'. Reporting on a video-based ethnographic study of an upper secondary classroom in Norway, the paper centres on the following research questions: Which material-discursive practices 'matter' in upper secondary teaching situations, and how are participants' bodies shaping and being shaped by these practices? The paper combines sociomaterial practice theory with the agential realist concepts of material-discursivity and apparatus to trace the spatial and bodily enactment of a teaching situation. In the first part of the paper, I identify two material-discursive practices: the practice of tasks and the practice of friendship. Second, I examine the two practices' material intertwinement, proposing that they entangle and coarticulate a larger material arrangement termed the teaching apparatus that regulates the possibilities and limitations for 'doing' in the classroom. The paper offers a perspective on teaching that increases our awareness of its interconnectedness and unpredictability, allowing for a more fine-grained understanding of the embodied liveliness and material complexity of everyday teaching encounters. Finally, I propose that thinking with a spatially, bodily and relationally produced teaching apparatus offers an affirmative and agential approach to discussing educational quality.

Introduction

The spatial and bodily relations of everyday teaching situations are vibrant forces in the relational becoming of education (Fenwick et al., 2011). The topic of materiality is increasingly being addressed in educational research. However, there are few empirical accounts of how the material practices that constitute teaching can be understood to emerge in actual classroom situations (Bodén et al., 2020; Hinton & Treusch, 2015). The current paper presents materials from a video-based ethnographic study of a Norwegian upper secondary classroom and investigates how bodily and spatial processes contribute to the materialisation of a teaching situation. The research question informing the paper is as follows: *Which material-discursive practices*

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'matter' in upper-secondary teaching situations, and how are participants' bodies shaping and being shaped by these practices? The ethnographic material is analysed through engaging the empirical data with sociomaterial conceptions of *practice* (Gherardi, 2021) and Barad's (2007) conceptualisation of *material-discursivity* and *apparatus*. Following this sociomaterial framework, I assume that the phenomenon of 'teaching' emerges because of relational enactments that are co-performed by teachers and students as well as a multitude of other material participants (Fenwick et al., 2011).

The present paper considers teaching as a joint effort that emerges from spatial and bodily engagement. This stance disrupts the predominant assumptions of teaching, for instance, as an individual activity primarily enacted by teachers (Larsen, 2010). Moreover, it questions the feasibility of the widespread desire for educational practices to adjust to predetermined, unified standards. According to Landri (2022), standards are 'normative specifications based on the temporary simplification of education' (p. 38). Holloway (2021) cautions that the current tendencies to provide teaching standards that privilege predefined, singular ways of 'doing' teaching risks concealing the rich plurality of teaching.

The study presented in this paper builds on previous research critiquing such simplistic ideas by conceptualising education as a complex and materially constituted phenomenon (Fenwick et al., 2011; Gorur et al., 2019). Different strands of sociomaterial theories have enabled researchers to consider practices of teaching and learning in a broad range of contexts while considering their material relationships in terms of processes, gatherings, networks or assemblages (de Freitas & Sinclair, 2014; Nielsen et al., 2022; Vanden Buverie & Simons, 2017). Some studies have brought to the fore the spatial production of educational practice, for instance, disrupting notions of an 'inside' and 'outside' of schools (McGregor, 2003; Nespor, 1997, 2000). Drawing on critical theory and feminist materialism, researchers have addressed how bodily practices do productive work in classrooms, for instance, how forces of affect shape what students and teachers can (not) do in educational encounters (Dernikos, 2020; Mulcahy, 2012; Taylor, 2018). Sociomaterial studies have focused on how human bodies are connected to things (Roehl, 2012; Taylor, 2013), built environments (Herman & Tondeur, 2021; Rosén Rasmussen, 2021) and concepts (de Freitas & Palmer, 2016). Research on micro-level classroom interaction has also brought to the fore how educational technology-in-use performs unexpected relations during daily school activities (Aagaard, 2017; Alirezabeigi et al., 2022; Bodén, 2017; Sørensen, 2009).

Barad's agential realist theory has informed materialist research on learning processes (Juelskjær, 2020; Lenz Taguchi, 2010; Plauborg, 2018). Researchers have also highlighted the presence of more complex material relational structures in educational settings by describing a wide range of apparatuses of power (Barad, 2007), including, for instance, assessments of educational readiness (Nielsen et al., 2022), student evaluations of teaching (Thiel, 2020), curriculum theory (Pratt, 2021), neoliberalist conceptions of critical thinking (Danvers, 2021), and material storytelling (Juelskjær, 2014). Adopting a Foucauldian perspective, Simons and Masschelein (2008) and Juelskjær and Staunæs (2016) suggest that a learning apparatus can be traced in the present-day public discourses on learning as capital, competence management, learning outcome and learning-centred leadership.

This field has demonstrated how materiality is active in the complex co-enactment of education practices. The current paper expands on these insights by addressing which material-discursive practices emerge in upper secondary teaching situations. I begin by presenting the sociomaterial framework before providing a brief outline of the methodological and analytical processes of the ethnographic study. Next, I present a series of excerpts from an upper secondary classroom. Through an analysis of their relational, spatial and bodily choreography, I articulate how two material-discursive practices are at play, termed *the practice of tasks* and *the practice of friendship*. In the final section, I discuss the intertwining relationship between these two practices and argue that teaching can be understood as an entanglement of multiple practices, coined here as *a teaching apparatus*.

Sociomaterial practice theory and the apparatus

Following a sociomaterial stance, I assume *practices* to be a processual phenomenon that arises from the situated entanglements of action, embodiment and knowledge (Gherardi, 2021). Social practices may appear stable but are in constant evolution. Their endurance depends on the ongoing entanglement of multiple sociomaterial 'elements', such as bodies, doings, sayings, concepts, texts, objects, technologies, space and time (Gherardi, 2016). Gherardi (2021) describes practice as a relatively stable 'way of doing' that interconnect such material entanglements.

The current paper aligns with a posthuman branch of sociomaterial practice theory that addresses how the material elements within practice 'hold together and acquire agency in being entangled' (Gherardi, 2017, p. 50). There are numerous spatial and bodily possibilities for how the elements of practice may be 'held together' (Orlikowski, 2007). Meanwhile, as some relational entanglements grow stable, they arise as *the* legitimate and meaningful way to engage in certain situations, thus resolving this indeterminacy. Practices specify explicit and implicit rules that provide opportunities and restrictions for movement and action. Over time, some modes of doing become sedimented, and as sources for normativity, they perform an agential and binding force on bodies (Gherardi, 2021).

Barad (2007) emphasises that discursive practices and material phenomena always arise together, and this co-articulation of agency is termed *material-discursivity*. Thus, material relations do not merely contribute to social practices but rather *constitute* practices and their regulatory processes (Barad, 2007). The binding effect of material-discursive forces may be a response to explicit rules or to a more implicit, embodied sensation (Gherardi, 2017). For instance, the subtle affective pull of responsibility or a feeling that something appears logical, natural and appropriate to do and say (Orlikowski & Scott, 2015). As a result, a material-discursive practice should be understood as shaping relations by connecting its members and orienting their bodies, actions, habits and values in a specific direction.

Gherardi (2021) explains that the objects, bodies and spatiality of a situation may (dis) connect in ways that change or reinvent the configuration of the practice. Furthermore, as the material elements of the practice connect, they 'acquire agency through their connectedness' (p. 10). A person may, due to their current or previous connections,

memories or anticipations, respond by (re)enacting, resisting or translating the rules of a practice. Consequently, because practices come into being through their material members, in each day-to-day instance of its 'doing', the practice is being shaped by its members as they (dis)connect and establish new relations and associations (Gherardi, 2016).

A practice does not arise as a self-contained entity but intersects and unfolds in relation to other practices in a larger situated texture of practices (Gherardi, 2021). Practices may exist in mutually dependent relationships, or in relationships of opposition to other practices, interfering with one another's established rules and modalities (Nicolini, 2012). Thus, the possibility of enacting one practice depends on the configuration of other practices. Therefore, it is crucial not only to map connections of the elements within a practice but also the connections between practices.

An analytical tool that is suitable to describe the complex inter-involvement of practices is Barad's (2003) concept of *apparatus*. In their agential realist account of the term, Barad draws on insights from Bohr, Foucault, Butler and Haraway. Barad (2007) defines the apparatus as specific and dynamic *boundary-drawing practices* (p. 208), inviting us to consider how stable properties and intelligibility are performative effects of the apparatus' relational enactment. According to Barad (2007), meaningful boundaries materialise through the process of *intra-action*, which is understood as a material and relational entanglement. For instance, when several situated practices intra-act, their entanglement articulates a more complex formation of boundaries. The specificity of the entanglement makes particular ways of 'being' and 'doing' appear relevant, or within reach. In other words, the agential force of the apparatus emerges through its iterative and relational (re)configuration of the world (Barad, 2003, 2007).

There is some ambiguity in how Barad differentiates between material-discursive 'practices' and 'apparatuses'. For the present paper, I make an analytic distinction between the two terms. I understand the apparatus as constituted by the intra-action of several agential practices. Thus, the material-discursive production of a phenomenon (e.g. a teaching situation) does not only depend on the rules and responsibilities of 'one' practice but instead emerges in the more complex relationality of a larger boundary-drawing apparatus of multiple practices (Barad, 2007, p. 218). Consequently, it is the relational configuration of the apparatus, not any singular actant or practice, that determines the differential 'cut', thus creating the 'actual' possibilities and constraints for spatial and bodily action within each situation.

Importantly, the material discursive practices, and all their human and nonhuman members have the capacity to (dis)connect in the ongoing intra-action (Barad, 2007). They are actively co-constructing the apparatus and, thus, involved in its ongoing, dynamic work of (re)configuring and constraining possibilities for being and doing. Therefore, the material specificities of practices are crucial in the relational configuration of the apparatus. In this approach, there are no fixed or external boundaries. Instead, the apparatus is constituted by specific agential practices that entangle and co-enact 'specific exclusionary boundaries' (Barad, 2003, p. 816). The agential emergence, trajectories and effects of the apparatus are embedded and performed *within* the material relations that it consists of (Julien, 2021).

By following this posthuman sociomaterial framework, the present paper assumes practices and apparatuses to be embodied and spatial processes that enact relational

capacities and connections. This theoretical orientation creates an analytic sensitivity towards the material arrangement of day-to-day teaching situations, specifically to how practices emerge and combine, and to their situated, boundary-drawing effects.

Methodological considerations

The current paper presents a video-based ethnography in a Norwegian upper-secondary classroom. The research question asks *which* material-discursive practices 'matter' in the upper secondary teaching situations and *how* participants' bodies were shaping and being shaped by these practices. Following the sociomaterial approach to practice, the inquiry started from the 'midst' of everyday life of classroom activities as they unfolded as part of situated relationships (Klykken, 2021). Taking place in 2018, the ethnographic fieldwork followed the activities of a class of students 17–18 years old and their teacher in one subject called 'The Media Society' over three months. While conducting the project, I actively engaged with national guidelines for research ethics (NESH, 2016), including the principle of informed consent (Klykken, 2022) and the national requirements for protecting the participants' privacy and anonymity (NSD, 2020).

During the fieldwork, I recorded a series of approximately 40 lessons using two pocket-sized cameras and one separate audio recorder. Making audio-visual recordings allowed me to examine in detail the relational, spatial, verbal and nonverbal bodily processes of the classroom (Luff & Heath, 2012). One camera would often be placed to record an overview of the whole-class situation, while the other camera simultaneously recorded the same situation from a different angle or with a narrower focus, such as following the activities of one group of students. Both cameras could easily be moved in response to unfolding activities. The recorded material was supported by my field notes and the situated knowledge I gained from being in the field.

The analytical work entailed a mapping of spatial and bodily relationships, and I looked for ways of doing that appeared normalised and legitimised within the teaching situations. I also examined the relationships between these material practices. During the first phase of the analysis, I organised the recorded material chronologically into a linear timeline using video analysis software. I labelled segments of the timeline using layers of non-excluding, descriptive keywords referring to, for instance, the spatial arrangement of bodies in the room, types of interaction and themes of conversations. This process eased my access to the video corpus (Coffey, 2018). Next, I transcribed a selection of short segments from the recorded activities. These situations were chosen with the aim of making detailed descriptions of as broad a spectrum of material practices as possible (Knoblauch & Schnettler, 2012). I selected situations that appeared to be recordings of typical actions and arrangements, for example, whole-class lectures and group work, but also more unusual unclear or ambiguous situations and arrangements, for example, situations of apparent confusion or inactivity or of contrasting emotional qualities, for example, particularly joyous or tense moments.

In the next phase, I connected the empirical data with theoretical constructs (Jackson & Mazzei, 2012). This process entailed a nonlinear interplay between the transcriptions and theoretical concepts, in other words, switching between reading-the-data-while-thinking-the-theory and reading-the-theory-while-thinking-the-data (Jackson & Mazzei, 2012). It was, for example, useful to 'plug in' the theoretical concept of material-discursive practices early in the process. Thus, theory aided the disruption of a hard-to-

break habitual focus on students and teachers as the main actors of the classroom and instead oriented my analytical focus towards bodily doings and spatial connections. In the final part of the analysis, the empirical material was 'thought' together with the concept of apparatus (Barad, 2007).

A relational mapping of classroom practices

This section presents a relational account of a teaching situation in an upper secondary classroom. To address the question of which practices 'mattered' and how these practices were shaping and being shaped by bodies, I have placed the analytical focus on the emerging moment-to-moment material relationships. I begin by mapping and discussing the bodily and spatial contributions to the material arrangement before making an analytic distinction between the two types of material-discursive practices.

The enactment of a task: 'Come up and write (.) all of you'

It is just before lunch, towards the end of a double lesson. The classroom was organised so that individual desks and chairs were placed next to one another, forming rows of desks facing in the same direction. The placement and orientation of the students' desks produced a passage in the middle of the room, leading to a more open space appearing to be the 'front' of the classroom. In this section of the room was a projection screen on wheels, a large whiteboard attached to the wall and a freestanding table on wheels. This teacher's desk was tall and narrow, fitting a standing person, and it was facing in the direction of the students' desks.

The theme of the lesson was media usage statistics. Leading up to this point in the lesson, there had been a 15-minute lecture. The teacher had been talking while standing and moving around in the front section of the room, switching between facing the class and facing the whiteboard while using a marker to write on it. The students were seated by their desks on swivel chairs, directing their bodies and gazes towards the teacher and front area of the room, remaining silent, except when responding to questions from the teacher.

The teacher had drawn up a table with several empty columns on the whiteboard. The header of the first column said 'Media channels' while the other columns had headers with keywords representing the different functions of media in society. The teacher was now standing in front of the columns on the whiteboard, with the marker pen in his hand.

Vignette 1

Bodily doings	Doings with words
The students are seated and silent, gazing in the direction of the teacher and the whiteboard. The teacher turns towards the whiteboard and taps with the marker pen on the empty column with a header titled 'media channels'.	Teacher: Now, we have (.) in a way (.) looked at which functions the media has, so now we have to look at different media channels.

<div align="right">(Continued)</div>

Bodily doings	Doings with words
The teacher turns back towards the students and looks around the room with some hesitation, as if he is modifying his plans.	T: So next (.) I think what we will do, so that it is not just me harping, but you doing it yourselves— (.) Erm— (.) (We) should have had more markers. (.) You know what —
The teacher looks at the 'teacher-desk', walks over to it and picks up a cardboard carton from the desk drawer and pulls out some whiteboard markers. Then he speaks again to the class, this time more resolutely.	T: Yes, here, we have lots of markers (.) Yes. Come up and write (.) all of you.

Note: (.) = pause; Underline = emphasis.

Initially, during the lecture, the task for the students was to stay seated and be silent while listening, looking and replying to the talking and moving teacher body. From the moment the teacher announced that next, the students would be 'doing it' themselves, a new task was given to the students. Starting at this point, the students, not the teacher, were expected to be 'active' by moving to the front of the room and writing examples of media channels into the column on the whiteboard.

Vignette 2

Bodily doings
Student 1, sitting near the front of the room, and Student 2, sitting at the back, slowly stand up. They glance seriously but playfully at each other. Then, suddenly, both rush towards the front of the room. For a couple of seconds, their bodies enter a single energetic 'bundle' as they appear to compete by preventing each other from getting to the front of the room first.
Some of the other students smile or laugh at the two bundling bodies; some exchange weary looks, while others remain serious or unaffected. (Play-fighting was not an unusual activity for these two students.)
As soon as the two students reach the teacher, their bodies separate. The teacher gives them a marker pen, and they walk calmly up to the whiteboard and begin to collaborate on writing the names of different media channels in the empty column.

These two first vignettes show how the bodies in the classroom were transformed from one spatial constellation to another. When the teacher handed over the responsibility for writing to the students, the rules of the classroom changed, and the possibilities for students' movement and action were altered. This change is visible in the two students' immediate response to the teacher's announcement.

This situation of 'handing over' rules and responsibilities demonstrates a particular material component within the teaching situation: the students' orientation towards the new requests for doing. This bodily orientation was a recurring relational pattern throughout the ethnographic fieldwork. The teacher routinely provided the students with new rules for doing, and the students actively and routinely tuned into the new allowances and restrictions. While each new task prompted a range of different responses, the students' attentive measuring of these rules (and to how they may alter) was a stable 'way of doing' in the upper secondary classroom. The iterative direction of attention towards the rules and responsibilities of each specific task will be conceptualised here as *the practice of tasks*. A task can be understood as a particular set of actions tied together with personal responsibility. Thus, the request to perform a school-related task resulted in the bodily 'pull' of a felt duty or obligation to perform an action or to act in a specific way. In the

above situation, the practice of tasks encompassed both the doings of the teacher when he 'tied' responsibilities for future action together with the students' bodies and the way the students actively evaluated and sought to align with the new boundaries for bodily doings and sayings.

Through the collective, habitual orientation towards the current rules for action, the practice of tasks connected and shaped bodies while producing capacities, possibilities and limitations for moving and speaking in the classroom. In the initial setup, the task of 'following the lecture' required stillness from the students, while the task of 'writing on the whiteboard' required movement. In this sense, the local configuration of each enactment of the practice produced temporary openings and limitations for bodies moving and connecting. The practice of tasks is an ordering force 'at work', regulating bodies in the upper secondary classroom, thus constituting a *material-discursive practice*.

Importantly, the practice of tasks is the accomplishment of a multitude of material participants. In the vignette above, the physical orientation of the furniture directed the students' attention towards the teacher and the whiteboard at the front of the room. Therefore, the classroom layout can be seen as contributing to the configuration of the practice of tasks. The teacher's statement on himself 'harping' and that the students instead should be 'doing it' can also be understood as a material contributor to the enactment of the practice of tasks. The comment could be the response of an experienced teacher who senses the presence of tired or restless students' bodies because this situation occurred towards the end of a double lesson. The comment could also reference ideals of 'good teaching' as being less teacher centred and including more student-active learning. This situation illustrates how broader societal forces are entangled and contribute within the in situ materiality of the classroom, including educational policies and teacher education. Thus, a heterogeneity of doings, sayings, things and wider societal processes contributed to the practice of tasks and how it shaped living bodies and their capacities for action in this upper secondary classroom.

The situated configuration of the practice of tasks created a local contract for what actions and movements were legitimate. The practice temporarily applied a set of rules for its members' bodies to follow and organised the materiality of the classroom in a particular way. However, as the vignettes below show, after the teacher's initial request for the students to move and write, a wide spectrum of responses continued to unfold in several waves of spatial and bodily action. This highlights how the capacities to do the task were not evenly distributed among all students and that the practice of tasks was not alone in shaping the capacities to move and interact.

The enactment of friendship: walking 'up' in pairs

Next, Students 3 and 4, sitting together near the front of the room, stood up and walked calmly up to the teacher, who handed them a marker pen. Their calm and controlled movements appeared as a bodily contrast to the two first students' energetic, playful encounter. There were now four students using the whiteboard. Together they formed a wall of bodies, blocking the rest of the class' view of the column in which they had been told to write.

In the meantime, the rest of the students remained seated and talked quietly among themselves. Their overlapping voices and subtle movements filled the room. Some students talked about whether to walk up and about what to write, and some commented on the crowded space by the whiteboard. It became clear that there was some tension and hesitation among the students over whether to join the activity because of the group of students blocking the column.

Vignette 3

Bodily doings	Doings with words
Student 5 is sitting by her desk, facing the whiteboard and talking to Student 6, who is seated in the same row.	Student 5 [confidently]: Just walk up and push them aside. Student 6: But I don't know what to write.
The teacher slowly walks down the middle of the classroom, towards the back of the room, while smiling and communicating with some of the students on his way.	[Inaudible talking]
As the teacher moves past Student 5, they exchange a 'fist bump' (a greeting gesture).	
Next, Student 5 almost jumps up and walks resolutely up the space between the rows of desks.	
Halfway up to the whiteboard, Student 5 cheerfully calls another student, Student 7, by her nickname.	Student 5: Liv-usen!
Student 7 responds immediately and follows Student 5 up to the whiteboard. Together, they inspect the growing list, manoeuvre their way around and through the group of students to access the whiteboard and join the writing activity.	
Meanwhile, the teacher walks to the back of the room. Student 8, sitting in the last row, then stands up and walks over to talk to the teacher before joining the activity at the front of the room.	
Some students stay by the whiteboard; others return to their desks, while new students join. While on the whiteboard, the students alternate their movement between taking steps back, looking at the list from a distance while considering what has not been written and then reaching past each other to write again. Some students crouch to access the bottom of the growing list. Some are talking, enthusiastically or exaggeratingly asking each other what the others are writing. Some examples of what is written are the following: 9GAG, Netflix, Tumblr, Facebook, YouTube.	

In the above vignette, we see how some of the students made friendly statements or gestures, such as Student 5's calling her friend to join her, or acted in other ways to increase proximity to their peers, such as the first two students playfighting. Interestingly, the first six students who walked up to write on the whiteboard in this event did so together, in pairs. There were also informal, friendly connections in the student-teacher relations, as seen in the exchange of a 'fist bump'. Thus, the above situation shows several examples of how the students connected, physically and verbally, with their co-students and the teacher while engaging in the task.

These types of lively, relational exchanges occurred throughout the ethnographic fieldwork. Students would, for example, talk casually to each other about their progress on a task, ask for support and give each other advice. The students could also connect through off-task topics, for example, by telling jokes, discussing news topics, and sharing details and stories from their everyday life, both in person and via digital devices. Friendly connections also emerged through nonverbal gestures, body language or other kinds of spatial behaviour and physical interaction, for

instance, exchanging smiles or other playful facial expressions, hugs, and physical pranks.

The students' orientation towards the possibilities and restrictions for friendly connectivity was a recurring 'way of doing' in the teaching situations. Therefore, these enactments of friendliness, affinity and companionship are conceptualised here as *the practice of friendship*. Friendship is understood as an affective encounter manifesting through a shared attraction and connection, and this engagement is a dynamic, fluid, informal mode of being together (Stivale, 2000). The closeness of a friendly alliance implies a sense of responsibility and loyalty, for instance, requiring one person to follow, listen to or respond to another (Albrecht-Crane, 2005). Nevertheless, friendly relationships are complicated, nuanced and open-ended, because they also involve possibilities for distance, dissonance and disconnection (Stivale, 2000).

During the fieldwork, I found that some patterns of friendly connections remained relatively stable while others changed. Some students appeared to have close friends within the class, while others did not. Some groups of students seemed to be tight-knit and closed, while other students moved freely between many groups of friends in the same class. The boundaries in each situated enactment of the practice of friendship were contingent on the students' relational histories, such as preferences, expectations and memories of previous friendly connections. Such relational traces are visible in the above vignette, for example, in the students' enactment of pairs. Thus, the 'local' potentiality for friendly connections was unevenly distributed.

The configuration of this practice's boundaries for 'doing' were also actively composed of other material elements. For instance, the above vignette shows how the whiteboard and writing task connected the students. In other teaching situations, I also saw friendly connections frequently happening over, for example, mobile phones, computer games, shopping websites, sports news, computer chargers, water bottles and walking together to a drinking fountain right outside the classroom.

Consequently, the practice of friendship produced connections and, depending on each situation's material arrangement, modified the legitimate ways for students and teachers to move and connect in each classroom situation. The practice of friendship was, therefore, another *material-discursive practice* that affected this classroom's possibilities for engaging in movement and action.

The enactment of friendship (while resisting the task): 'Everything has been written'

Although some of the students were eager to move away from their desks to carry out the task and engage in friendly connections, other students remained seated and reluctant to join the activity on the whiteboard. The obstacle of the 'wall' of bodies and not knowing what to write caused some students to hesitate to do the task. Although the teacher had requested that all the students walk to the front of the room, by this point in the activity, only around half of the students had written on the whiteboard. Thus, the class translated the given task into activity and eagerness, as well as nonactivity, hesitancy and tension.

The following vignette shows an example of how the local configuration of the practice of friendship 'mattered' in the sense that it constrained some of the students' participation in the practice of tasks.

Vignette 4

Bodily doings	Doings with words
The teacher suddenly speaks loudly, from the back of the classroom, and directs his voice to three seated students.	Teacher: (Student 9, Student 10 and Student 11). You have to (.) go to the front and write. (. . .) You can't let 'the boys' take over.
Students 9, 10 and 11, seated on the same row, look at each other and then towards the whiteboard, while talking quietly.	[Inaudible]
Student 9 replies to the teacher.	Student 9: But they have written everything. Everything has been written.
The teacher replies, surprised.	Teacher: Have they?
Meanwhile, Student 5 has returned to her desk. Next, she speaks in the direction of students 9, 10 and 11.	Student 5: You can write different things than what they have written. Write VG [a Norwegian newspaper]. Write Pinterest. (. . .) Write Tinder! [a dating app].
Students 9, 10 and 11 swivel their chairs and look hesitantly towards each other.	
Then, Student 9 turns to Student 5 with a smile and reply.	Student 9: You can write it.
	Student 10: She can write it. (.) You (go ahead and) write it.
Students 10 and 11 laugh.	[Laughter]
Student 5 stands up and walks resolutely back to the whiteboard. After writing, she returns to her desk, and speaks smilingly to students 9, 10 and 11, who remain seated.	[Inaudible talk and laughter]

Note: (.) = pause; Underline = emphasis; (. . .) = speech left out.

Based on how they connected in other events, Students 9, 10 and 11 appeared to be close friends. In this vignette, the students' combined resistance to enacting the teacher's requests for action can be understood as a re-enactment of their past 'doings' of friendship. Even after Student 5's friendly attempt to help, the three students resisted the request of 'doing the task' and remained seated. Thus, the students enacted the practice of friendship in a way that entailed *not* participating in the requested action. Their shared response to the task was to remain loyal and connected. In this situation, the 'pull' of responsibility to (re)enact the friendly alliance appeared to be incompatible with the 'pull' of responsibility to enact the practice of tasks. In the previous vignettes, we saw how the students' orientation towards peer connections produced temporary alliances that enabled them to enact the task, for instance, by becoming 'pairs'. However, as this situation shows, the practice of friendship also produced connections that enabled some students to refuse the responsibility specified by the task.

Configuration of the teaching apparatus

The above vignettes show how both the practice of tasks and the practice of friendships functioned as material-discursive forces in the upper secondary classroom. The two practices *shaped* the students' doings by creating boundaries for actions that appear rational, legitimate and 'within reach'. The vignettes also show how the students were engaged in relations in ways that allowed them to *shape* practices by negotiating, translating and resisting requests

for action. Importantly, the two practices did not unfold as separate processes. In this section, I place the analytical focus on the relationship between the two practices to show how they enfold and act upon each other to form a larger material-discursive entanglement.

Interweaving practices

The practice of tasks is discernible in the students' iterative direction of attention towards the responsibilities of the task. The practice of tasks produced a specific set of boundaries for actions, including amplifying and diminishing the students' possibilities for 'doing friendship'. For instance, the task of following the lecture required the students to listen to and look at the teacher, leaving little room to interact with peers. The task of 'writing on the whiteboard' required the students to move away from their desks, which provided more possibilities (for some students) to engage in friendly connections. Thus, the practice of tasks temporarily shaped the opportunities and restrictions for moving and interacting with peers, consequently, creating specific material conditions for the students' enactment of the practice of friendship. In this sense, the configuration of the practice of tasks sometimes facilitated and enabled the practice of friendship, and at other times, it did not.

Likewise, *the practice of friendship* produced a particular set of boundaries for action within the same teaching situation that amplified and diminished the students' possibilities for 'doing the task'. We can, for instance, understand the two students' practice of friendly, playful fighting as an affective force that enabled them to walk up to the whiteboard. Similarly, the loyal alliance performed by the three seated students limited their involvement in the task. In other words, the local configuration of responsibilities in the practice of friendship sometimes facilitated the enactment of the practice of tasks and at other times not.

As such, the two practices continuously affected each other. The responsibility produced by the obligatory 'pull' of the practice of tasks interweaved with the responsibility produced by the 'pull' of loyalty in the practice of friendship. Furthermore, the boundaries for 'doing tasks' and 'doing friendship' can be understood as interweaving into a larger, more complex texture of rules and responsibilities. Thus, this interplay generated a *third* set of boundaries that rendered some actions (un)doable within this specific classroom situation, namely *the teaching apparatus*.

The teaching apparatus

According to Barad (2003), an apparatus consists of specific agential practices that entangle and co-enact 'specific exclusionary boundaries', which, in turn, generate 'dynamic (re)configurings of the world' (p. 816). Following the sociomaterial notion of inseparability (Orlikowski, 2007), the potentiality of a classroom is abundant, and there is no inherently right way to enact 'teaching'. However, the teaching apparatus, consisting of the two practices, functioned as a productive and constraining force that temporarily resolved this indeterminacy. Its relational 'setup' generated a dynamic configuration that caused each classroom encounter to materialise into an array of 'ways of doing', which included and excluded specific ways of 'doing tasks' and 'doing friendship'.

Notably, the boundaries were not the same for all of the students all of the time. Although the students were involved in the same practices and responsibilities, they engaged with them differently. In the above configuration, some students emerged as 'active', doing the 'right' activity by moving, writing, speaking or being spoken to. Other students were 'inactive' or not doing the 'right' activity by remaining seated, not writing, speaking nor engaging in a friendly alliance. Barad (2007) uses the conception of *diffraction* to explain this distributing effect of the apparatus: when waves meet, their phases may enhance or cancel one another, and consequently, their interference creates a 'composite waveform' (p. 76). Rather than creating a clear set of boundaries for doing, the teaching situation's 'actual' responsibilities diffracted into fuzzy and complex patterns. In this sense, the teaching apparatus created not just one set of rules, but a spectrum of boundaries for legitimate actions. The result was a situated distribution of capacities and responsibilities that made different ways of doing emerge as 'within reach' for different students. Importantly, this does not mean that the teaching apparatus was deterministic. Instead, as shown, the agential potential for change was embedded in the entangled state of the apparatus. Hence, the students, teachers and other material members were not just *shaped by* the apparatus; they were also *shaping* the configuration of the apparatus.

Concluding thoughts

At the beginning of this paper, I asked *which* material-discursive practices 'matter' in the upper secondary teaching situation and *how* participants' bodies were shaping and being shaped by these practices. The close tracing of the spatial and bodily processes within the upper secondary teaching situations has shown how the material-discursive practices of tasks and friendship (re)configured the classroom's material relations. The practices, in turn, were also shaping and being shaped by each other as part of the larger relational setup of the teaching apparatus. Hence, the agential work of the teaching apparatus depended on the two practices and their reciprocal relation, as well as each of the practice's 'inner' spatial and bodily alignments.

One key contribution of this paper relates to the importance of friendship. Recent research on the material relationality of education has, in similar ways, argued that the enactment of friendship (Sellar, 2012), informal social relations (Hickey & Riddle, 2022; Plauborg, 2016; Riese et al., 2012) and meaningful interpersonal connections (Gravett & Winstone, 2022; Gravett et al., 2021) are productive of the conditions for learning in pedagogical encounters. This paper's arguments add to the existing research by articulating 'teaching' as an apparatus that is relationally enacted by *both* the practice of tasks *and* the practice of friendship. Furthermore, understanding that friendly connections actively construct and shape the 'actual' fabric of teaching situations can support educators, researchers and policymakers in engaging more responsively and responsibly in their work on educational practice.

The present paper draws a rich picture of the classroom, thus adding to the 'complex turn' in research on professional teacher practices (Nerland, 2022; Strom & Martin, 2022). The paper articulates both the regulatory forces and fluid boundaries of 'teaching', while putting spatial and bodily processes at the centre of the relational becoming of the teaching apparatus. Consequently, no single actant controls the teaching apparatus. This

argument challenges current practices of assessing educational quality using predefined standards and student performance data (Appels et al., 2022; Connell, 2009; Wittek & Kvernbekk, 2011). Acknowledging the relational becoming of each teaching situation means recognising that it often takes unexpected trajectories and has unforeseen effects, which, in turn, de-emphasises the agential significance of individual teachers in educational change.

Furthermore, as the present paper has shown, even a small change in the material arrangement of a teaching situation changes how the teaching apparatus distributes capacities. As such, there is a need to pay attention to the fine details of the apparatus and its boundary-making practices. Thinking with the concept of a teaching apparatus is one path to increase awareness of the interconnectedness and unpredictability of teaching and allow for a more fine-grained understanding of the embodied liveliness and material complexity of everyday classroom encounters. From this stance, the qualities of 'teaching' are understood as embodied and embedded in the materiality of everyday situations. Therefore, I propose that the teaching apparatus can offer a productive approach to broaden the debate on the qualities of educational practice.

Approaching teaching qualities as emerging from material relations resonates with an *agential* and *affirmative* (Braidotti, 2019) attitude towards education. This way of thinking reduces the attachment to consistency and sameness, instead accentuating the situated configuration of practices with an openness and curiosity to how things can change and be different (Staunæs & Brøgger, 2020). Inquiring into education from an affirmative and differential approach makes it possible to tap into the plurality of practices and variations in perspectives. This stance also sensitises our attention towards complexity and the importance of connections. I propose that inquiring into how practices co-constitute the material trajectory of the teaching apparatus is one way to begin the open-ended process of mapping diverse educational qualities that are not valued or easily measured by the current quality systems. As such, attending to material relations can contribute to alternative and more qualitative valuation schemes, integrating spatiality, bodies, relations and affects (Fenwick et al., 2011; Nespor, 2004).

Taking an affirmative and experimental stance can also reorient practitioners to the ongoing relational possibilities and limitations of educational practice. Teachers' work is increasingly complex, integrating new technologies and relations both inside and outside the walls of the school (Nerland, 2022; Nespor, 1997). The relational complexity of students' lives are also intensifying, for instance, through technologies that traverse school – home boundaries, such as digital practices of social inclusion/exclusion and bullying (Søndergaard & Rabøl Hansen, 2018). Moreover, the increasing relational complexity of schools makes time a limited resource, and teachers have expressed the need for more time and space dedicated to planning, reflecting on and discussing teaching processes and relations (Hickey & Riddle, 2023; NOU 2023:1).

What we choose to direct attention towards gains value (Ahmed, 2010), and this also counts for education. Choosing what to direct attention to when evaluating educational quality is always partial and excludes perspectives. As argued by Holloway (2021), there is a danger that simplistic ideas of teaching practices can suppress diversity, which, in turn, can restrict our curiosity and imagination concerning 'what school *is*, and what it *can be*' (p. 164). Additionally, a one-dimensional approach to teaching quality may reduce the

overall educational responsiveness to the changing and complex challenges of society today (Holloway, 2021). Requiring time-constrained teachers to pay detailed attention to simplistic notions of teaching quality may hold back alternative ideas about what qualifies as good education. In conclusion, I argue that asking teachers, researchers and policymakers to direct more careful attention to the interconnectedness of bodies and practices in everyday pedagogical encounters, can be one way to better understand and value the much-needed qualities of diversity, connectivity and responsiveness in educational practice.

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Disclosure statement

Notes on contributor

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