

Queering the Data: The Somatechnics of English Early Childhood Education and Care Teachers

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Abstract

Education has increasingly been consumed by neoliberal expectations that result in the need for data to be collected to justify regulative, pedagogical, curricular, and teaching practices. The marketisation of higher education requires more quantitative measurement of student attainment and progress which impacts on pedagogy and provision. Working with Karen Barad's theorisations of spacetimemattering, agential cuts, intra-action, and diffractive analysis, I draw on research with Early Childhood Education and Care (ECEC) teachers who were working and concurrently studying on a degree programme. Empirical data was generated from a focus group discussing the influences of data recording software on the teachers and their professional practice, the devices used as part of the recording process, and the curricular expectations during children's assessment. Scholars have argued that the need to ensure children meet developmentally appropriate milestones in ECEC can lead to performative, technicist teacher practices driven by data and that these practices may result in datafication and 'dividual' subjectivities (Deleuze 1992). Entangling with material-discursive productions between ECEC teachers and 'data' provides a new contribution to understanding the influence of other-than-human bodies on the process of dividualisation and its impact on professional practice. Although focussing on ECEC teachers and their assessment practices, the outcomes of the analysis are connected to higher education, which is facing similar pressures for student progress. In line with the theme of this issue of *Somatechnics*, I discuss

how putting to work Barad's agential realism can articulate and rethink both human and other-than-human matterings by revealing how some 'agential cuts' reinforce deficit dividual discourse. In turn, this can help us move beyond datafication and dividual practice.

Keywords: agential cuts, assessment data, Barad, ECEC teachers, higher education, intra-action

Introduction

Neoliberalism has had a significant impact on reframing education across the age phases from Early Childhood Education and Care (ECEC) to Higher Education (HE). This framing has been based on human capital theory (HCT). HCT is concerned with the ways in which individuals' personal lives become entangled with the need to participate in formal education to prepare children and adults for economic productivity (Becker 1975). Anna Tsing notes that global capitalism requires 'standardizing labour' (2015: 110) which then drives education systems. As a result, neoliberal concepts in education are embedded in the discourse of the free market where standardisation, accountability, high-stakes testing, marketisation, and performance indicators become the norm (Ball 2013; Tsing 2015). This individualisation of the learner produces a 'rational economic subject' (Robert et al. 2018: 2) and reimagines what counts as good teaching where measurable student outcomes become a focus (Ball 2013).

What is needed is a more expansive consideration of how subjectivities become produced in connection with other-than-human materialities (see for example Bozalek et al. 2018a; Taylor and Bayley 2019). Turning to critical posthumanist and feminist new materialist theorising provides a focus on relational ontologies that move beyond binary

Cartesian debates which split the mind and the body. Such a splitting is fundamental to any form of rational subjectivity. The posthuman turn has influenced ways in which education has been conceptualised (for example Fairchild 2019; Bodén et al. 2019; Taylor and Bayley 2019) and has provided new ‘possibilities and provocations for the body of work in higher education’ (Bozalek et al. 2018b: 1). Feminist new materialisms allow for researchers to recognise ‘intersecting patterns of marginalization encompassing race, gender, sexuality, age socioeconomic class, dis/ability, and nationality’ (Truman 2019: 10) and how these impact on the researcher and the research process. In this way researchers become responsible for critical consideration of these relational intersections.

The work of Karen Barad (2007) is employed to describe and analyse how a group of ECEC teachers,¹ who were undertaking a degree programme at a University in the South of England which allowed them to work in the sector at the same time as studying, perceived how their subjectivities became influenced by neoliberal expectations of ECEC practices. Agential realism has been conceived of as an ethico-onto-epistemology where ‘*practices of knowing are specific material engagements*’ (Barad 2007: 91; italics in original). The material engagements in this article relate to the process of assessing children’s learning and how this might reify a certain type of individual subjectivities as the teacher / learner navigates the expectations set out for teaching and learning. For example, Gilles Deleuze (1992) argued that, in societies of control, neo-liberal subjects are afforded certain kinds of freedoms while being surrounded by wider control mechanisms. Power operates through a process of continuous modulation that gives the subject a perceived sense of freedom, but simultaneously produces the ‘dividual’ – an individual who is divisible and reducible to quantifiable information or data – who has limited agency. One of these modulations results in a regime of perpetual training and assessment where the learner undertakes further education to complement their employment potential.

Working with Barad's (2007) agential realism and Deleuze's (1992) dividual allows me to consider the somatechnics of an aspect of teacher practice that can demonstrate how bodies are formed and how they respond to the technicity of the world. The practice in question is linked to the English statutory curricular framework,² entitled the Early Years Foundation Stage (EYFS), that is delivered to children between the ages of birth to five years old (DfE 2017). A core part of this framework is concerned with the observation of children's learning and development with both formative (non-statutory) and summative (statutory) assessments.

Although the focus of this article is ECEC teachers' experiences with datafication (Roberts-Holmes and Bradbury 2016) and what this produces, the practices described have the potential to be – and are in some ways, if obliquely – applied to HE. Regardless of the age phase, assessment and recording of data has become of concern across the breadth of educational institutions from ECEC through compulsory schooling to HE (Ball 2013; Williamson 2018; Robert et al. 2018). The teachers who are included in this article attended a HE degree programme and their discussions of how they are entangled with the collection and assessment of data has synergies with the expectations for assessment across degree programmes. It also became apparent that the adult students working under the shadow of datafication with the children in their care were components of the nature of datafication in HE.

This article is divided into a number of sections that, first, attend to agential realism, English ECEC, and the requirements for data to be collected and analysed. Other sections articulate the methodology for the generation of data, how this is analysed, and offer some concluding thoughts and the implications for both ECEC and HE. In the title of the article I employ the term 'queer' in the same vein as Nikki Sullivan and Samantha Murray (2009) where 'queering' is not synonymous with an analysis that focuses on sexuality, but with a

critique of a wide range of normalizing regimes' (Miskolci 2011: 650). Furthermore, I am drawn to Noreen Giffney and Myra J. Hird's utilisation of queer to challenge normative thinking, which allows me to 'unpack binaries and reread gaps, silences and in-between spaces' (2016: 5) about data. In this article, data is multiple encompassing data captured in education, children's data collected and recorded by ECEC teachers, field data from the focus group, and data selected for inclusion in the analysis. The multiple aspects of data are analysed to explore the possible articulations of dividual practices, how these might manifest in ECEC teaching and their potential impact for HE.

While the article acknowledges the influence of human capital theory and datafication on schooling, it also aims to disturb existing conceptualisations of the ECEC teacher as dividual. These disturbances create new thinking practices shaped by diverse constellations of human and other-than-human bodies (Fairchild 2017; 2019). The data explored in this article produces a partial political response to datafication to 'detect the not-yet-articulated common agendas' (Tsing 2015: 254). In so doing, it provides a space to push back against the material-technical-somatechnic vision of ECEC to reveal dynamic relational connectivity between data recording devices and software (other-than-human) and ECEC teachers (human). I offer this article as a partial contribution to knowledge making practices (Benozzo et al. 2015; Niccolini et al. 2018; Taylor and Gannon 2018). The article does not seek to define grand narratives on the ECEC teacher but explores how 'encounters are, by their nature, indeterminate; we [ECEC bodies] are unpredictably transformed' (Tsing 2015: 46).

Entanglement with Spacetime-mattering, Intra-Action, and Agential Cuts

Developed from Niels Bohr's work on quantum physics, Barad's (2007) theorisation of agential realism questions the definiteness of subject-object boundaries and argues that apparatuses of measurement are inseparable from the things that they observe / measure. She

calls this ‘agential separability’ where phenomena are not primarily existing bounded bodies, but relationally connected human and other-than-human intra-acting collectives. This kind of primary ontological connectivity provides ‘good epistemological, ontological and theoretical ammunition for moving beyond dualism and representation’ (Fairchild and Taylor 2019). Barad’s neologism ‘intra-action’ refers to the agentic entanglement of phenomena where ‘boundaries and properties of the components of phenomena become determinate and that particular concepts (that is particular material articulations of the world) become meaningful’ (Barad 2007: 139). Neither material nor discursive practice is *a priori*, nor are they external to each other, and they do not signify fixed properties of independently existing objects. Materiality and discourse are co-constitutive and always-already relational, thus noting the dynamic intra-action of phenomena where ‘bodies are not objects with inherent boundaries and properties; they are material-discursive phenomena’ (Barad 2007: 153).

These material-discursive phenomena are subject to agential cuts. Annette Arlander notes that ‘boundaries and properties of the parts of a phenomena become determinate only in the enactment of an agential cut’ (2017: 140) which materialise how certain realities, and not others, appear. Both researchers and concepts become responsible for making agential cuts which are influenced by spacetime mattering. For Barad (2007) space and time are more than fixed and linear entities, they are co-relational which result in a reconfiguring of intra-actions of past / space and present / space. Agency becomes distributed across space, time, matter, relations and bodies which results in other-than-human productions of subjectivity. Therefore, ‘subjectivity is not a matter of individuality but a relation of responsibility to the other’ (Barad 2007: 391).

In later work, Barad (2012, 2014, 2017) exemplifies how agential cuts can offer potentialities for some bodies and denote exclusions for others. She does this through her conceptualisation of ‘cutting together-apart’, a notion that produces a radical rethinking of the

body as more than a final form or stasis, rather a dynamic, processual, iterative connection of human and other-than-human bodies (Barad 2014). Importantly, Barad (2017) argues agential realist approaches do not forget or erase othered bodies, rather they allow for a responsible and situated feminist engagement with bodies and boundary-making practices. Following Barad, I argue that spacetimemattering, intra-action, and agential cuts can allow for a reconfiguration of ECEC teacher data collection, assessment, and recording practices which move beyond dividual subjectivities, but also account for wider tensions in political and societal expectations for ‘measuring’ children’s learning, especially as this has implications for how they come to view themselves in HE. The entanglements revealed in this article highlight the generative nature of the possibilities offered by thinking with agential cuts and intra-actions, and the marks of power fluctuations afforded on/to bodies enacted in spacetimemattering.

Early Childhood Matterings

The development of the English ECEC teacher

A combination of the workforce composition and the limited value placed on working with young children has contributed to deficit discourses applied to ECEC teachers (Osgood 2012; Moss 2017, 2019). This is magnified as ECEC teachers are predominantly female and have historically been framed as low-skilled with low pay doing ‘naturally’ women’s work, reproducing an overarching assumption that motherhood is a sufficient grounding to work with young children (Ailwood 2008; Andrew and Newman 2012). Although research has suggested that ECEC teachers have attempted to overcome deficit notions of professional practice, these acts of resistance have not been reflected at a national level but consist of local or individual acts (see Osgood 2012). To make the situation more complex, ECEC teachers need to navigate public deficit perceptions and their own sites of resistance against a

backdrop of statutory curricular frameworks which micromanages expectations for children and teachers where regulatory compliance may impact on teacher agency (DfE 2017; Moss 2019). Similar deficit assumptions persist today where public perceptions, linked to the UK Government reinforcement of the title ‘child-care’, are part of wider deficit conceptualisations of the value of caring work (Moss 2017).

The implementation of a professionalisation agenda saw the opportunity for ECEC teachers to attain graduate level qualifications (Miller 2008) which came hand-in-hand with regulation and surveillance, as well as standardised education programmes (see DfE 2017). This produced tensions as the ECEC teacher was encouraged to undertake training to become more professional, at the same time becoming exposed to surveillance and self-policing modulations, which saw the de-valorisation of ECEC teacher judgement as it was juxtaposed against a potential of raised status (Fairchild 2017). There remains limited parity between ECEC teachers and those who teach older age phases. For example, ECEC teachers lack the status, recognition, and terms and conditions of those who hold ‘Qualified Teacher Status’³ and predominantly work in compulsory schooling (Hevey 2013).

As Tsing (2015) notes, when work is perceived as gendered, capitalist forms of production are co-implicated in non-capitalist forms of life. Furthermore, this perception may lead to a flexible, casualised workforce always under threat of precarity (Mirowski 2014). In ECEC, precarity has been reflected in Alice Bradbury and Guy Roberts-Holmes (2018) research which argues the Deleuzian dividual subjectivity can be reproduced in the workplace. Feminist new materialism can offer alternative ways to reconceptualise ECEC teacher practices. Working with agential realism (Barad 2007) and reconfiguring the dividual (Deleuze 1992), I explore what might be produced from the relationality between teachers, policy, and practice expectations. In this vein, I aim to move beyond some of the historical

and contemporary neoliberal views of teaching young children by providing alternative material articulations of teaching.

The English ECEC sector

The diversity of the English ECEC sector is evident in types of non-statutory provision for the birth to four-age range. These include private day nurseries, children's centres, nurseries attached to schools (or long day-care / preschools), and childminders (or family day care). Provision can be sessional or full time for up to 51 weeks of the year as selected by parents. The required qualification to work in these types of settings is a vocational accreditation, which is equivalent to exit-level high school certificates, although academic qualifications to postgraduate level are also available. Once the child passes the September after their fourth birthday, they enter compulsory schooling for the Reception Year, which is generally led by qualified teachers who hold either an undergraduate or a postgraduate teaching qualification. ECEC pedagogy is play-based and acknowledges the child's capacity to explore and construct meaning through playful learning experiences, either alone or with peers (DfE 2017). In Reception, pedagogy becomes more adult-led with individual or group pedagogical events led by teachers in an effort to 'prepare' children for more formal compulsory stages of education (Wood 2014; DfE 2017).

In many settings, assessment can be recorded in one of two ways: via a paper 'learning journal' or an online version of the same document. This assessment record provides a historical and chronological note of the child's development and progress, including both formative and summative assessment points. Assessment of a child's learning is reinforced by curricular controls that include a range of assessed early learning goals whereby children either exceed, meet, or have not yet reached expected levels (DfE 2017). This model of assessment can produce performative expectations of assessment which 'lead

us to read backwards from the end point’ (MacRae 2019: 5) and can, therefore, promote a view of learning and development that is more linear on paper than in actual fact. The focus on an outcomes-based pedagogy can result in a narrowing and more formulaic interpretation of the curriculum (Moss 2019). These types of learning and curricular expectations are not limited to ECEC. In the next section I consider how data permeates all levels of education.

The Requirement for Data in Education

The increase in the marketisation of the HE sector has seen a growth in the need for data to measure and regulate university performance. This has become a more pressing need in the Anglophone nations as the student has been reframed as a consumer of education paying fees to increase their opportunities for future employment (Molesworth et al. 2011). There are parallels between HE and ECEC, both of which are non-statutory and both of which have similar pressures for measurement of progress and value for money outcomes for the ‘consumer’ (student or parent). Ben Williamson has argued that this has seen the shift of data collection to produce ‘practical relays of policy objectives to reform the sector’ (2018: 1) which help to reinforce the more neoliberal aspects of government policies. In the UK, this has resulted in the ‘Teaching Excellence Framework’ (TEF) which has a dual approach of measuring teaching quality and student satisfaction, and the potential for graduate employment (Gunn 2018).

In tandem with this explosion of data collection in HE, the data collected in statutory compulsory schooling has been linked to pedagogy, exam successes, and educational attainment which has been used to rank or rate schools / children (Ball 2003; Ozga 2009; Biesta 2017), and influence wider global education policy (Ball 2013; Selwyn 2014). Furthermore, the nature of school governance, another example of the neoliberal approach to education (Williamson 2016a), requires data to frame and measure professional practice and

pedagogy, as well as to record school attendance (Bodén 2015), classroom management (Williamson 2017), and expectations of a standardised form of education (Selwyn 2011). These aspects, in turn, make the collection of data a pressing need in a competitive market where school selection by parents may depend on positive data outcomes. There is growing evidence for the ‘biodigital’ child (Williamson 2016b) and the ‘datafied child’ (Lupton and Williamson 2017) that, using Michel Foucault’s (2004) notion of biopolitics, subject the child’s social life to regimes of surveillance and control which is tracked and traced via data collection.

In English ECEC, argues Bradbury (2014), the nature of assessment challenges notions of equitable practice, where neoliberal, individualised, linear learner identities are valorised and shape assessment practices. She argues that the way in which children’s assessment data is captured and recorded impacts how ECEC teachers plan curricular opportunities, thus risking the homogenisation of all children’s capacities to reach an ‘acceptable’ level of development. By the same token, Roberts-Holmes and Bradbury (2016) understand that the datafication of English ECEC is a means of surveillance to govern teacher practices with tracking and hyper-accountability producing a performative process with little space for alternatives. Bradbury and Roberts-Holmes (2018) argue that ECEC teachers subject themselves to self-surveillance and modulate their practices and, in so doing, render themselves individual subjectivities (Deleuze 1992). In these instances, the need for ‘good’ data, driven by a pedagogy which enhances children’s learning and development, can produce specific forms of ECEC teaching which are focussed on children meeting developmental milestones (Bradbury and Roberts-Holmes 2018), often based on neurotypical notions of development. I have identified how data is captured as part of regulatory processes and requirements in education. In the next section I articulate the methodological underpinning for this research which was employed to generate data for this article.

Queering the Data (Collection)

Research is a boundary-making practice that enacts agential cuts which reveal particular facets of the phenomena that are being ‘measured’ (Barad 2007). The entangled nature of ethico-onto-epistemologies notes how research should be accountable for revealing what might be included / excluded from agential cuts. Sara Childers (2013) discusses the intra-action between fieldwork, data, and theory, arguing that fieldwork is a material-discursive event which produces relational connections between the ‘field’ and research/er. She proposes that feminist theorising and research are ‘an entangled material-discursive practice that expands the field of vision and intra-actions that count’ (Childers 2013: 605). Barad (2007) details how the apparatuses (of research) are an integral part of the constitution of phenomena. Drawing on both Barad’s (2007) and Childers’s (2013) work, I become entangled with fieldwork, as practices of knowing do not separate me and the participants from the world, revealing instead our dynamic, intra-acting, ontological and accountable becomings.

The data for this article was intra-actively generated by a focus group of six ECEC teachers who attended the second year of an ECEC Foundation Degree course at a University in the South of England. The focus group took place after their final session of a module on ECEC curriculums; it focussed on the entanglements of the teachers, children’s data (written observations of achievement that may be accompanied with photographic evidence) on learning and development, and online child development recording software. The teachers discussed the following opening set of questions without any further prompts from me:

- 1) Can you tell me a bit about the online learning journals that you use?
- 2) What they are?
- 3) How they work?

4) How regularly you use them?

The focus-group data selected to be analysed in this article revealed ways in which the data generated and recorded from children's assessment became materialisations of ECEC teacher subjectivities. Following ethical practices all names have been anonymised using a pseudonym.

Feminist new materialist work moves beyond reflective optics and representational practices (Taylor 2013; Niccolini et al. 2018; Taylor and Gannon 2018; Trafi-Prats 2019) turning to diffractive optics (Barad 2007) as a methodological and analytical proposition to explore the messy and connected relations when researchers follow a posthuman oeuvre. While I could have considered an inductive or thematic analysis of the accounts of the participants in the focus group, I was conscious of some of the critiques of reflection and representation. Reflective optics and representational practices can arrest debate and thinking as it 'claims to represent truth or morality' (MacLure 2015: 102). Diffraction becomes a way to move beyond such optics and practices and reveal the interference patterns produced by intra-acting phenomena. Methodologically, it offers possibilities to understand what is produced by the intra-acting phenomena and the cuts they enact. Analytically, diffraction acknowledges the entanglement of the researcher and the researched and is concerned with the difference that being expressed during the intra-actions. Therefore, data fragments presented in this article reveal some of the thinking-making practices where the teachers discussed their experiences and entanglements with online learning journals.

Data entanglements

The data phenomena in this section are drawn from parts of the transcripts where the materiality of data collection and recording, and the tools employed to accomplish this, were discussed. I explore these diffractively (Barad 2007) which accounts for interference patterns

produced when these data fragments intra-act with theory, policy or existing research on data in education. In this way, I pay ‘attention to what we don’t normally see, to what is excluded’ (Taylor 2013: 692).

Software and Databases

The online learning journal software is usually delivered to handheld tablets for ease of making observations and assessments data of children’s learning moments. These records are then uploaded onto the software products and become part of the databases. There are a range of products on the market and the ECEC teachers in this article discuss a number of these, most notably *Tapestry*, *Babies Days*, *Too Simple* and *Class Dojo*. Children’s data from the observations and assessments is ‘hosted’ by software producers and the programmes require internet access and Wi-Fi to function ‘in the moment’. Each nurse and ECEC teacher only have access to the data which is relevant for their role with either a nominated ECEC manager / teacher as the controller of who is able to access parts of the database. In many cases, parents are given access to their children’s records so they can view and comment on their child’s daily experiences and add their own comments on home learning.

The following two data fragments give some insight into users’ experience of the software and databases:

We also use *Tapestry*. It’s basically a database that you create both of your staff and the children and also family because they also have access to the information. You can use it for logging observations with pictures and with videos, you can take photographs of work that they’ve completed. (Patricia)

I worked in a childminder's home where she used *Babies Days*, which was the same way; you could go and do the assessment and put on their next steps etc, but it also did everything else. But on comparison *Tapestry* is a lot more user friendly so you can go in and you can do it in the moment, whereas *Babies*

Days was a lot harder because there [were] a lot more steps you had to go through before you could upload it so it was a lot more time consuming. (Carolyn)

In both of these extracts, it is possible to note the suggestion of dividual subjectivities and professional practice (Deleuze 1992; Roberts-Holmes and Bradbury 2016). Databases require codes to highlight and classify data, which then become assigned to the children, ECEC teachers, and parents, reducing their bodies to data / codes. Deleuze (1992: 7) suggests that this kind of coding ‘substitutes for the individual or numerical body the code of a “dividual” material to be controlled’. The data codes become the ways in which the neoliberal need for measurement and datafication become expressed. Power flows through the data protocols (Galloway 2004) which segment and measure the child, becoming a modulation to cement expectations for professional practice. The phenomena produced by the intra-actions of children’s data, ECEC teacher uploads, databases, and software mirror the processes of neoliberal capitalism which subverts identities and outputs them as the depersonalised consumer (Mirowski 2014) and, I argue, in this way produces a datafied other-than-human body which can reinforce dividual subjectivities.

Bronwyn Davies (2014: 34) considers how neoliberal practices become individualising where competition produces judgements about whether ECEC teachers are ‘ever good enough’. The phenomena resulting from the intra-action between teachers, policy on assessment, and the software they use reinforces the neoliberal need to record quantifiable evidence. The need to draw on multiple levels of evidence and record this quickly allows for standardisation of evidence, itself linked to the need to be ‘good enough’. Deficits are magnified due to the lack of parity between ECEC teachers and qualified teachers who work in older age phases (i.e. from Reception to HE) (Hevey 2013). The agential capacities of the material-discursive intra-actions of software / databases / humans / data open up the ECEC

teacher for scrutiny of the perception of their role (deficit or otherwise) within the materialisation of private-public, gendered parent-teacher agential cuts.

Tsing (2015: 285) notes how commodification reframes professionalism, which then forces ‘the surveillance techniques of privatization’. In addition to the notions of the biodigital child and the datafied child, I therefore propose the notion of the biodigital, datafied parent and teacher as the agential cuts analysed above highlight the potential for dividual subjectivities. Although, in this instance, agential cuts have revealed how what is included in mattering moves the ECEC teacher towards dividuality, intra-actions also act as a springboard to consider how agential cuts are indeterminate and can be the ‘node in which many beginnings lie in wait’ (Tsing 2015: 254). In the next section, I move beyond the notion of the ECEC teacher as dividual to ignite different ways to think with agential cuts and professional practice.

Intra-Acting Devices

The nature of ECEC pedagogy requires flexibility in supporting play in a range of indoor and outdoor learning spaces (Wood 2014). Hence, as previously noted, observations of children’s development were recorded (and assessed) on handheld tablets. The most prominent device used in ECEC settings was the iPad and, in the cases of the settings discussed, there were limited numbers of devices per setting due to cost constraints. The following data fragments note some of the challenges where data, software, ECEC teachers, and devices entangle:

When you’re typing, sometimes the words I’m typing have got 8 syllables and the iPad changes the words completely and it makes its own thing. (Claire)

We had another teacher take over the iPad and ... when it says “access microphone”, she pressed “deny” so we had months of videos that had no sound to them because they’d denied the microphone ...

So then we had all these videos but you're like, "No, we can't hear anything" so they've become a bit worthless. (Paula)

In these fragments, the tablets act as both apparatus and phenomenon (Barad 2007) where their agentic capacities override human input of observations and their subsequent assessment. Agential cuts reconfigure assessment practices where one cut contaminates data via predictive text surreptitiously changing the meaning of the observation / assessment; with another cut removing the sound from any of the videos rendering it *worthless*. In the first fragment, the lively dance of iPad animacy was revealed as *the iPad changes the words completely and it makes its own thing*. This statement queers the data collection devices as the iPad makes its own playful (algorithmic) additions to the observation, and the boundaries between ECEC teacher and data collection devices become blurred. Tsing employs the term *contaminated diversity* to 'refer to cultural and biological ways of life that have developed' (2012: 95). Although she applies this to ecological matters, it can be extended to human, iPad, and data connections. The iPad's addition to the observations disturbs the need to assess and measure children's development. Subjectivity, as a momentary intra-action, becomes other-than-human and contaminated (Tsing 2015). These collective encounters push against the neo-liberal imperatives for both a measurement culture and dividuality.

There are also technological challenges with the app with regards to the data 'cloud' and the times when the app crashes:

What happens is, if you don't click the learner ..., it sits in a cloud with hundreds and hundreds of observations and you think you've done your bit and actually on *Too Simple* ... there's literally hundreds of observations that have been taking place and photos. (Patricia)

With *Tapestry*, the most frustrating thing is when you've done a beautiful observation, you've got your picture, you've written your description, and you're like "yup, that's a good one", and you press "Save", and the App crashes. (Paula)

The data 'cloud' queers the measurement apparatus as the data has been uploaded to a 'nowhere' space – *there's literally hundreds of observations that have been taking place and photos*. The cloud produces another type of potential contamination providing a different articulation that is not focussed on the ECEC teacher, but on the requirements of the app which needs a link to the child's record. In this instance, the cloud becomes the site of resistance that playfully pushes back against capitalist data governance (Tsing 2015; Williamson 2016a). The agential capacities of the cloud are a cut where data cannot be included in the overall measurement of child development. The observations and photographs of the children become suspended in a virtual space and time outside of the individualised records for each child. The linearity of learning becomes a spacetime mattering as past and present observations intermingle as both a presence and absence (from the child's record), each leaving a material trace of the child's learning. As the app crashes data becomes 'lost' both in the past when it was materialised on the app before the crash, and in the present as the practitioner writes on the app, but this is never fully materialised on the child's record. These fragments reveal the challenges of using devices with predictive text, a binary data system where data is either saved or not, and the 'nowhere' cloud. In these two excerpts, it is a challenge to equate individual subjectivities to the ECEC teacher. The animacy of the app and the data cloud queer observations and assessments as they intra-act with ECEC teachers, children, and data, revealing differential agential cuts and more affirmative and playful articulations of relational other-than-individual subjectivities.

Curricula Phenomena

ECEC curricular policy sets out the requirements for pedagogy where goals for learning become the bedrock of the curriculum delivered to young children. Here teachers are expected to devise, sustain, and enable learning environments through which the child's development is observed and assessed (DfE 2017). Some of the teachers spoke of the pressure to produce a required number of observations:

You used the word “churning out” and that’s exactly the problem, it’s that staff become mindful that they have to produce these observations. But ... you are missing the point of doing observations in the first place. It’s not about producing enough to fulfil tick boxes to produce numbers. It’s about looking at the child and helping that child develop. (Claire)

Churning out, as a relational intra-action, could have negative connotations where ECEC teachers produce observations in large quantities to tick boxes (Roberts-Holmes and Bradbury 2016). Previous research suggests the need for good data to drive governance and meet policy requirements (Selwyn 2014; Williamson 2016a; Bradbury and Roberts-Holmes 2018), and these requirements provide a form of governmentality which can lead to a performative practice (Foucault 2004) where bodies churn to produce positive data outcomes. Observations based on this conceptualisation become a currency and are an enactment of what Tsing (2015) entitles *salvage accumulation*. Here ‘raw’ materials (the observations) become converted (salvaged) into measurable outcomes (accumulation) which link to HCT and the need for children to be educated to fulfil their role as future worker. The observation / assessment / outcomes process produces ‘good’ data which leads to the image of the educated child satisfying managers, policy makers, and regulators. However, ‘to churn’ can also denote a mixing that creates something new. This mixing of relations articulates the productive nature of the observation process that can be queered as a site of instability. Rejecting the

tick-box requirements and considering the needs of the individual child moves beyond performativity. The intra-actions between policy, the environment, development and learning, and the child (Woods 2014), as well as *connecting to the child and helping that child develop* provide an alternative to dividuality and standardisation.

The expectations of good data are also used to surveil ECEC teachers, as in the case of the second fragment where a member of the Senior Leadership Team questions the teacher's practice. There are expectations of normative forms of assessment which influence teachers' practice and pedagogy, leading to certain ways teachers manage classrooms:

The CEO even, he came around and I'm literally sat in a doorframe on an iPad typing an observation up and he just stepped over me and he was like, "What on earth are you doing?" And I was like, "An observation!", but he then frowned upon me because I was then doing that observations but I was like I need to do this observation, take a picture and do it now, and if this is where it happened, then this is where it is, I can't choose where it is. (Carol)

Part of Barad's (2007) commitment to objectivity is to pay due regards to the mattering of matter. In this fragment, an other-than-human body – the doorframe – becomes part of the intra-active process of observation. The entanglement of physical-material spaces with ECEC pedagogy and practice highlights how the doorframe 'matters'. A mundane and everyday object (Holmes and Jones 2016) becomes a vibrant and agentic component of the observation and assessment phenomenon. The doorframe is an embodied iterative reconfiguration of 'data collection' that acts as a momentary and ephemeral anchor point of spacetime mattering of ECEC teacher, tablet, photograph, and data upload. The door frame 'mattering' was not *a priori*, it emerged as part of the momentary intra-active event revealing a more vibrant 'latent commons' (Tsing 2015: 135) where other-than-human entanglements push dividual and neoliberal practices aside. This mattering was mobilised as part of the observations and

assessment process noting the dynamic and vibrant relations of the ECEC teacher and the material world. Both these excerpts indicate how curricular expectations are more than a human concern. Dividuality is not confined to human agency, and ways to move beyond these deficit discourses are demonstrated as intra-actions reveal other-than-human animations and articulations of ECEC teachers' subjectivities.

Concluding Thoughts

This article enacted a series of agential cuts which contribute a response to potential dividual and deficit discourses which surround ECEC teachers who are seen as feminised, low-skilled, and underpaid, as well as under surveillance by policy makers and regulators. This potentially precarious existence is couched in neoliberal education practices that are premised on 'data' to record and predict a child's progress. I instantiated new ways to reimagine data entanglements as intra-acting human and other-than-human phenomena, revealing how bodies are made and unmade during the observation and assessment process. In some cases, software and assessment process re-inscribe dividual subjectivities, marking both ECEC teachers and children's bodies. These material-discursive productions connect to policy requirements to measure the effectiveness of teaching programmes, reinforcing deficit discourses that surround the gendered nature of ECEC teachers and their work. However, there are other 'not-yet-articulated' (Tsing 2015: 254) intra-actions that reveal a move beyond dividual subjectivities. Tablets queer data collection, predictive text 'contaminates', soundless videos are '(un)productive', and space and time become disrupted as children's data gets lost in a cloud 'nowhere'. Pedagogy becomes in-formed by agential cuts which 'churn' observations, focusing on the child rather than the product of the observation process. There are also material actors within the classroom, such as the doorframe, that are co-constitutive elements of the observation and assessment process.

The flow between dividual and other-than-human subjectivities has implications for ECEC training and practice, and for HE, as it provides grounds for a diffractive methodological and analytical proposition for those researching the impact of data and metrics in HE. The ECEC teachers included in this article were studying in HE and they themselves were subject to the same data driven narratives that surround education. In this instance, they were entangled with data and datafication in their day-to-day work activities with children, and were subjected to datafication as students in a degree programme. The outcomes of this article can therefore also provide alternative ways for lecturers teaching in ECEC programmes to critically analyse the ways in which neoliberalism and datafication can frame teacher practice from the position of themselves and their students. This can provide a different starting point for teaching and learning for those studying ECEC degrees by attempting to resist the deficit and dividualised notions of professional practice that have been conceptualised as part of ECEC work.

Notes

¹ The term ECEC teachers is employed in this article to cover all those working in ECEC in England regardless of the level of qualification obtained or job role.

² From 1997 legislation and regulatory powers have been devolved to Scotland, Wales, and Northern Ireland. The impact of this in Early Childhood Education and Care (ECEC) has seen a divergence in curricular requirements, staffing qualifications and regulation (<https://www.gov.uk/guidance/devolution-of-powers-to-scotland-wales-and-northern-ireland>).

³ This is awarded to those who have taken either an Undergraduate or Postgraduate course which is assessed against the degree requirement, and also meets the Teacher Standards (<https://www.gov.uk/government/publications/teachers-standards>).

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