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An exploration of human and platform intra-actions in a digital teaching and learning environment

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ABSTRACT

This study uses a sociomaterial critical posthuman paradigm to examine possibilities, constraints, and tensions that come into view in the ‘intra-action’ between teachers and a digital environment. It considers how teacher subjectivities may be reimagined in new digitised visuospatial environments. This qualitative study utilises reflective interviews with things to illuminate general issues of subjectivities in human/digital contexts in a newly adopted Virtual Learning Environment (VLE) at a university in the Middle East. The interviews reveal several diffractions from the new entanglement created by introducing the new VLE. This highlights what it means to be a higher education educator in the digital age. This study contributes to critical research on digital assemblages to counteract the wholly positivist and non-problematized discourse of instrumentalization of technology use in education that often accompanies them. It also creates more openings for discussing posthuman subjectivities in sociomaterial contexts.

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Posthuman; sociomaterial; digital education; education; teacher subjectivities

Introduction

This research considers the digital environment (Crook 2013; Eynon 2017) of a newly implemented Virtual Learning Environment (VLE) in a higher education institution as a new space of intra-action (Barad 2007) between material and humans. It considers what it means to teach within this new context of digitisation (Bayne 2016). As technology advances, it changes how we understand our bodies, text, and materiality. This has implications for teaching and learning in higher education. It can be argued that since few spaces of teaching and learning have not been affected by the digital (Eynon 2017; Gallagher, Breines, and Blaney 2021; Selwyn 2017; Teräs, Teräs, and Suoranta 2022) and because of the discourse of technology as either saviour (Gallagher and Breines 2021) or benign tool (Hamilton and Friesen 2013), there is an ethical imperative to investigate these entanglements. A sensemaking (Introna 2019) exercise should consider these environments. In studying intra-actions (Barad 2007) within this digital environment, this research examines the entanglement of teaching and new VLE from a sociomaterial, critical posthumanist (Bayne 2018) perspective and what emerges from this. The aim is to understand teacher subjectivities in new digitised visuospatial environments and how both are positioned and conditioned to act in particular ways (Hultin 2019). The study utilises reflective interviews with faculty while watching recordings of class sessions to investigate the enactments of the teacher and the platform, the openings, closing, and tensions created. I aim to answer the following questions:

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- (1) How do educators reflect on/describe their positions in relation to the new VLE?
- (2) Through teacher reflections on the teacher and VLE intra-action (Barad 2007) and new space, what possibilities, constraints, and tensions come into view?
- (3) What do the 'entanglements' reveal about the materialisation and redefinition of subjectivities within this intra-action?

Context

A new curriculum and online Virtual Learning Environment (VLE) were implemented in a university in the Middle East in 2021. This is a result of a partnership with an American education company. The VLE is a platform purpose-built by the partner and designed around active learning as a pedagogy in which students are actively engaged in the learning process through activities such as problem-solving, discussion, and experimentation. Students are provided with links to material to read or watch before the online class and the VLE is an online setting where active learning is supposed to be implemented.

Students engage in critical thinking and problem-solving discussions and activities in class. The teacher 'controls' each lesson plan by navigating through a 'timeline' using a mouse/trackpad and keyboard. For each course in general education, students attend two online and one in-person class every week. This study examines online classes. Synchronous classes are recorded and both students and instructors can view the recordings. Instructors can monitor student progress and participation in all class activities during and after class. A keyboard shortcut lets teachers examine students 'talk-time' in class. Back-end data includes teacher talking time and is accessible to instructors outside of class. This is one of several student and teacher performance data sets accessible to educators.

All faculty working in the new college applied and underwent an interview and screening process. Faculty were informed of the new conditions and expectations. New faculty joined from within the existing university and from external applicants. While all faculty received the same training and are made fully aware of the teaching environment and expectations prior to starting, we should consider that they may have different reasons for wanting to accept the job. In addition, while conditions are explained prior to starting, what happens can differ from expectations. We could consider the starting point that of Degn's (2018) compliance. Degn (2018) explained that compliance has many forms but is a type of 'sensemaking'. These types of responses could be any from a defeatist response, along a continuum to optimistic compliance. I would argue that there is always more than one type at play at any one time and what happens is likely to differ depending on ongoing responses. What can be revealed in this research is what happens within that compliance entanglement.

Researching digital environments

Assemblages and entanglements

Throughout educational technology discourse, there has been a tendency to consider how digital technologies can help individuals break free from materiality (Gourlay 2021a). Weller (2015) claims in relation to Massive Open Online Courses (MOOCs),

There are several necessary elements to the Silicon Valley narrative: firstly, that a technological fix is both possible and in existence; secondly, that external forces will change, or disrupt, an existing sector; thirdly that wholesale revolution is required; lastly that the solution is provided by commerce. (Weller 2015)

A similar discourse surrounds the VLE. It's said the platform is immersive and unique. The platform is characterised as playing 'a supportive background role' (Kattzman, Regan, and Bader-Natal 2017, 207), and 'Technology is the stage' (Kattzman, Regan, and Bader-Natal 2017, 210).

Both assertions suggest an instrumentalist view of the digital tool (Hamilton and Friesen 2013), while the design claims suggest a more essentialist view. This study views the digital environment as an ‘assemblage’ rather than a binary connection with the instructor.

My philosophical stance is, as Wagner, Newell, and Piccoli (2010), that the material and social are interdependent and constantly influence each other through the actions and practices of individuals who use the technologies in their daily lives. The new VLE space can be considered an online arrangement (Bolldén 2016). In this view, digital environments such as the VLE cannot be separated from the social context in which they are used or the design principles under which they were made. These entanglements can potentially enable, constrain, and enhance what teacher users can practically accomplish. (Thompson 2016) describes these connections in education as ‘learning ecologies’, and this helps us visualise more of a messy ‘mixed up, ever-changing, de-centred spaces and practices’ (Thompson 2016, 493). Tietjen et al. (2023) claim that material assemblages can shape human perception and behaviour in much the same way that humans can direct or shape a material thing. In this sense, the VLE is not simply a tool being used by the teachers, it is part of the social and material assemblage. This entanglement is complex and does not privilege the social or the material elements. In this way, the VLE digital environment is not separate or distinct from the teachers but shapes their social worlds and subjectivities.

The VLE and faculty are part of a critical posthuman ‘entanglement’ and ‘assemblage’ rather than a binary connection between technology/policy and the instructor. A ‘more-than-human’ collective, or ‘assemblage’, includes humans and non-humans (Ellis and Goodyear 2018). In contrast to a typical humanist stance where the human is the main referent or where the self and the world are binary. In this assemblage, humans and non-humans share agency and the focus on what becomes. What ‘becomes’ in this inquiry is what these assemblages open, shut, and expose at one moment.

In many humanist accounts, the human subject is positioned either in opposition to digital technologies or as wholly created by them (Williamson, Potter, and Eynon 2019). Critical posthumanism repositions the human subject as inseparable from the world and plausible only as it evolves through it (Bayne 2018, 1). (Bayne 2018, 1). This is an ‘ontological shift’ from understanding the human subject as distinct from the environment surrounding ‘him’ to seeing the human subject as relational (Bayne 2018; Braidotti 2018). My position is that teachers’ subjectivities are enacted and negotiated through ‘the networks or ecologies within which they are assembled’ (Bayne 2018) and through agential capacities. ‘Co-presence, that is to say, the simultaneity of being in the world together, defines the ethics of interaction with both human and non-human others’ (Braidotti 2013, 169). This approach is hoped to reveal the networks and assemblages.

Instead of being critical of the technology, I take on Ross, Bayne, and Lamb’s suggestion to a ‘call to attention, rather than a call to arms’ (2019, 23). Research in digital assemblages in education is critical to counteract the wholly positivist and non-problematized discourse of instrumentalization of technology use in education that often accompanies them and creates more openings in the discussion (Selwyn 2016; 2017; Teräs, Teräs, and Suoranta 2022, 8). This enables us to recognise the openings and closings that happen when new material assemblages are introduced.

It has been claimed that a posthuman position can disappear the human (Williamson, Potter, and Eynon 2019) altogether, and subjectivity and identity are at odds with such an ontology. Hawley (2021, 13) suggests that ‘if we foreground non-human material agency without paying sufficient attention to the asymmetry and range of human agentic capacities, are we in danger of weaving the Emperor’s New Clothes?’. Rather than disappearing the subject, critical posthumanism is instead an act of *decentering* the human (Gourlay 2021b). The posthuman subject is a ‘nomadic’ subject (Braidotti 2013), constantly creating and being created by the histories, contexts, material, and human entanglements. Subjects are constantly evolving and flowing (Gravett and Ajjawi 2022). This relationality and nomad status is essential in understanding how specific changes are enacted on the ground and account for power relationships.

Intra-action and diffraction

While the critical posthumanist position emphasises a decentring of the human, a sociomaterial focus puts an emphasis on describing what is revealed because of the enmeshment of ‘the social, technical, and human’ (Fenwick, Edwards, and Sawchuk 2015, 3). The term ‘intra-action,’ coined by Barad (2007), serves as a substitute for the binary concept of ‘interaction,’ which implies the existence of pre-established entities that engage in action with one another. Intra-action conceptualises agency as a dynamic interplay of forces (2007, 141) rather than an intrinsic attribute possessed by individuals or humans. Within this framework, all entities engage in a continuous process of exchange, diffraction, and mutual influence, operating in an inseparable manner. Thus, the elements of the VLE and the human subjects are intertwined. The metaphor of diffraction helps to understand both phenomena and as a way of viewing the data (Fox and Alldred 2021). In physics, diffraction is the spread and overlapping of waves as they pass around an obstacle ‘We can understand diffraction patterns – as patterns of difference that make a difference – to be the fundamental constituents that make up the world’ (Barad 2007, 72). This enables us to consider what is emerging rather than what is. The metaphor is useful as it takes us away from simple cause and effect and allows us to see patterns, openings, and closings. Diffraction is a constant, so what is being revealed at one point in time is constantly in flux.

This account focuses on how teacher subjectivities are enacted and negotiated through the digital ecology in which it is entangled. In a sense what is revealed and what is created through this ‘nomad status’: The reflective interviews reveal the diffractions that happen through the entanglement to a decentred human subject.

Methodology

Semi-structured reflective interviews with things

Seven interviews were conducted with faculty members of the new college. The interviews were conducted while watching recordings of their VLE class sessions. Each interview lasted approximately 1 h. Volunteers were recruited through official channels. Faculty interested in participating volunteered through a Google Form. Volunteers had a range of experience teaching on the VLE from 1 to 3 semesters. Some had back-end and course design experience on the platform. All had either PhD or MA-level qualifications. The purpose was explained verbally at the beginning of the interview. It was made clear that we were not watching the video to critique their teaching or to comment on the students. Faculty were encouraged to stop the video at any time and reflect on anything happening, and I asked them to pause the video whenever I wanted to ask a question. The interviews were semi-structured. Questions were both description questions such as, ‘Please describe what we are looking at here.’ As well as analysis questions such as: ‘What do you feel working in this new space has opened and what has the space closed?’ As well as follow-up questions to comments made by teachers. The interview was led by asking questions about what was on screen and following teachers’ comments.

The interview while watching class recordings can be considered a reflection since faculty are being asked to revisit and examine their own circumstances (Bozalek and Zembylas 2017). The VLE is considered a relevant and essential research participant (Adams and Thompson 2011). Following Hultin’s (2019) view of the interview ‘as a relational practice through which the researcher and the researched, subjects and objects, simultaneously become in a relationship of entanglement’ (96). In this case, I need to ‘invite’ (Hultin 2019) artefacts into the interview to enable interviewees to access memories and recall sensations. Reflections should be more profound if positioned in the same space as the situation they are being asked to reflect upon. This involves a shift in focus from looking at things and phenomena from the outside to being positioned inside with them. (Barad 2007; Hultin 2019). In addition, the interviewer can feel with the reflector, empathising and becoming together. This method was used to help understand a specific snapshot of time in a change

process and how certain practices and categories of teacher identities are enacted and could become accepted and assumed over time (Hultin 2019).

Reflective interviews in the new space were used as a further response to bring back the ‘human factor’ Williamson, Potter, and Eynon (2019) claim has been missing from posthumanism. To trace the entanglements of the teacher and the new teaching and learning method and space, I also consider the importance of reflection in meaning-making (Hawley 2021). Reflective interviews were used in this case because of the assumption that the notion of the ‘self’ is a continuous negotiation and reflection (Hawley 2021). It should also be acknowledged that the faculty’s reflections on the VLE through their interview while watching their own classes creates further diffractions as this event becomes a part of the entanglement.

Position of researcher, entanglement

As a teacher and course coordinator within the college, I am an insider researcher. While considerations of interview bias and the robustness of the study are essential when conducting insider research (Trowler 2014), reconciling insider research is less problematic when considering that all researchers in the sociomaterial critical posthuman philosophy are always and already part of the research (Barad 2003). The practice of research enacts reality (Hultin 2019, 93). I accept that this process is a ‘messy, complex, and sometimes confusing undertaking’ (Thompson and Adams 2020, 338). This messiness is partly due to the space the researcher occupies (external or internal). In a sense, we occupy an outside position within the study (Barad 2007; Schadler 2019). This ‘brings a different ontological understanding of the subjects and objects involved in the meetings in the receptions’ (Hultin 2019, 102). I have come to understand that my observations and experiences as a VLE user create a unique position, and I should be positioned inside the research rather than an outsider looking in. My position as a ‘becoming-nomad’ (Braidotti 2013) researcher meant interviewing, reflecting with colleagues, rewatching, reading, analysing, and writing created my own journey, or becoming, alongside the meaning-making expedition I was on.

Analysis

Interviews were recorded via Zoom, transcribed using ‘Transkriptor’ and rewatched for transcription accuracy. The transcriptions were then analysed for evidence of revelations of what was being created, opened, or closed. I also looked for evidence of effects on teacher subjectivity. Through multiple readings, I identified these as ‘quirks’ in ‘Quirkos’. Twelve main ‘quirks’, and several sub ‘quirks’ were identified. Video interviews were rewatched multiple times, analysed looking for patterns of evidence of constraints, tensions, and reconciliations and used to describe the entanglements of the material and human aspects. The process was one of becoming, and it involved reading, writing, pausing, and analysis which resulted in the growth of this account of my interpretation of the utterances and interactions. The focus was always on ‘mess, disorder, and ambivalences that order phenomena and not try to reduce them to tidy explanations’ (Fenwick and Edwards 2011, 719) as well as to go beyond taken-for-granted relationships of cause and effect.

Ethics

Lancaster University and the research site university granted ethical approval. The participating faculty members received an information sheet and provided written consent to be interviewed and recorded. Some interviews were conducted in person and some online due to faculty availability and location. All interviews were recorded on Zoom. This was chosen since it allows data to be locally stored and easily downloaded as video and audio files. Zoom is also a familiar platform to the faculty as they have an account through the research site university and are familiar with the privacy policies (Archibald et al. 2019). All videos and transcripts are stored in password-

protected folders in Dropbox (Vault) and Quirkos (password-protected at multiple levels). The identities of the participants are anonymised.

Findings and discussion

The reflective interviews revealed the complexity of relationships between teachers and technology. They also aided in revealing the entanglements' intricacy and messiness. Multiple diffractions are at work at the same time, and all the intra-actions (Barad 2007) of the multitude of subjects demonstrate how difficult it is to separate them from processes. The interviews showed that the VLE and human 'intra-actions' (Barad 2007) exercised non-neutral influences on the teachers (Adams and Thompson 2011). I identified four 'quirks' in the data: surveillance; structured, timed lessons; agency; and teacher-student relationships. These are presented through narratives provided by the reflective interviews.

Surveillance

The issue of surveillance within the VLE platform arose multiple times in connection to a complex relationship between tensions and possibilities. Collier and Ross (2020, 277) state that 'technologically mediated practices in higher education are not often seen in terms of surveillance, but they should be'. The VLE lessons are recorded, and a range of data is collected on students, but it was clear that many teachers did not have knowledge of who was watching the classes or when admin on the back end watched live classes without the teachers' or students' knowledge. These types of surveillance in educational technology are rarely questioned as the benefits are assumed to be greater than the privacy of staff or students (Collier and Ross 2020). This aspect alone created a picture of multiple subjectivity diffractions (Haraway 2004). In interviews, teachers debated the issue of surveillance in several ways. The surveillance seems to bring to the forefront in teachers' minds what it means to be a professional educator and what image they are presenting to the world. The closed nature of the classroom bordered by the walls is compared to the new uncertain and surveilled borders created by the new system numerous times. An internal debate recurred in most interviews that while the surveillance aspect was something useful for them, it was not benign. Everyone commented that the surveillance function in the VLE made them change or modify their behaviour in the classroom. It could be welcomed as a classroom assistant and yet, at the same time, create anxiety and stress. More than one teacher debated the complexity of the surveillance embedded within the VLE system. During the recording, I asked Faculty 1 to pause the video. In the video, they were talking to students, but I felt they sounded uncomfortable. I asked if they were uncomfortable and to talk about that moment. The following monologue is part of their response.

Remember the fact that [the VLE] also video records every class? That's an important feature because, in a live class, it's not being recorded [...]. But here, that adds a dimension to what you say and how you say it because you know that, [...], if people wanted to look back on it, there's a record of it. So, I think that makes you more cautious and more careful. But what's wrong with that? more diplomatic, more polite, more sensitivity, you know? more aware, more culturally aware [...]. So it's not necessarily a bad thing. (Faculty 1)

Another example from Faculty 6 was given at the end of the interview regarding the class being recorded:

Knowing that they can go in at any point. It did, ... made my teaching, I would say, quality better. In the beginning, I was like, OK, but what if one day I'm not feeling it and I'm not, you know, I'm not OK? [...] So, I feel that it has made me realize that I have to be, I have to give the best version of myself and every single class, I have to come prepared. (Faculty 6)

The above quotes demonstrate that self-policing of a particular type of professional behaviour which teachers pre-defined as belonging to a 'good' teacher, is an element of the VLE entanglement.

This demonstrates a connection between the intra-action and subjectivities. The interviews also revealed the standardisation of professionalism. The VLE function of automatically recording classes stopped them from engaging in non-professional behaviour. Faculty 7 recalled an experience of their lesson being observed without her knowledge. The experience created reported embarrassment because they felt that they had not behaved professionally at one moment in the lesson, however despite that they explained that the surveillance is positive:

I actually kind of like teaching a very structured course with lots of people ... teaching the same course. [...] We all have talked with that teacher that, you know, lets their class go way earlier and is a little soft on the grading, and I [...] like that I'm sure there's a report somewhere that says yeah you dumped him out of class. 20 min early every single time. (Faculty 7)

Surveillance and 'datafication' (Williamson, Bayne, and Shay 2020) were also brought up in terms of loss of agency through surveillance features. This narrative reveals the tension created by the recording of the lessons as well as the data created from those recordings. The 'ownership' of that data seems to be up for discussion. Not knowing exactly when they were being watched was a commonality, Faculty 3 asked me in my capacity as coordinator during the interview how often the lessons were being watched and when. I explained that they were frequently being watched offline and online. It is possible that someone with admin powers could be 'in' their lesson while it was live without them knowing.

Yeah, I mean, we joke about it, you know, they're watching every lesson, really. Better follow the script, that kind of thing. But it would be nice if they were more open and transparent about it? [...] Other issues about the recordings as well, do we give them permission for ourselves to be datafied, and where is that? [...] And anxiety. But I think just having the right to know and being told and transparency [...] Yeah, you know, it would be nice. It's not because we're gonna go and tell the world, but yeah, just for ourselves, and you know exactly what's going on. (Faculty 3)

Faculty 5 reported that the recording of classes created discomfort:

It's just the fact that you're always recorded that would want to keep you. [...] Robots. Person. Robot teacher. You know, not going off script. Umm. Yeah, this surveillance part makes you more, you know, stiff and. Not. Not relax. Not comfortable. Not. You know, being yourself. (Faculty 5)

The issue of surveillance was touched upon in all faculty reflections and consistently revealed tensions between the discomfort and the possibility of such a feature. Even if faculty were completely comfortable with the recorded lessons, surveillance never had a 'neutral' influence.

Structured timed lessons

The organised lesson plan embedded in the system was another aspect that created a mix of tensions and possibilities. Each lesson section is timed, and a timer is visible in the top right corner. This was compared directly to teaching face-to-face in a classroom by the faculty. Faculty displayed a negotiation between both the creation of anxiety and professionalism and, at times, a lack of agency. They are aware of their place in the larger picture and how their work as a teacher may matter (Loveless and Williamson 2013). The issue of agency seemed to change depending on the experience with the system and getting to know what was and was not 'allowed' or being judged by the people watching the videos. In a sense, a loss of agency was gained back through negotiations, justifications, and more knowledge of the lessons. Faculty 4 spent about ten minutes explaining their frustrations with the VLE after pausing the lesson at a whole class discussion stage. The connection was made between the timed lesson and the need to be an organised professional who is always in control of the lesson. They explained this in comparison to their experience teaching in a physical classroom.

You are on a clock to meet that [prescribed lesson]. Definitely has influenced my time awareness continuously it's a continuous, sort of secondary [...] tap on the shoulder. That's always there, you know. Watch the time, watch the time. (Faculty 4)

I used to feel comfortable walking into a class no matter what I was teaching because. At the end of the day, you're gonna know you can. Kind of fluff up here and there [...] whereas, with this, you have to be 110%. So that's the difference in my teaching. I'm now [...] not just prepared. I'm 110% prepared because I feel if one thing goes wrong, it'll spiral. (Faculty 4)

This connection reinforced the teacher's role as an organised, prepared professional.

I think in terms of planning, I have to be [...] much clearer in my head what I'm supposed to be doing in the lesson. (Faculty 3)

Definitely, it's being more organized as a teacher and following a proper structure, which I don't know if it is a positive or a negative. (Faculty 5)

This was also revealed as becoming more professional in the perceived eyes of the students:

But at the same time, I feel that the positive that came out of it is that I'm about to teach, and I think students look at us differently. They look at us not because it's a new program and it's like the program that everybody is talking about, and it prepares you for the future. I feel that they look, I don't know if it's me, but I see, I feel that they look at us in a different way. They know we are professional. (Faculty 6)

Agency and subjectivity

The use of new technology also made teachers reflect on what it means to be a professional educator in the digital age. 'The educator' is framed as an adaptable learning subject that needs to keep up with technological developments rather than be critical of technology. The teacher's role is to keep learning and keeping up with any tech to grow and evolve. It is to be 'in control' or at least be perceived as being in control. Rather than question the tech, teachers reflected inward about how they needed to keep up for fear of 'being judged'. This judgement was viewed as more enhanced because of the act of recording classes, but simply 'failing' with the tech function in front of students created a certain anxiety. The judgement seemed to come from three directions. Firstly, being judged by students, secondly by their peers and finally by the management. This was more prevalent during the first few weeks of using the system, but throughout, there was a self-expectation that the teacher should be 'good' with the technology. In response to a question about how teaching in the new model had changed their teaching:

Using technology makes you feel like we're being judged a bit more. [...] So, I'm always a bit aware of that's what they're thinking. And even worse if other teachers are watching. You want to perform well in front of your colleagues. (Faculty 3)

It makes me feel a bit anxious and a bit archaic, like a little bit old. Because I'm so slow with it, you know, I feel slow with it. I might not be, it could be a split second, but they don't know necessarily what I'm doing, but it makes me feel uncomfortable. It makes me feel archaic with the technology, you know, not fluid with it. (Faculty 4)

Faculty 5 at the end of the interview without being prompted reflected on the interview:

You really made me reflect on many things that, especially about the fact that I'm always stressed that this could be from the technology part. And now I think I need to do something that would make me feel better, you know? Work on myself, maybe more, yeah, because this is not healthy. [...] Because this is, this will be the, the medium that we're going to use for a long time now. (Faculty 5)

The sense of loss of agency is enhanced when the tech 'fails' or acts outside of expectations. The following comment was made when the teacher observed a part of the lesson where he was attempting to fix an issue with the connection and attempt to connect with a student who seemingly couldn't hear the teacher's question. The teacher stopped the recording:

The technology always makes you feel a bit nervous [...] it can make you feel powerless. You know when the technology goes. If they can't hear you or you can't see them, you can immediately feel a sense of powerlessness [...]. Which is frustrating. (Faculty 1)

The following comment was made to a follow-up question. The faculty member had suggested that the new way of teaching felt ‘robot-like’. I asked what feelings this brought about.

It does create anxiety. Stress. Especially when you know the system shuts down and you don't know what's going to happen. [...] it adds on this stress [...]. When you're teaching, you're always on. You know, like tensed. And the. And you can't wait for the class to finish. Whereas this is not the job of a teacher. (Faculty 5)

Teacher-student relationship

The interviews revealed the teacher's role as support for students. Some limitations were revealed – sometimes when the technology fails, but also as existing in the design. This same design was also said to create equality and the ability to reach all students. The position of the teacher vis-a-vis the student was mediated or constrained by the VLE in various ways. While watching the recording, I asked Faculty 3 to stop and comment on a poll that was running. I asked simply, ‘What is happening here?’ They explained that they were debriefing a poll and started to explain reasons they were not completely happy with the interface. Their reflection led them to a longer discussion on technical issues:

So you have all these sorts of technical issues, and you lose the flow of the class. And I feel that the person, the student who is about to speak, if they're enthusiastic, they kind of lose their enthusiasm to some degree. [...] I sometimes feel like that that I've kind of let them down or that I've taken from their opportunity. (Faculty 4)

Faculty 3 reflected on the interface and the difficulty of not knowing what students are seeing. This led to their conclusion that the VLE ‘mediates the way that you're looking at the students and how they see you’ (Faculty 3). Faculty 4 in their reflection on the poll that was being run also commented on the VLE as a barrier:

It can act like a barrier [...] It's difficult for me to read the students' take on what's been said. I can't see if other students are agreeing; if they're just zoning out; if they're panicking and afraid that I'm going to ask them next for the next one, so they're prepping, you know? All of that is lost in this setup here, and I'm trying to listen to the person and find their response at the same time. (Faculty 4)

The teachers ultimately framed themselves as a dependent relationship role that cannot legitimately exist without the student. The framing of the teacher was always positioned in relation to the student, and teachers commented on how the VLE positioned them. These categories were Facilitator (of learning), Controller (of the technology), Surveiller (of students and themselves), and Professional (teacher). Teachers are negotiating their way through new teacher-student relationships through the mediator of the VLE. In this sense, the VLE diffracts the teacher-student relationships.

Discussion

Possibilities, constraints, and tensions

The reflections revealed several possibilities with overlapping tensions, revealing how the material/human entanglement is messy with multiple overlapping diffractions (Barad 2007; Haraway 2004). The negotiations produced contradictions and internal debates around coming to terms with certain VLE platform features. One of these was the recording function (surveillance function). While often unproblematised in terms of learning analytics and gathering data on students (Williamson, Bayne, and Shay 2020), in the case of the VLE, the focus is also on the teacher – whether real or imaginary – through the function of classes being recorded and available for outsiders (outside the original lesson context). This afforded a variety of debates, negotiations, and resignations. The focus on surveillance by some faculty showed how a single function within a programme, or in this case the VLE, can have multiple diffractions. In this

case, the function of classes being recorded, and data being gathered created an underlying discomfort of being watched or judged. This aligns with Ross, Bayne, and Lamb's argument (2019, 42) that 'the algorithmic properties of [digital, social] systems perform functions that cannot be reduced to the intentionality of either the teachers using these systems or the authors who create the software'. This functionality of recording classes cannot be reduced to the institution's or designers' intentions, no matter how well-intentioned they were. This is significant for all aspects of datafication and storage of recorded class sessions and creating transparency for all participants in the system.

The VLE was positioned as more than a tool through all accounts. Teachers' deliberations over the constraints and possibilities reveal the VLE as a non-stable, non-neutral entity entangled in negotiation and described as both a 'barrier' and a 'mediator' by faculty, much akin to Latour's objects as mediators rather than intermediaries (Gourlay 2015; Latour 2005). The meaning and use of the VLE are in constant negotiation and transformation, but not as a passive object; the entanglement of the digital and social is revealed through the accounts.

Materialisation and redefinition of subjectivities within this intra-action

The reflections on teaching in the VLE brought to light another element of what it is to be professional in a digital education age. The VLE became an assistant in policing the students while simultaneously acting as an enforcer of a particular teacher subject – the 'professional', 'organised', 'diplomatic', carefully presented, controlled subject. This was often connected to what a teacher was expected to do and be (Howard 2022). There was a clear sense that being a teacher currently involves specifically developing yourself professionally in teaching and learning technologies and digital technologies in general. This 'digital disruption', rather than leading to a de-professionalisation of teachers (Wyatt-Smith, Lingard, and Heck 2021) in the case of the VLE and the new system, clarified the extension of what it means to be professional in the role of teacher. Teachers are expected to be competent with the technology, and feelings of inadequacy as a teacher emerge if they feel they are not as capable as they need to be. One primary value presented in the reflective interviews was that they should be able to adapt quickly to new digital environments, and if they feel they are not reaching the perceived standard of competence, they will feel inadequate (Trede, Macklin, and Bridges 2012). This is exacerbated by the perception that they are being watched or 'judged' by students and colleagues. This was revealed through anxiety when they felt they were failing and pride when they felt they had achieved this.

The faculty often felt they had to 'control' the environment, almost like a conductor on the orchestra of learning; the students were sometimes positioned as their 'marionettes'. This sometimes problematised the teacher-student relationship and, consequently, the teacher subjectivity. This seemed to show that a specific way of being a teacher in the new environment was meaningful, not just working the technology but also 'being' and teaching through the boundary of the VLE screen. It was clear that a certain amount of anxiety was experienced – especially when the new VLE was first adopted. However, teachers expressed that as they became more comfortable with the technology and less aware of the possibilities of surveillance, they started experimenting more with the lessons. This 'claiming back' of their agency was essential to teachers' understanding of being a good teacher – the creativity and spontaneity – not being a 'robot'.

This equates to a 'coming to terms' with the new systems and their pre-positioned subjectivities (Howard 2021). This involved a negotiation through what could be accepted and made sense of through the entanglement. In this sense, each one of the teachers is their own 'nomad' subject (Braidotti 2013). Each member chose to be a part of this system and had experienced using the system in the recruitment process; they all started at a point of compliance. What happened next was the process of becoming a new subject in this new entanglement – a process of explicit negotiation that is still ongoing. The reflective interviews allowed teachers to bring issues to the front of their minds

and engage in the intellectual debate about meaning. This legitimised certain subject positions and, in some cases, delegitimised others. This shows the stream of negotiations of subjectivities that are constantly happening, and teacher identities, practices, and classifications are adopted, accepted, and assumed over time (Hultin 2019).

Conclusion

The reflective interviews while viewing the lesson recordings proved extremely valuable. The interview binary dynamic was disrupted, and the conversation went in revealing directions. They revealed the complexity of overlapping diffractions (Barad 2007; Haraway 2004) when new digital teaching and learning spaces are introduced in a Higher Education environment. The complexities have implications for educator subjectivities and reveal negotiations between established and adapting meanings of what it means to teachers be professional educators. These systems comprise a complex interplay between human and material subjects. The new VLE brought up questions about what the teacher is and what the teacher does (Howard 2022) vis-a-vis students and digital material. There were also negotiations of agency in this entanglement. The entanglements are less than straightforward in such intra-actions (Barad 2007). The interconnection between the technology, the structured lesson, and the teacher as a professional is undoubtedly messy (Fenwick and Edwards 2011). The approach made clear that the elements are all connected and that subject negotiations are part of introducing new digital technologies in higher education settings. This also revealed unexpected tensions and conflicts between the intent of the design and the effects of the design. The actors engage in the new entanglements with the VLE while it is presented unproblematically to them as a saviour and solution. A critical engagement from the beginning needs to be embraced by all stakeholders. This criticality need not be a negative, but more an assumption and openness to accept that unexpected diffractions will happen. This especially applies to data collection and recordings as this research also opens further research questions about surveillance in education technology. Surveillance features in technology should be seen as part of the sociomaterial map as they contain implications for designers and institutions when using VLEs. This research has focused on teacher and object entanglements, but it made clear that the teacher does not exist without the student. In all interviews, faculty framed their actions around and in relation to their students. Further studies incorporating students and management would likely create a greater understanding of the different negotiations within and around the entanglements.

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1. Research site: Zayed University, UAE: University Research Ethics Committee: Approval code: ZU22_107_F
2. **Lancaster University** The Faculty of Arts and Social Sciences and Lancaster University Management School have a joint Research Ethics Committee, **Approver: Professor Paul Trowler.**

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