

# Chapter 4

## Data classes: an investigation of the people that ‘do data’ in schools

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**Abstract:** Amidst ongoing enthusiasms for ‘data-driven’ schooling, concerns are being raised over likely shifts in power associated with the ways in which school staff are engaging with the production and analysis of data. Following the emerging tradition of ‘critical data studies’, this chapter addresses the important question of who gets to ‘do’ data within school contexts (and, conversely, who does not). In particular, the chapter draws on in-depth interview data generated from qualitative studies of digital data practices within three secondary schools in the Australian state of Victoria. Belying outward appearances of being successful ‘data schools’, five distinct ‘hierarchies’ of data-using staff are identified – each aligned with a number of notable reconfigurations of power and redistributions of agency. The chapter discusses the ways in which pressures to use data are entwined with wider reformations of teacher identity and teacher professionalism. In particular, the chapter considers how any conferred benefits of ‘doing data’ seem delineated by a range of significant factors - not least teachers’ gender, status, disciplinary background and career stage. In this sense, it is concluded that dominant discourses of the educational benefits of data-driven schooling need to be challenged – if not reconsidered altogether.

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### INTRODUCTION

Schools are now sites for the voluminous production of digital data – from external examination and assessment grades, through to internal measures of student attendance, parental satisfaction, and teacher performance. While schools have always collected and recorded non-digital data on students through examinations and attendance registers, the rise of powerful data processing systems has fuelled expectations for schools (and the people who work in schools) to be “data-driven” and “data-intensive” in everything that they do. All told, schools and classrooms are being recast as environments where “it is no longer acceptable to simply use anecdotes, gut feelings, or opinions as the basis for decisions” (Mandinach 2012, p.71). Instead, school staff (at all levels of seniority) are expected to engage in “data-driven decision making” as a means of improving their practice and ensuring their accountability.

This “data turn” is generally portrayed in positive terms in educational spheres. While

it is acknowledged that schools' actual data use remains inconsistent, engagement with data nevertheless continues to be promoted as a basis for the improvement of the school system. School leaders are now encouraged to foster institutional "data cultures" (Schildkamp 2017) and to establish shared norms for data use. Mechanisms for doing this include the development of school-specific "data plans" and the coordination of "data teams" that allow staff to engage with data on collaborative and communal terms (see Wardrip & Herman 2018, Schildkamp & Gummer 2013). All told, the increasing generation, circulation and process of educational data is associated with promises of significant benefits and reform. As Jarke and Breiter (2019, p.3) put it:

Digital data allow for the analysis of different educational practices to a degree of complexity not previously possible and to a much greater extent, as they can be very detailed, cover a more complete scope and can be flexibly combined ... digital data not only serve to support decisions, but also fundamentally change the organisation of learning and teaching.

While the 'grey' literature and policy recommendations for school improvement continues to be driven largely by enthusiastic efforts to support "better" uses of data within schools, an emerging body of work is beginning to examine critically the ways in which this prevailing "logic of enumeration" (Hardy 2015) is actually being played-out *within* individual schools. For example, such studies have illustrated how expectations of sustained data use can intensify teachers' work, lead to diminished professional autonomy and a heightened sense of continuous performativity (e.g. Kim 2018, Bradbury & Roberts-Holmes 2017, Selwyn *et al.* 2016).

This chapter seeks to extend these studies by pursuing an organisation-focused approach to examining the realities of how school staff are "doing" data. In particular, we take a lead from the emerging "critical data studies" tradition (Kitchin & Lauriault 2014, Iliadis & Russo 2016). This encourages us to problematise the rising societal prominence of data (particularly in digitally-mediated forms) in terms of associated shifts in power and politics. In this sense, critical data studies draw attention to the fact that the control and use of digital data is becoming a key source of power in society. As such, this raises questions over which individuals and institutions are becoming (more) empowered by their jurisdiction over digital data (and, conversely, who is becoming disempowered). At the same time, it also draws attention to the extent to which data and data-driven processes are becoming "new power brokers" (Diakopolous 2013, p.2) in their own right.

In an educational context, therefore, it makes sense to reassess the rising prominence of school data in these messier critically-minded terms. Indeed, Jarke and Breiter (2019, p.5) contrast enthusiasms for the inclusive and consistent benefits of school data with the likely divides and inequalities implicit in the competences required to work with and interpret data. If nothing else, differences in technical "know-how" are likely to see the increased involvement of particular staff in schools' data processes, and the subsequent marginalisation of others. As Ian Hardy has previously noted, it makes sense to see professional association with numbers and

statistics within a school as a new form of power due to “the seductiveness of the constitution of an enumerate subject position” (Hardy 2015, p.30).

On one hand, then, we might well expect to find a number of newly-formed “data classes” within a school. The “data classes” metaphor is multileveled in that it refers not only to how the different groups of teachers understand and work with digital data in schools, but also highlights how these classes lead to new forms of ‘data power’ (Kennedy & Bates, 2017), which govern indirectly and without proximity. Who gets to “do” data within a school context (and, conversely, who does not) therefore raises new and important questions, particularly with regard to the effect this has on the design of curriculum and pedagogy schools. These might be ordered along lines of technical and statistical expertise – reflecting what Lev Manovich (2011) has described previously as a “data analysis divide” between data experts and those without specialist computational training and skills. At the same time, however, we need to remain mindful of the ways in which this remains entwined with broader micro-politics of everyday schooling (see Ball 1987), such as the school’s executive structure, faculty and departmental divisions and other established hierarchies and power dynamics.

Given the focus of this book on datafication *and* education, we are particularly interested in how teachers understand data and how this shapes their professional practices and interactions with students, teachers and administrators. In particular, how data is “done” in schools has an impact on any conceptualisation around pedagogy and curriculum, which of course effects how children and young people learn and understand the world and their place in it.

In this sense, the chapter now goes on to consider the following research questions:

1. Which staff are associated with data use in schools?
2. What motivates these staff to respond to the prioritization of data within the current educational context?
3. What do these staff see themselves as doing with data (and, at the same time, how do others view their work)?

We begin by outlining the research approach and methods. We then present the findings, which are organised according to the different ‘data classes’ that we found in schools, namely: executive/senior leadership; data teams; data experts; data enthusiasts; and the ‘run-of-the-mill’ majority of teachers. The discussion begins by outlining the importance of context, highlighting how the micro-politics of each school shaped the formation of these data classes and the impact on curriculum and pedagogy. Also discussed is how data, which was often conflated with datafication, was treated as an object that could be manipulated and controlled to achieve particular ends. The chapter concludes by speculating on what these new power dynamics mean for teachers and students in Australian schools.

## **RESEARCH APPROACH AND METHODS**

With these questions in mind, we now go on to develop a critical account of the digital data work currently taking place within secondary schools in the Australian state of Victoria. To do this, we draw on interview data generated from in-depth qualitative studies of digital data practices in three contrasting Victorian secondary schools across the 2019 academic year. Although we readily acknowledge that schools have always generated and used non-digital data, we do not account for or explore these practices in the present study. This empirical data constituted the opening phase of a three-year research project seeking to make use of participatory methods to reimagine schools' datafied practices. The three case-study schools were a small inner-city government school (Weston High School), a large suburban Catholic school (Brookdale High School), and a medium-sized outer-suburbs private school (Northland College). In Australia, approximately one in five students attend a Catholic school. The Catholic education system is different from both the public and private education systems in that it was established by the Catholic Church. Catholic schools are ostensibly faith communities based on belief in God and a Christian way of life.

This period of immersive fieldwork in the three schools involved identifying and examining the main forms of data generation associated with school ethnography – including over 60 site visits, *in situ* observations and general “hanging around”, field notes, documentary analysis, photographing, corridor conversations, and more formal interviews with IT staff, data specialists, school leaders, teachers and students. In particular, this chapter draws upon interviews with over 50 staff across the three schools in teaching, leadership, technology and administrative positions. Each participant is given a pseudonym, which is outlined in the Endnotes to this chapter. These interviews were in-depth and semi-structured, lasting anywhere between 30 and 90 minutes. Drawing on thematic analysis of this corpus, structured initially by the *a priori* themes of the three broad research questions described above, this chapter now goes on to explore the different forms of data “people” and data “work” that were described by interviewees as constituting how data was being “done” within each school. This can be described in terms of the following five distinct hierarchies of data engagement.

## FINDINGS

### *i. “Data” as an executive-level concern*

The schools' use of data was initially presented to us as a senior leadership concern. Indeed, the influence of Principals, their Deputies and other executive staff was evident across the three schools – each responding to different perceived data imperatives. For example, Weston's Principal Sarah described herself as motivated primarily by the ways in which Victoria's state Department of Education & Training (the “DET”) was prioritising data-driven schooling (“*things from the Department that are imperatives to do*”). This included various directives, reporting criteria and online portals designed to ensure that all government schools were engaging with official data flows. While Sarah was well aware of the importance of data to the DET, she couched this in rather sarcastic terms (“*I guess that the basic mantra in education*

now is ‘Understand Thy Impact’). Through various initiatives and communications from the DET, Sarah was well aware of the fact that data engagement was a Principal’s responsibility. Nevertheless, Sarah saw ‘data engagement’ as enabling collective action throughout her staff. For example, she was sharing access to the DET “Principal Data Portal” with a wide range of colleagues beyond the officially-permitted five-person limit. As Sarah reasoned:

*“I’ve actually shared the data ... I understand why you wouldn’t just give it to everyone [but] I certainly think people in leading roles need to have their own access ... It’s [about] teacher agency ... it’s not rocket science!” [1]*

Brookdale’s executive staff, in comparison, described themselves as responding directly to a recent school inspection that had deemed the school to be “failing” in its use of data. While indignant about being criticised by “*elderly ex-teachers coming in to tell us how we are doing*” they accepted the judgement that the school was “*data rich and usage poor*” [2]. As a result, the school’s Headteacher had appointed one of his Deputies as the school’s official “Head of Data”. Les interpreted this role as requiring him to instigate a “root and branch” reform of the school’s IT systems [3]. This was viewed by other Brookdale staff with scepticism:

*“So, now we have a Dean of Data [who] doesn’t know data ... I’m not having a crack – he’s a wonderful man, but that position is a compromise to keep someone in a job who lives and breathes Brookdale .... But each year we have to show him how to upload data to [the LMS]”. [4]*

In contrast, there was little overt criticism of the ways in which the Executive Principal and his Deputy were leading Northland’s ambitions toward becoming a “data-informed” school. From our initial visits onwards, this was presented as a top-down commitment that was shared throughout the school. Indeed, the Principal was confident that “the staff here are open to data” [5]. Principal Dennis had been in the post for five years and now felt that “we’ve got the school to run well as a school normally should”. As such, his ambitions to refine Northland’s data use were rationalised as “tweaking to get the best out of the machine now the machine’s running reasonably well, to use an industrial metaphor” [5]. While this was usually talked about in a positive light, Dennis occasionally expressed anxieties over not fully using the mass of data that was being generated within the fee-paying school:

*“One of our weaknesses is we’ve got so much data that we don’t use ... or we just have a cursory look at ... So I’d hate at some stage to have something go badly wrong and we could’ve foreseen it”.*

## **ii. The formation of “data teams”**

Despite their varying levels of assuredness, these “executive” school leaders had little personal expertise regarding data use. For example, Dennis saw himself as contributing experience and “soft skills” to Northland’s data agenda [5] - establishing

connections and initiating communication amongst school staff. Northland's commitment to improved use of data therefore fell to a formally-constituted "Data Leadership Team". This was an eight-person sub-group of the school's "Teaching and Learning Committee". Joining Dennis and his Deputy Principal (Russ) were Northland's IT manager and a second member of the school's "tech team" with responsibility for programming. Three other places fell to senior teaching staff with assigned responsibilities as "project managers" for various aspects of school improvement. The project portfolios deemed to be aligned with data use were the lead staff for "Assessment and Reporting", "Character Assessment", and "Professional Development"). Making up the numbers was Stephen – Northland's "Senior Data Manager". In reality, this group was rarely convened *en masse*. Rather, various combinations of these staff met when directed. These meetings and interactions were largely initiated by Dennis and Russ, as well as by the school's chief technology officer (CTO). In this sense, the overall "Data Leadership Team" was less of a working team and more the pretence of a working team. Indeed, the "Data Leadership Team" could be read in terms of hierarchy and exclusion rather than indicating any kind of knowledge or expertise.

In contrast, Weston's principal had assembled a similarly-sized group of staff that did gather together to "talk about data" [1]. Various referred to as the school's "data group", "data committee" and "data team", this was a more organic arrangement than in Northland. As Sarah reflected, "the first thing we realised when we got together was that everyone has a different take on what 'data' is". This group met together on an informal basis ("we perhaps don't meet as often as we should" [1]), and comprised of six staff with responsibility for teacher professional development, student learning and timetabling.

Reflecting Sarah's ambition to share data beyond the schools' executive, the group's initial interests had settled around the idea of improving data accessibility and data awareness throughout the school. As Vic put it, "looking at how data is used around the school and making it available for other teachers". One point of consensus was the goal of making data a collective responsibility. As per DET protocol, Weston's teachers were arranged in different "professional learning communities" (PLCs) organised around subject specialisms, such as numeracy, literacy, and health and physical education. As such, "the idea of the [data] group is to build the capacity of the PLCs - *not* just the individual teachers - to utilise data" [6]. Another tentative aim was to develop way of 'students understanding their own data' and encouraging 'students to begin to take data on board' [1].

On the face of it, Brookdale had a similar group of senior staff with a data remit, albeit with little sense of collective responsibility or cohesion. Some of the group had designated titles. For example, Les was the "Head of Data," while a recently appointed recruit with a background in corporate business intelligence was the "Data Analyst". Other staff involved were the school's "Director of IT", and another senior teacher working in a "Director of Teaching & Learning" role with additional responsibility for the school's learning management system. In contrast to the (semi)formal "team" structures at Northlands and Weston, Brookdale's staff were working along relatively separate lines, with various people coming together to enact

Les's reform of the school's data infrastructure. This primarily involved improving interoperability between the school's various data systems. As Les reasoned, "you can't do the data part of the job ... unless you've got the other parts working" [3].

### ***iii. Officially designated "data experts"***

While providing designated responsibility for 'data' within the organisational structure of each school, these different teams and committees offered limited direction and expertise with regard to digital data. For example, we first visited when Weston's team was pursuing the idea of producing "data packs" [6] for each teacher community. These eventually took the form of a series of Google Documents with lists of relevant resources. In all schools, then, any advanced data work (particularly data processing and analysis) was being undertaken by specific individuals who were deemed to have sufficient levels of data expertise, both technically and conceptually.

In Northland and Weston this work fell to two similarly-positioned senior teachers. Tony and Stephen were both recognised informally as their schools' "data experts" who took on responsibility for running analyses. This data work was certainly not the result of large analytics systems and complex calculations. Instead, Northland's Senior Data Manager (Stephen) was at the heart of most data analyses within the school, while Weston's "Data Manager" (Tony) fulfilled a similar role. They were both full-time teachers in their mid-fifties teaching mathematics (Stephen) and science (Tony). Both had self-professed interests in data and statistics and had accordingly worked their way into data-focused roles. Tony was Weston's timetabling manager, while Stephen had an allotment of one-day-a-week to improve student "growth" through data (i.e. coordinating the school's efforts around improving student performance). These teachers were entitled to an allotment of "non-teaching" time to take responsibility for their schools' data analysis.

Both teachers were well-regarded by their colleagues. Northland staff would regularly refer to Stephen as the school's "data guy". Tony was introduced to us by Weston's principal as "very clever with spreadsheets" [1]. In contrast, Stephen was quick to describe his skillset in more modest terms: "data and spreadsheeting is something I've just picked up over time ... I've just sort of fallen into it" [8]. Tony was similarly modest: "I don't have any training in it ... I've just always liked numbers ... all I do is essentially old-fashioned spreadsheet work in the same way that I was doing ten years ago. It's just me and my laptop" [9].

Both Stephen and Tony had been given responsibility for running the few big data analyses that formed the backbone of data work in Northland and Weston. For example, Stephen ran an annual "prediction exercise" at the beginning of students' final year to produce "robust estimations" of their likely university admission scores. He also ran analyses to identify top-performing students who might be awarded "academic prizes". At Weston, Tony undertook similar analyses, as well as annual reviews of school-wide data relating to student "lates" and non-attendance. All these data exercises took considerable amounts of time and "manual" effort – meaning that

each analysis was conducted only once or twice each year. As such, their data work had become an important part of school knowledge, with other teachers reliant on them to mediate and communicate the analysis of student data. Despite this, both teachers acted largely independently of their colleagues. As Stephen put it, “I keep telling them ... if I walk under a bus - this is all gone!”. Similarly, as one of Tony’s colleagues put it, “if only we had two or three of him, it would be amazing” [10].

In contrast, school-wide data work within Brookdale were designated officially to two staff members. The school’s main annual review of examination data fell under Les’s purview as “Head of Data”. Les took responsibility for uploading and coordinating access to this data. In contrast to Weston and Northland, he did not devolve responsibility for the subsequent analysis to statistically-minded colleagues. Instead, this work was outsourced to an external data consultant – a former teacher who teachers described as having a “good reputation” across Melbourne schools. Margaret was currently employed by an independent education research organisation, meaning that Brookdale could officially contract her to run annual analyses of the school’s examination data. As Les explained, the value of such a service was bolstered by the opportunity to gain a sense of how Brookdale compared with the research organisation’s other clients:

*“One good thing about Margaret is that she also tells you how you rank against other schools as well. She does this for about 40 or 50 schools. So we can see how our classes did against them ... Of course, the problem with that is that Margaret charges \$2,000 to do this! But we consider it pretty important and we’ve done it for a long, long time. There’d be a lot of schools who would see that investment as lower on their list of priorities for spending money ... but it is great to see where you lie in the whole scheme of things” [3]*

At the same time, Brookdale had also taken the bold step of recruiting a corporate data professional into a newly-created role of the school’s “Data Analyst”. Kyra had previously worked as a business intelligence and data warehousing consultant in various corporate positions. As far as Brookdale’s leadership was concerned, this decision to move beyond teacher-led data work to a full-time “professional” hire marked a significant shift:

*“We’ve got to make [data] work for us and it really wasn’t happening ... we’ve probably been saying that for the last six years ... and so those conversations evolved into the need of someone like Kyra – but it’s not easy to find a data analyst! ... She’s got that technical know-how ... she’s a great resource – we’d hate to lose her” [3]*

Despite her “know-how”, Kyra had yet to become involved in any data analysis or sustained data-work in the school. Most teachers in the school were only vaguely aware of who she was – as one teacher put it: “So now apparently we have a data analyst. I don’t know if I’ve ever met her. I mean, I’ve probably said, ‘Hello’ ... don’t know what she’s used for” [4]. Instead, Les had co-opted Kyra into assisting with the

redevelopment of the school's IT system ("because she's got fair bit of an IT bent she's had to try and fix [the portals] up from the back end ... the data part of her job has been put on the backburner" [3]). As Kyra described it:

*"I'm supporting the IT team – they need the extra support. My role was data analysis, but I haven't still got to that stage as yet because of the change of products ... I didn't realise there are so many things in the education sector coming from corporate. ... so as such [the school] is in a transition phase ... So I haven't done much data analysis as yet because of this change of products" [11]*

#### **iv. Individual data "enthusiasts"**

Stephen, Tony and Kyra were not the only members of staff involved with "doing data". Alongside each school's officially mandated "analysts" were small numbers of highly interested and data savvy staff who also took it upon themselves to engage in data analyses. For example, Brookdale's data leadership were rather closed off from the staff, yet there were a number of "lone wolf" data analysts doing their own work in the school. In particular, many teachers we spoke with identified Dane as a leading proponent of data in the school. Dane's fellow Religious Education (RE) teachers referred to him as "the master of data at our school ... he doesn't sleep". Other staff were quick to inform us that "Dane is the data king ... with his spreadsheets and huge data[sets]" [12]. Even the school Principal pointed to "the RE guys" as the main exemplar within Brookdale of "high-end manipulation" [2].

In contrast, Dane was a relatively unassuming young teacher in the RE department who had worked previously as a Maths specialist. As Dane explained, what had started as a hobby had progressed in a focus on making frequent use of data within his own teaching:

*"I come at it from a statistical perspective. And in terms of my actual expertise and training, it's mostly self-taught. I really enjoy spread sheets. I think there's a lot that I can do with them in terms of figuring out trends and also trying to get a sense of where everything sits. But also just trying to find a half-way house between pure data and the usefulness of that data" [13]*

For Dane, school-related data analysis was now a "passion project". Previously, he had analysed data as a hobby *outside* work, even contributing to an online forum, specifically a subreddit, dedicated to data management ("*I used to be fairly active on a subreddit. I would enjoy reading other people's data management problems and then offering solutions on my experience*" [13]), he now brought his interests to bear on school-related data problems. Dane would request access to various datasets from the school systems and then set about running analyses that he saw as worthwhile, or otherwise had been suggested by colleagues. As such, Dane has assumed a role as unofficial data consultant for the colleagues he worked with closely, often undertaking analyses that he reckoned could take up much of his

evening and weekends. Aside from his love of data, Dane's primary motivation was to use data to "find out what's really happening", "prove points" and "win arguments" within the school. As he put it, "when things get thrown up, I challenge them on a statistical basis if I have to" [13].

Due to the structure of the school's faculties, Dane's efforts remained the preserve of RE and humanities classes. As a relatively traditional Catholic school, Brookdale had a rigid department structure with staff from different subject areas tending to work in "silos". In terms of student numbers and perceived prestige, the RE department was considered to be a leading area of teaching. Moreover, Dane implied that other departments were resistant to sharing good practice, and perhaps also distrustful of his analyses. For example, he bemoaned that "I don't have the credibility" to work with data relating to maths teaching: "... there's some very strong characters in the Maths department who stand in the way" [13]. Dane's colleagues also recalled rebuffed attempts to share data work with the Science department: "It tends to be a little bit of 'You do it your way, I'll do it my way'" [4]. All told, Dane was keen to "not to do anything too public" and, instead, conduct his analyses for a small (but receptive) group of RE and humanities teachers. As a consequence, teachers in RE and the humanities were using dedicated software to analyse digital data on student learning, while those in the sciences were using more traditional, analogue methods, leading to different faculties having different insights and outcomes when designing future curriculum and pedagogy.

Two similar data enthusiasts were also prominent within Weston – both working within their respective subject "communities" of teachers. Vic was a Maths teacher who was involved mostly in working with data generated by a personalised maths learning system being used in most of his department's classes. This generated a mass of data relating to maths teaching that Vic was analysing on behalf of his PLC. Vic was happy to spend considerable time on the "micromanagement of our own data" [6]. Vic had begun to share this work with "three other teachers out of the ten or so [in the Maths PLC] who want go to this level of detail". Even Tony – Weston's official Data Lead – marvelled at the quantity and specificity of the data that Vic had access to, alongside the amount of time he was able to spend on the analysis: "I've never had enough time to do that with, say, the National Assessment Plan – Literacy and Numeracy (NAPLAN) data" [9].

Elsewhere in Weston, Mick was a charismatic Media Studies teacher who described himself as working with data in a number of "maverick" ways. He described his approach as constituting "almost a new category of teacher that is more research-based as well as pedagogical practice-based" [14]. Mick was certainly confident in pursuing his own agenda. For example, in order to gain better access to data he was opting to circumvent the school's official LMS and run his teaching primarily through Google Classroom. He reasoned that this "hack" allowed him to benefit from what he believed were "seamless" ways of managing student data, assessment and feedback: "it's such a powerful suite ... happy days!" [14]. Mick was also exploring the use of different apps that he thought might generate additional data on students ("I've been messing around the ClassDojo and things like that"). Most notably, and with little regard to privacy, Mick was sharing his data with an informal network of

like-minded teachers from other local schools – therefore allowing comparisons to be made with similar students and teaching data:

*“We share our data ... I’ve got a few networks of teachers, and I’ve set up things like a shared spreadsheet that looks at both the marks of my class and also some of the other schools in our area. So we’re able to cross-moderate, ... and look at things like the spread of marks in a comparable school. This stuff works really well as a sort of working day-by-day data point ... People want in, it’s not that they have to do it! [laughs] ... I meet up with one or two of them on the holidays because they’re friends, but this is a way of doing collaboration without having to physically meet people”.*

#### **v. The “run-of-the-mill” majority**

The various staff hierarchies just outlined all dominated how data was talked about within Weston, Brookdale and Northland. Beyond the specialists, however, lay the majority of other teachers. Most staff at each of the three schools were able to the “data people” described in the previous sections from the majority of staff working in each of the three schools. Indeed, our initial meeting with Northland’s “Data Leadership Team” was prefaced by a clear warning to expect notable differences between “the people in this room and our run-of-the-mill teachers” [15]. Other data-focused staff were keen to make similar distinctions between themselves and what were described elsewhere as “average teachers” [16] and those “at the coalface”[2].

Of course, many of these “run-of-the-mill” staff were engaging with data in their own ways. As such, there were larger groups of what might be termed “dutiful” teachers in each school who lacked notable data expertise but nonetheless were well-aware of the need to make use of data in their work. Tellingly, in Brookdale this was associated with teachers who have joined the school from the UK: *“There’s a subset of teachers we’ve got here...who’ve come from the UK and they are so immersed in data over there ... It’s really interesting hearing them talk about lack of access to data [here]”* [17]. Often, data was not described by the Australian teachers as a particular passion or interest (*“you have to make a special effort really”* [10]), but acknowledged as a requirement of being a contemporary teacher:

*“There’s quite a few teachers who say that, ‘I’ve been teaching for however many years, don’t tell me how to do it.’ ... but there is this now this critical mass in the middle ... where people are going, ‘Come on, get over that!’”.* [12]

However, an equally large number of teachers were notably less compliant. This antipathy stemmed from a range of familiar concerns and criticisms – for example, relating to the quantification of students: *“We tell [students] they are more than a number ... but then we give them a number”* [18]. Another teacher who had recently left the profession responded bluntly to the question of how data made her feel: *“Bored ... The data never told me anything new. It just validated what I already knew”* [19].

As might be expected, the “data experts” described in previous sections had little sympathy for such attitudes. As one senior leader at Brookdale put it, *“there are those who jump on the bandwagon and want to learn about this form of teaching, and others who it leaves behind”* [20]. Elsewhere, it was suggested these negative reactions to data use were symptomatic of professional incompetence (*“some of them are fearful, usually unjustifiably ... but not always”* [5]), generational intransigence (*“those who trained in the previous millennium”* [9]), or are simply reluctant to be challenged:

*“Whatever the data tells you, if it’s good and it’s true and it’s rigorous and it’s meaningful, you’ve got to listen - and that’s a hard pill to swallow for a lot of people”* [14]

*“Your average teacher follows gut instinct. That instinctive behaviour and learnt pattern of behaviour is not always an easy clear migration to valuing quantitative data”* [16]

Conversely, the increasing importance given to data experts across the three schools was also a source of tacit tension. This was a point of resentment that a few interviewees were happy to voice. On occasion, it was suggested that conspicuous enthusiasm over data in schools was a form of cynical career-building by ambitious colleagues – i.e. *“teachers who are looking to build a career and reckon that data can support them ... they wouldn’t think critically or be politically-minded”* [19]. Elsewhere, the notably gendered nature of many of our previous descriptions was raised as an underlying issue. In justifying Brookdale’s data drive, for example, one teacher reasoned simply, *“The place is run by men you see”* [12]. Otherwise, data was rationalised as a matter of status and power: *“It’s not a matter of gender ... but it is a matter of hierarchy”* [18]. All told, leadership assumptions that “the staff here are open to data” were certainly open to debate.

## **DISCUSSION**

In one sense, Weston, Brookdale and Northland could all be described as relatively successful users of data. On the face of it, Principals and senior staff had sufficiently “crafted coherence” (Gunnulfson & Roe 2018) around the idea of being “data schools”. While not boasting notably distinctive or innovative “data cultures” *per se*, each school could nevertheless plausibly claim to be paying attention to student and teacher data. Committees and teams had been convened, individual members of staff appointed in “lead” and “manager” positions, and teachers were generally assumed to be “on board”. All told, these schools were certainly making “good enough” use of data without committing fully to data-driven and data-intensive practices.

While some broad similarities were apparent, our findings also point to the influence of local school contexts on the ways in which data was being approached and

enacted. For example, Weston was a relatively open and progressively-minded school – subject to the state government’s data “imperatives”, but also striving to foster a collective approach in the way that it went about things. In contrast, Brookdale was a relatively under-resourced traditional Catholic school – lacking the same centralised imperatives but nevertheless feeling compelled to “do data”. Finally, Northland was a fee-paying school with a distinct corporate ethos and focus on efficiency. These different values and agendas certainly shaped each school’s approach toward data. At the same time, we need to acknowledge the influence of school micro-politics on the ways in which particular staff were engaging with different forms of data. For example, there were distinct differences in how top-down executive control was (and was not) being challenged, the legacies of long-standing departmental divisions and inter-subject hostilities, as well as how new data-related organisational arrangements were being subsumed into established patterns of power and control.

Interestingly, across all three schools, data was approached as an “object” to be used and valued. Data is “operational” in that it is ostensibly strings of indecipherable numbers that flow between software systems (Andrejevic, 2019), however, it was not often seen as such. This has ramifications for how data becomes entangled with power. As an object, digital data can be traded, moved and correlated – it becomes valuable to those with the knowledge and expertise to “do something with it,” regardless of how useful or innovative that might be. However, in reality, it is often how software systems process and represent the data that is significant. Shifting away from the data as “object” perspective might lead to a more critical and holistic perspective on how education *systems* are changing due to datafication and the commercialization of educational technology. As Hintz, Dencik and Wahl-Jorgenson (2019) explain, datafication “facilitates a new form of governance that relies on data-driven practices of categorization, classification, segmentation, selection and scoring” (p.146). What we observed in each of our schools is the datafication of systems and processes, yet this was often not discussed. Instead, data was considered an object that was to be dealt with by particular people and/or groups in each school.

The growing prominence of data in these three schools was also aligned with a number of notable data-related reconfigurations of power and redistributions of agency (Jarke & Breiter 2019). First, despite appearing to be institution-wide commitments, only a handful of staff were actually involved in each school’s data-work. Beyond each school’s executive oversight and “data leadership” group, actual data work remained the preserve of a few staff with sufficient data skills and interest, but different responsibilities and accountabilities. In this sense, the establishment of data groups, data deans and project managers was largely organisational in effect - “the establishment of bureaucracy as a purpose of, rather than as a means for, technological advancement” (Wittmann 2018, p.70). More significant, then, were the individuals actually engaging with school data on a sustained basis - i.e. either in the guise of officially-mandated “data leads” or as self-motivated “data mavericks”.

On the face of it, the creation of official “data lead” roles reflect a tendency for schools to respond to technological change by creating additional specialisations

and positions (cf. the recent rise of school CTOs, network managers and “digital innovation” leads). While teachers such as Stephen and Tony were self-proclaimed data “enthusiasts”, their designated “data lead” roles were clearly demanding. These positions involved intense bouts of data-work in response to requests from school leadership – therefore constituting what could be described as quasi-consultancy roles. With this remit came a considerable amount of “soft power,” which could be used to coerce, highlight or nudge particular behaviours in teachers and students. This was evident in the multiple spreadsheet-based decisions that each teacher made about what could (and could not) be said about the school, teachers and students. These analytic “tweaks” and “fiddlings” were being made on the basis of Stephen and Tony’s technical and professional judgements – not least, their personal readings of the datasets and tacit assumptions about the students and staff represented in the data. In this sense, both Stephen and Tony were key gatekeepers of “what the data said”, and therefore held undefined but influential positions of power within their schools (see Wood 2014).

In contrast, “data mavericks” such as Mick, Dane and Vic were not beholden to the analytical demands of their superiors. These staff presented themselves as striving to use data as a “reality check” on their own teaching and the teaching of close colleagues. While these staff also considered data-work as a hobby and passion, they were clearly following their own lines of interest and inquiry (and were therefore less interested in fostering any school-wide use of data). These individuals could be said to be exercising power within their personal networks – i.e. using data to gather the respect and admiration of peers within and beyond the school. Yet, these teachers’ data work was not being undertaken to direct the actions of others *per se*, but rather being used to build their own status and careers, and in some cases, to be of benefit for their colleagues.

For the time being, at least, these two cadres of data analysts loomed large over how their schools were engaging with data. The rising significance of such staff reflects the emphasis currently attached to the specialist “data analyst” in the practical implementation of the data-driven society. These are individuals that promise to tame and draw meaning from masses of data. Our schools were therefore understandably happy to delegate some responsibility for “doing data” to teachers willing to act-out the analyst role – hopeful that they might coax some extra sense and additional narrative from their data. As David Beer (2019, p.101) reflects:

These figures are expected to create insights through a combination of skill, analytical ability and the capability to know and martial both the data and the analytical tools available. Time pressed and data rich, the analyst’s skilled glance is seen to be of great value.

As such, these data analysts were prominent role-models for the growing impingement of data on reformations of teacher identity and teacher professionalism - i.e. “educators’ understanding of themselves as professionals” (Anderson & Cohen 2015, p.2). Indeed, the pressure of “data” has already been noted as a significant factor now shaping teachers’ professional identities (Lewis and Holloway 2013;

Buchanan & McPherson 2019). In our own study, the imperative of data and the visibility of school data “leads” and “mavericks” was also an acknowledged influence on how most teachers saw themselves - either in terms of obediently “getting up to speed” with data at some time in the near-future, or else a recalcitrance to be “doing data” at all. That said, the strongest sense of altered professional identity arguably resided in the “data mavericks” themselves. Some of these teachers clearly saw themselves as a “new breed” of professional, and certainly were drawing on their use of data to reposition themselves amongst colleagues. Teachers such as Mick could be said to embody what has been noted elsewhere as a “new professionalism” within teaching – i.e. driven less by issues of discretion, trust and partnership, and more toward “outcomes-based, entrepreneurial and corporate” ways of working (Anderson & Cohen 2015, p.3).

Indeed, this perceived distinctiveness of “doing data” could be said to correspond with at least three differentiated identities or forms of “capital” that were distributed unevenly amongst staff in our three schools. First is what might be called “data capital” or “analytic capital” - i.e. the distinction of having “huge data” or simply being able to talk comfortably about pivot tables. Throughout all our time in the schools, the issue of actual competence in data analysis was a carefully choreographed topic of conversation. The older official “data leads” in Weston and Northland were keen to underplay their analytic skills. In contrast, Brookdale’s business intelligence professional was diplomatic enough not to appear critical of the “small data” and “primitive tools” that she was encountering. Even the “data mavericks” were not excessively boastful. Indeed, as Mick reflected: *“I think no-one in education is an expert in data, no matter what they tell you - no-one comes in as being a top-end statistician”* [14]. As such, the ability to maintain an appearance of analytic competency without over-claiming one’s skillset was a key capacity. In this sense, “data power” in schools was not so much derived from advanced statistical know-how, but the capacity to project a general confidence and competence with data.

Allied with this was an associated “technical capital” (Sims 2014). This was key distinguishing feature between the school “data leads” (notable for their “old fashioned” reliance on Excel), and the more technologically-ambitious “data mavericks”. As has been noted before, digital skills and technological expertise are often used by individual teachers as “a means to strengthen their position within their school” (Pitzalis & De Feo 2019, p.85). Crucially, the data mavericks were drawing on a wide range of technological resources - from the transgressive adoption of platforms such as Google Class through to drawing on forums such as Reddit and social-media networks of teachers from other schools. Compared with the relatively staid nature of their schools’ technology use, these teachers were notably engaged in mainstream “tech culture” and networked practices - a key part of how they distinguished themselves from their colleagues. In this small way, then, “demonstrating resistance can generate symbolic capital to be invested and exploited as a career furthering strategy” (Pitzalis & De Feo 2019, p.86).

Finally, alongside these technical capitals was the continued significance of what might be termed “teacher capital” (Zevenbergen 2006). “Data mavericks” such as Mick, Dane and Vic were well-regarded by their immediate colleagues for deploying

advanced uses of technology and data to improve teaching practice and better understand their students. In contrast, Brookdale's "great resource" of hiring Kyra was treated with distinct ambivalence by most teachers we spoke with - despite her extensive skills as a corporate business intelligence analyst. This notion of teacher capital was also apparent in the resistant refrain of "knowing" students as more-than-a-number. In these ways, the kudos of such "teacherly" concerns remained a key element of who was permitted to be a valid school data expert and/or why some teachers were keen to present themselves as disengaged from data use.

Indeed, the various forms of data work just described appear to be delineated by a range of notable factors - not least the gender, status, subject knowledge and career stage of the staff involved. These characteristics were also apparent in the types of teachers more likely to be marginalised and excluded from the beneficial consequences of "doing data". In particular, our study points to a number of ways in which in the "doing" of school data was arranged along gendered lines - i.e. the ways in which gender and identity was being constructed in and through school data, as well as how data expertise and engagement was situated, embodied and localised in the marginalised voices and views of less powerful female staff. For example, data analyst Kyra had taken the professional step backwards to work in schools to fit with her child-care commitments, while the male data specialists and mavericks were able to work long hours on the weekends and in the evenings given their lack of immediate caring responsibilities. Such instances highlight ways in which data inequalities map onto existing power differentials and unequal social relations across school staff. As Evelyn Ruppert (2013) points out, it is notable how the dominant "datascapes" of societal settings such as schools tend to be tied closely with dominant "theories of social order".

These findings point to several broader paradigm shifts emerging within schooling systems. Not only is there a prioritising of "objective" judgement of student performance, but this "new professionalism" is changing classroom practice as teachers begin to prioritise activities and assessments that can be easily datafied, as opposed to those that are best for student learning. For example, Mick was exploring how he could use different software programs like Class Dojo and Google Classroom to generate *more* data on his students so he could compare their performance with students at other schools. In this way, teachers and students are becoming subject to datafication processes. They are, as Ajunwa and Green (2019) explain, 'supervised' by software. In critical circles, datafication raises concerns of privacy and profiling, yet our findings highlight a more nuanced - but equally problematic - set of concerns specific to the school context.

While issues of privacy and profiling are important, datafication was leading to the reconfiguring of teacher roles and schooling processes before many in the school had a chance to consider exactly what was taking place. As such, it was technology, in combination with the priorities of certain data classes, that were driving the agenda, while everyone else simply had to "get on board". Our findings point to the need for *all* teachers to be better supported to develop understandings of data and datafication. Only then is it possible to identify and potentially resist how the datafication of education is changing classroom practice. Curriculum and pedagogy

must be designed and implemented by teachers with content *and* context knowledge (i.e. students, resources etc), in order to serve the most important stakeholder – the student. The power of ‘big tech’ and data processing may serve a bureaucratic purpose, but it will be potentially damaging if it is directing the everyday teaching and learning experiences in schools.

## **CONCLUSIONS**

In some ways, these findings could be read simply as schools struggling to satisfactorily respond to external imperatives to “do data”. Clearly, we did not find schoolwide engagement with data – instead, small groups of staff continue to drive their school’s interest in data and take effective ownership of the “issue”. Instead of criticising Northland, Weston and Brookdale as not fitting the mould of the ideal-type “data-driven” school, all three schools might in fact be praised for resisting the feared repercussions of excessive data-driven performativity and professional disempowerment. For the time being, at least, these schools were certainly not being over-run by data.

In this sense, the current ad-hoc arrangements described in this chapter need to be made “problematic” – i.e. framed as a matter of school politics, and reconsidered as a topic of professional concern and controversy. In this sense, there is much in this chapter that needs to be challenged. For example, how might the concerns of “run-of-the-mill” majorities be better represented in how schools collectively view their engagements with data? How might the topic of school data be reconstituted as a more collective, democratic school-wide endeavour? What alternate forms of data expertise and data uses might be encouraged within the school communities? Rather than providing definite answers to educational problems, the use of data within schools clearly needs to be approached in a more sceptical way.

## ENDNOTES

### [1] List of staff participants

1	Weston	Sarah	Principal	F	51-60
2	Brookdale	Stewart	Deputy (one of three)	M	51-60
3	Brookdale	Les	Dean of Data	M	61-65
4	Brookdale	John	RE teacher	M	31-35
5	Northland	Dennis	Principal	M	51-60
6	Weston	Vic	Maths teacher, PLC leader	M	51-60
7	Weston	Susan	Assistant Principal	F	51-60
8	Northland	Stephen	Data lead teacher, Maths	M	51-60
9	Weston	Tony	Data lead teacher, Biology	M	61-65
10	Weston	Ben	PE teacher, PLC leader.	M	21-30
11	Brookdale	Kyra	Data analyst	F	31-40
12	Brookdale	Larissa	Teaching librarian	F	65+
13	Brookdale	Dane	RE teacher, data lead for subject	M	21-30
14	Weston	Mick	English teacher, PLC leader	M	31-40
15	Northland	Russ	Deputy Principal	M	31-40
16	Northland	Rob	Senior IT technician	M	41-50
17	Brookdale	Richard	Humanities teacher, Head of Learning and Teaching	M	51-60
18	Northland	Angela	Head of English literature & drama	F	41-50
19	-	Jo	Ex-teacher – left profession at the end of last academic year.	F	21-30
20	Brookdale	Christian	Humanities teacher, LMS manager	M	31-40

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