Nordic Journal of Comparative and International Education (NJCIE)

NJCIE 2018, Vol. 2(2–3), 181–195 http://doi.org/10.7577/njcie.2774

Committing to School Development: Social and Material Entanglements

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Peer-reviewed article; received 28 May 2018; accepted 26 August 2018

Abstract
School leaders are faced with an unprecedented growth in school data accompanied by expectations that they use this data to improve their institutions. Current technologies enable complex processes of unifying and analysing data in personalised and accessible formats. This study investigates a tool developed by the Norwegian Directorate for Education and Training called the Point of View analysis (PoV). The PoV combines outcome-based data on achievement, data from staff surveys about current practices, and the staff's reflections. A central tenet in Actor-Network Theory (ANT) is that material tools do not just regulate the activities of humans, but have their own agency and form relationships with their human counterparts. This analysis positions the PoV as an actor that may transform, distort, or modify meaning or elements. A content analysis of the PoV instrument is conducted, and interviews with three school principals who have used the tool are analysed. An ANT-inspired analytical approach is used to demonstrate how the PoV tool connects local practices with national policies and discourses in emerging and fluctuating networks. This analysis revealed that powerful policy discourses may be compromised by their entanglement with local and regional concerns.

Keywords: education policy; actor-network theory; school development; school data; technology infrastructures

Introduction

Increasingly, social life is documented in granular detail in digital databases. New and evolving technologies afford recording, storage, and distribution of massive amounts of information. Databases play an important role in national and international educational policy-making and governance (Ozga, 2009). Large-scale databases intended for monitoring or governance purposes are often combined in software packages intended to enhance teaching, learning, and management in districts, schools, and classrooms, or for

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 ISSN: 2535-4051

individual students (Edwards, 2014; Selwyn, 2015; Williamson, 2015b). A growing body of recent research has focused on data use and on "what happens when new data inventions, processes and protocols enter into the complex ecology of the classroom, school and administrative offices" (Coburn & Turner, 2012, p. 100). Such research may focus on the outcomes of data use, on strategies for promoting data use, or on the practice of people's engagement with data. These studies include mechanisms for interpreting and decision-making (Coburn, Toure', & Yamashita, 2009), interaction and meaning-making (Horn & Little, 2010), and discovering emerging routines for engaging with data (Prøitz, Mausethagen, & Skedsmo, 2017a; Sherer & Spillane, 2011).

Although in education, data seems ubiquitous and at times overwhelming, less attention is paid to the process of accumulating data and the material forms of data that circulate and are made accessible to practitioners. In a study of two digital data systems in the UK, Williamson (2015a, p. 1) noted that "database instruments and infrastructures are now at the centre of efforts to know, govern and manage education". Data rely on measurements and are often confounded with facts; what is considered digital and standardised facts "take precedence over more individual, historical, moral and humanistic concerns" (Williamson, 2017, p. 46). Moreover, all data are selections, chosen by a person or persons for a specific purpose (Kitchin, 2014). Data on student performance can inform policymaking, be used for accountability purposes, or be mined as a resource for school development; as such, they may create tensions in their multifarious connections to practices (see Prøitz, Mausethagen, & Skedsmo, 2017b, p. 1). Such data are represented in a number of material forms: excel files, tables, statistics, and diagrams, and can be built into software packages applied by practitioners. The purpose of this study is to explore how data manifests in and interacts with the efforts of schools using digital tools to determine their need for school development. In particular, the analysis will trace the entanglement and disentanglement of policy and practice that might be inherent to this process. This work will not focus on data as an input to practice, or the results of using data; rather, the focus is on how the digital tool and process design operate in the constitution of specific practices. The tool, the Point-of-View (PoV) analysis was developed by the Norwegian Directorate for Education and Training (DET) (Utdanningsdirektoratet, 2016). This instrument aims to combine outcome measures and descriptive data about cultural and social issues in the reflective processes of a school's staff. As such, the PoV combines the deliberation orientation of a welfare state and the outcome orientation that characterises a competitive state (see also Moos, 2017, p. 169).

The aim of this study is to investigate how social and material entities act together in the making and unmaking of practices in PoV processes. To achieve this aim, Actor-Network theory (ANT) will be employed. As described by Fenwick, Edwards and Sawchuck (2011, p. 10), ANT entails a *sensibility* or a number of *sensibilities* that share "[a] commitment to trace the process by which the elements come together and manage to hold together to assemble collectives or networks". The following research questions guide this empirical investigation of the PoV tool and practice:

- What are the connections that develop between the tool, the schools' practices, and other entities?
- How do such connections shape the tool as well as the practices and practitioners?

This paper proceeds as follows: After the introduction, the PoV and how it is used within a Norwegian policy context will be described. Next, ANT concepts useful in the analysis of the PoV will be introduced. This will be followed by an overview of methods and analytical approaches. Results will be presented in two sections; the first focused on the contents of the tool and its connections to other actors, including the collection of data and policy discourses materialised in White Papers and other official documents. The second includes accounts from three school principals regarding how the tool was used. After describing results, a discussion thereof and attending theoretical and methodological concerns is presented. The conclusions section addresses certain issues arising from the analysis and suggests areas that need further investigation.

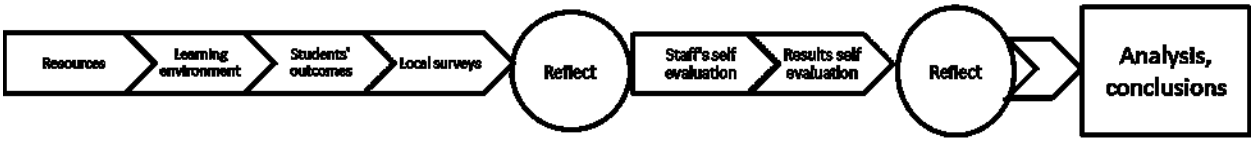
The Point-of-View analysis

The Point of View (PoV) is a free tool offered to schools to help reflect on evidence about their current practices and student outcomes. It is designed to enable schools to determine shared aims for school development. In the first phase, school data are collected from the School Portal, a web-based interface that provides "relevant and reliable data" in the fields of "learning outcomes, learning environments, resources, and completion rates" (Utdanningsdirektoratet, n.d.). School leaders are encouraged to select relevant datasets and create reports that are approachable and useful. This phase ends with a discussion among the staff.

In the second phase, the staff assesses the school's practice by rating 105 statements, divided into 6 sections: competence and motivation, adapted education and assessment, learning environment and counselling, culture for learning, leadership, and professional development and cooperation. Some schools may decide to include additional areas, as well. Individual teachers indicate for each statement whether the schools' practice is satisfactory (green), can be improved (yellow) or must be changed (red). A digital tool totals these values and generates a report classifying items by green, -yellow, or -red category and also providing results in percentages. This report is then presented to and discussed by the staff.

In the third phase, the staff's discussions on prior phases are summed up, leading to a joint decision on what are to be school's priorities. Schools are encouraged to engage the staff in a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis (a tool is offered on the DET website). Figure 1 illustrates the design of the PoV process.

Figure 1: The PoV process



Translated from Utdanningsdirektoratet (2017, p. 4).

Many material and social entities are entangled in a PoV process**:** numbers and standards that feed into the tool from the school portal, values derived from inputs regarding testing, examination procedures, students' learning activities and achievements, and staffs' teaching approaches. These entities connect with educational policies, professional discourses, and research in the enactment of networks or assemblages of actors. ANT provides theoretical concepts that will serve to unpack such entanglements.

The sensibilities of Actor-Network Theory

A central tenet to socio-material approaches is that things are performative. Activities cannot be explained solely by human intentions or structural forces. Rather, production, change, and development must be understood as being effects of assemblages of (net)working material and social actors (Fenwick et al., 2011). While education is replete with materials such as textbooks, curriculum texts, learning equipment, policy texts, and databases, educational research often neglects the quality and performative contribution of such materials (Waltz, 2006). When mentioned, such elements are considered inert entities or ideas that are implemented in contexts, interpreted, and taken up by practitioners, or that control or regulate practices. They are construed as objects, tools to achieve the intentions of human actors or drivers of social interactions. In ANT, both social/discursive entities and material things are assumed to be performative, with neither being privileged above the other. Thus, the PoV as a tool is an actor that connects with other actors to produce a change through the reshuffling of elements (Fenwick & Edwards, 2010; Latour, 2005); the focus is on tracing "the process by which elements come together and manage to hold together to assemble collective networks" (Fenwick et al., 2011, p. 10). In this study, this approach is manifested in an empirical investigation of the PoV tool and its connections to its users in the assembled networks of tools and people.

In addition to the generalised symmetry of material and social objects, a few other insights from ANT guided the analysis. ANT's concept of *translation* refers to the continuous negotiations that occur when entities come together, work on each other, and change each other; these are eventually stabilised in actor networks that may be mobilised to "assume a particular role and perform knowledge in a particular way" (Fenwick & Edwards, 2010, p. 10). Callon (2007) suggests four major moments of translation: *problematisation* is the passage point at which ideas, objects, or problems begin to be framed in particular ways; *interessement* is the selection process during which separate entities are attracted to or invited into this particular frame; *enrolment* is the negotiation and translation process through which entities become engaged in new behaviours and take on new

roles; and *mobilisation* denotes the processes through which the network's particular translations are extended to and connect with other networks (Callon, 2007; Fenwick et al., 2011). The moments of translation are not a timeline for a linear unfolding of translation. Translation processes are a fluid ordering of things that are "created and maintained through actors' strategic efforts to negotiate and manoeuvre one another into networks of aligned allies" (Mähring, Holmström, Keil, & Montealegre, 2004, p. 214). In this study, the moments of translation serve as devices for directing the analytical gaze of the researcher.

Latour's distinction between *intermediaries* and *mediators* (Fenwick & Edwards, 2010; Latour, 2005) is employed herein to describe how translation works. The former designates objects which circulate without changing that with which they interact. For example, the computer used to perform the PoV self-analysis, while important in performing the networked activity, does not change inputs, entities, or meanings. In contrast, a *mediator* is an object or entity that may transform, distort, or modify a meaning or element, often in unpredictable ways, "leading to a multitude of directions which may modify all the contradictory accounts attributed to its role" (Latour, 2005, p. 39). An example of this would be the material visualisation of a school's results following self-analysis.

Methodology

The construction of networks and how they are maintained and transformed is central to ANT. ANT is distinguished from other approaches by a firm rejection of the idea that change is caused by societal forces or structures or results from social interactions or interpretations (Latour, 2005). Instead, the ways in which actors enlist other actors into their world and how they bestow qualities, desires, visions, and motivations on these actors are empirically examined. In the present context, ANT describes how the networks of the PoV (e.g., policies, technologies, and artefacts), enlist schools (networks of local policies, persons, values, visions, and practices).

ANT does not prescribe particular methods for research other than a general insistence to follow the actors (Gherardi, 2001; Latour, 2005). While ethnographic approaches are often recommended in socio-material research, interviews and document analysis have also been utilised (Wæraas & Nielsen, 2016). In this study, statements provided in the PoV self-assessment tool are analysed to map their connections to policies, research, and practices over time. For example, the statement, "In our school we have a shared understanding of what constitutes good assessment practice" links entities such as legal requirements, teacher cooperation and competence, student involvement, routines, procedures, and templates. Statements were coded according to the actors enrolled and mobilised therein, and then linked to expectations from White Papers from 2003–2017.

Three school principals were interviewed: one from a lower-secondary school, one from a primary school, and one from a combined 1–10 school. Each was from a different

municipality chosen based upon geographic convenience. Keeping in mind that interviews cannot reveal all aspects of the PoV process, they nevertheless can provide an indication of how a variety of actors were assembled in the schools' practices. The interview guide consisted of nine questions concerning the principals' experiences while undergoing the PoV process. Interviews lasted between 30 and 45 minutes and were digitally recorded transcribed. The principals' accounts of the process were used to identify local actor networks and their connections to other networks, and Callon's (2007) moments of translation were used to analyse connections and translations among actor networks.

Opening the black box of the PoV instrument

According to Latour (1999), black-boxing occurs when the internal workings of network entities are rendered invisible. The PoV emerges from a wide assemblage of material and social entities working across time and space, including the Programme for International Student Assessment (PISA) surveys from the beginning of the 2000s and the consequent publications, public debates, and research they spawned (Elstad & Sivesind, 2010); master ideas such as quality, leadership, accountability, evidence-based practice, media (Røvik & Pettersen, 2014), and New Public Management (Møller & Skedsmo, 2013); and 21st century skills (Ananiadou & Claro, 2009). In short, the assemblages and connections of actor networks more or less associated with PoV could be extended infinitely.

Analysis of the 105 mandatory statements used in the PoV self-analysis tool revealed that they reflected current policies and curricula. Statements covered basic skills, teacher collaboration, students' mastery, results and the learning environment, leadership competence and teacher competence, reflections upon central issues, and expectations from the White Papers. Using a colour scheme (see above), the PoV self-analysis visualises to what extent the school is good according to predetermined standards, and where there may be gaps between what is considered good and the school's practices. For example, a green score could indicate that a school stimulates students' creativity (16)[2] and criticality (15), that the school has clear goals that are transparent to students and parents (2, 3 and 4), that students are motivated for and engaged in their school work (19 and 20), and have developed basic skills (6–10). The items in the self-evaluation tool of the PoV establish a benchmark against which teachers score their school and their practices. The characteristics of a good school can be traced to demands, requirements, and expectations set forth in the White Papers of the 2000s and often echo recommendations from the OECD and current research on school evaluation, effective schools, and professional development. The PoV is conducted at the nexus between multifarious material and social actors; however, in the material tool, the involvement of such actors as well as the producers of the tool and their considerations is indistinct. Statements acquire a taken-for-granted quality and are black-boxed (Gorur, 2011). The results of the self-assessment are material outputs: reports and web pages. Although results are intended to be used as a bedrock for

[2] Numbers refer to the numbering of statements in the PoV self-evaluation tool.

reflection, the analysis below shows that, to a large extent, results are taken as facts and questioned only occasionally.

The PoV in three schools: Unpacking actor networks

This section begins with a brief description of the three schools. Thereafter, the four moments of translation (Callon, 2007) will be used as heuristics for analysing interviews with the three schools' principals. The analysis will show how networks were assembled and connected to create and stabilise or destabilise practices.

School A is a medium-sized, lower-secondary school located in a rural area. The school has 300 students and 32 staff. It has high expectations for students' achievement, and its results on exams and national tests have steadily improved over a five-year period. Scores are now at or above the municipal average. The PoV was introduced to the school through its participation in the *Lower-Secondary School in Development*[3] national strategy. School B is a small primary school on the outskirts of a medium-sized city. The school has 170 students and 16 staff. The school's scores on national tests are medium to low, and according to student surveys[4] there are some problems with bullying. Following a meeting with the school superintendent, the principal decided to follow her suggestion and conduct a PoV. School C is a large grade 1–10 school in a suburban area. It has 725 students and 67 staff. The school has a considerable number of students from ethnic minorities; however, many are second or third generation. The school scores slightly below the municipal average on student surveys, and national test scores have improved significantly over the last three years; results on national tests and exams are now above the national average. The school's leadership team decided to conduct a PoV because "It is important to keep up the steam. We need to consolidate our practices and also always look for improvement" (Principal C).

To address the issue of how the PoV is performed into being, the following analysis reveals how entities come together and connect, forming chains and networks of actions and things. Translation-generated processes, devices, agents, and institutions become ordering effects in the process (Fenwick & Edwards, 2010, p. 9). The first moment of translation, *problematisation,* achieved when a problem and its relevant actors are identified, was defined in this study as when the three principals addressed a shared problem: how to improve their students' learning outcomes as measured by national tests, national surveys, and exam results. Their problem was entangled in networks consisting of policies, examination procedures, testing instruments, and curriculum mandates, among others. Many actionable options for the principals existed; however, for all three, the PoV be-

[3] Ungdomstrinn i utvikling, see https://www.udir.no/kvalitet-og-kompetanse/nasjonale-satsinger/ungdomstrinn-i-utvikling/

[4] A yearly national survey about learning and well-being, see https://www.udir.no/tall-og-forskning/brukerundersokelser/elevundersokelsen/

came *an obligatory passage point* (Callon, 2007). Once the problem was defined, an actor, the PoV, entered the scene and became indispensable to emergent networks; that is, "a system of alliances or associations between entities [is created], thereby defining the entities and what they 'want'" (Callon, 2007, p. 61). Several actors were involved, and new connections were forged in the process. First, student achievement as reported in the school portal became a central actor in the negotiations for all three principals in the particular rendition mediated by the PoV tool. The principals also mentioned the following as actors: the national initiative the *Lower-Secondary School in Development* (School A) which aims to strengthen local school development in classroom management, calculation, and reading and writing; the municipal school superintendent (School B); and political discourse on school improvement (School C). In the second moment of translation, *interessement*, entities were invited into or excluded from networks. School B initially framed their problem as bullying in the school. After discussions with the municipal superintendent, however, the principal decided that the focus should instead be on basic skills (the area prioritised for development in the municipality). Similarly, for School A, the municipality had already decided that mathematics was to be the area prioritised for development.

> The staff wondered why they needed to go through this [the PoV] when the focus of school development was already decided. I argued that the PoV would give us some insights that might come in handy when we started to design our improvement work, but to be honest, I kind of agreed that it might be a waste of time. In the end, I just made a decision to do it. (Principal A)

The principal's role was to convince the other actors that the roles he and the municipality had defined for the staff were acceptable (see also Luck, 2008, p. 74). The problematisation and interessement processes, when successful, ensure that actors consent to the goals and roles that are defined for them.

To engage with the problem (to improve students' learning) addressed through the obligatory point of passage (the PoV), a number of actors were enrolled. For example, the script of the PoV enlisted staff, surveys, digital representations, and activities, including filling out the self-assessment tool and engaging in the reflection process. Much work was done in the schools to sort out and define roles.

> The aim is that staff should feel ownership of the development process, but to be honest, most staff lost interest at that point. And in particular, the teachers—except for perhaps the maths teachers—felt that it did not concern them. They already knew that mathematics would be our area for development. (Principal A)

This principal decided not to use much time on this phase and proceeded to Phase 2, self-assessment. Even so, it was difficult to enrol teachers in accordance with their scripted roles, and nearly one-third did not complete the self-assessment. When presenting results to the staff, the principal focused on the results that he anticipated might be of interest to all staff and sought to strike a balance between good results and areas that might need improvement. This resulted in what the principal characterised as "good dis-

cussions about pedagogical issues." In the end, these discussions did not lead to a collective decision about specific areas for development, but the principal argued that the discussions probably affected work in teacher teams. In contrast, the maths teachers worked in several sessions, resulting in a concrete, realistic development plan.

In School B, the school leadership team and teachers agreed that student achievement was low; however, the teachers attributed this to low socio-economic status and limited personnel resources, among other external factors. "They think they are better than they are, especially when it comes to teaching basic skills," the principal said. He was confident that this would show up in the self-assessment survey. To motivate staff to take the survey, he enlisted the help of a counsellor from the municipality, and all staff completed the self-assessment. However, the results showed high scores, mostly green and some yellow, on statements related to basic skills. On student motivation and engagement, however, scores were red, and on teacher cooperation, yellow. Together with the counsellor from the municipality, the principal devised a plan to use the red areas as a stepping stone to enlist teachers to work on basic skills; in a presentation to the staff, the counsellor characterised teaching basic skills as a convenient tool to increase student engagement. By sharing a number of tricks of the trade accompanied by success stories from other schools, she convinced the teachers that the key to success was basic skills.

School C had a long history of using data from the school portal to decide on areas for school development. In addition, national mandates and the municipality's priorities played a significant role: "The municipality and the national level set the goals, but these do not automatically coincide with our situation. We need to align them with our problems," the principal said. Thus, to enlist staff in the new initiatives for school development, the results displayed in the PoV tool needed to be tweaked to fit within the municipality's agenda. At the time, the focus was expected to be developing repertoires for teaching and learning once each student in the school was equipped with a PC or iPad. Based on the results from the self-assessment, which showed, among other things, that the school's culture for learning could be improved, a plan was designed to develop staff members' digital competence. This plan included team collaboration, exchanging visits with other schools, and a commitment to sharing practices.

The final area of translation is *mobilisation*, which occurs when the negotiated roles are stabilised, put into effect, and able to circulate and connect to wider networks. To follow the actors in these processes would require a longer, more extensive investigation of the networks of relationships that extend beyond these three schools.

ANT makes a distinction between mediators and intermediaries (see above). An intermediary is an entity that carries its inscribed meaning across time and space without translation and is able, together with other entities, to invite or regulate actions. The PoV and its assemblage of actor networks invite very specific actions to be carried out. The three phases are expected to be completed, the results of the PoV self-assessment are to be used to define areas for school development, and the content of the self-assessment tool is to

be restricted to items that align closely with national policies. In the present study, analyses showed that in its situated performance in all three schools, the intermediary was transformed into a mediator. The PoV emerged within a heterogeneous network of policy actors, including people, documents, and discourses, and from a network of technicians, technologies, and algorithms. In its local performance, the tool invited alliances with other networks, outwardly with respect to municipal policies, the municipal superintendent, and documents and discourses, and inwardly with people in the schools and their technologies, knowledge, practices, and discourses. To unpack PoV processes, relational effects must be explored: how the PoV acted together with "other entities or forces to exclude, invite and regulate particular forms of participation" (Fenwick & Edwards, 2010, p. 7). The enrolment of actor networks varied among the schools. In School A, the assemblage of the *Lower-Secondary School in Development* national initiative, the municipality, and the knowledge and practices of the staff all came together in the school's undergoing of the PoV process. Since mathematics was already defined as the area for development in the school's municipality, Phase 1 in the inscribed process was quickly skimmed over, and results of the self-assessment in Phase 2 mediated "good pedagogical discussions, for example, about what high expectations might mean to students and what effect those expectations might have on them" (Principal A). In School B, Phase 1 reinforced "what we already knew, that our results were not good enough" (Principal B). When the results of the self-assessment indicated that basic skills were not a problem, the principal enlisted the counsellor from the municipality to redirect teachers' attention to basic skills. The PoV's function was to mediate between the principal's prior conceptions about what emerged as *a matter of concern* (basic skills) and what the self-assessment indicated as *a matter of fact* (see Latour, 2005, pp. 114–115); that is, the school's good results on basic skills, but only fair results on student engagement and staff cooperation.

> We [the counsellor and the principal] discussed how we could direct the staff to basic skills. In the end, the counsellor held a presentation focussing on how basic skills are a prerequisite for student motivation and engagement and on how teaching basic skills may engage students. After a reflective process by the staff, we decided to develop measures to increase staff cooperation and that the focus of these measures should be basic skills. (Principal B)

In School C, the leadership team discussed how to use the PoV.

> We already knew so much about school results that there was no need to spend much time on Phase 1. We continuously discuss results in staff and teacher teams as we go along. So for us, Phase 2 was what might be of interest. (Principal C)

In the end, School C decided on digital competence as the area for development; however, it was not evident from the data if or how the PoV contributed to this choice or how the municipality's action plan acted as an intermediary.

Discussion

Williamson (2015b) argues that database instruments and infrastructures play an important role in the efforts to know, govern, and manage education. The analysis of the PoV and its connections to local practices, practitioners, and other social and material actors in three schools showed how a range of networks could both emerge and fluctuate, and connect and disconnect in the shaping of local practices. The aim of the PoV tool and its processes is described by DET as "creating reflection about the school's practice and what areas the school wants to prioritise in their school development" (Utdanningsdirektoratet, 2016). However, this study revealed how networks of actors were connected, how networks performed alliances, and how attempts at governing compelled schools to revise what they wanted and generated new spaces in which they could act. The "relevant and reliable data" (Utdanningsdirektoratet, n.d) that constituted the sources made available to the PoV was closely connected to the National Quality Assessment System (NQAS), and the items in the self-review mirrored current policy and curriculum. Also evident were the roles of networks of municipal priorities and actors (superintendent and counsellor). This analysis demonstrated that policy is enacted through the tool and may reproduce or reinforce existing regimes (Williamson, 2017) rather than address the needs and priorities of local schools. In the assemblages of actor networks, problems, actors, and positions were reshuffled, and relationships and distributions of power were reconfigured.

In the PoV process, several entities were connected through circulating intermediaries (Callon, 1991): *texts*, including national policies, municipal action plans, international discourses, graphs, database records, and scientific texts on school development and organisational learning; *technical artefacts*, including the NQAS; and *human beings*, such as the principals' and municipal superintendents' social positions and the actors' beliefs, values, skills, and knowledge. On the one hand, the PoV was a stable association of actor networks, gathering associations together into a new shape and creating a force that occasioned other entities to act. Some inscriptions of the PoV were kept intact: they were *immutable mobiles*, things that "have developed enough solidity to be able to move about and still hold their relations in place" (Fenwick & Edwards, 2010, p. 18). The relationship with NQAS and the school data produced by and distributed in the school portal was held firmly in place; it was not questioned in the local PoV processes. These data became standards for what was considered quality in education and, as such, ordered practices across time and space. In this way, the PoV emerged as mobile, stable, and able to elicit action from a distance (Bowers, 1992).

On the other hand, the PoV process emerged as flexible and malleable; it underwent a process of translation as it interfaced with municipal action plans, principals' knowledge about their organisation, and negotiations among staff. The analysis of the self-assessment instrument showed how this tool was a transporter of national and international policies by implicit definition of what mattered in a good school. The material aspects of the

PoV (the manual, the films produced by the DET, the DET websites) constituted assemblages that could assert control over the enlisted networks. As they were woven into local actor networks, network members adapted processes to fit with their contextual issues, priorities, and concerns.

Concluding remarks

Increasingly across the globe, performance data is being collected, analysed, and turned into facts about students, schools, and systems to form the basis for decisions at all levels of the education system (Perrotta & Williamson, 2018; Williamson, 2017; Prøitz et al., 2017b). Data processing software is a vital actor in the process of visualising and distributing performance data effectively and rendering them convenient and understandable for users. Often, however, the analytical and political work feeding into the software is hidden and thus irrefutable; data become social facts.

This study yielded two concerns. The first is what Prøitz and colleagues referred to as "the alluring attributes of data and data use" (Prøitz et al., 2017b, p. 1). Digitization (Williamson, 2017) suggests standardisation and simplification of educational processes and could mask important nuances in those processes. We need to better understand the processes through which data are represented in a tool such as the PoV. Second, tools such as the PoV are not neutral devices processing facts about schools and their staff, but rather an articulation of the concerns of particular assemblages of actors. To some extent, these concerns reflect a "deliberation orientation" as well as an "outcome orientation" (see Moos, 2017, p. 169). In the local activities of the schools in this study, enrolment and positioning of additional actor-networks (e.g., the municipality's strategies and municipal support staff) contributed to a translation of the diverse matters of concerns into more narrow concerns. Data delivered by software packages and instruments can certainly be of help to schools in their struggle to handle the magnitude of information that is now available. Nonetheless, we need to learn more about the ways in which actors became connected, how networks perform alliances, and how the distribution of power may be reconfigured. By acknowledging how material entities are entangled with social entities (desires, knowledge, and intentions), an ANT analysis can provide insight into what occurs in moments of development and how the workings of one network can be compromised in its partial connection to other networks. This analysis also demonstrated how "materials as well as language and social processes can appear to lock hegemonies in place" (Fenwick & Edwards, 2010, p. 105), for example, what may be considered as facts about school quality based on results from the self-assessment tool or the items included in it.

Future studies might examine the ways in which data are accumulated, combined, analysed, and distributed in databases and digital tools; the networks and relationships among the policy actors and data companies involved in the creation of user-friendly data packages; and the negotiations and responses generated in schools' material practices. Policy and policy enactment are replete with controversies materialised in the actions of

human and non-human actors (Gorur, 2011). An analytical approach is needed to address shortcomings in current research on educational policy and practice, such as the tendency to leave policy issues out of research about classrooms and schools; an analytical focus on one policy at a time; and the conception of policies as "clear, abstract and fixed as opposed to one in which policies are awkward, incomplete, incoherent and unstable" (Ball, 1997, p. 265). ANT incites researchers to view policy and practice as assemblages of actor networks and to empirically explore their processes of entanglement and disentanglement. This posits ANT as a promising approach in educational policy research.

Acknowledgements

The author would like to thank colleagues in the research group CLEG (Curriculum Studies, Leadership and Educational Governance) at the Faculty of Educational Sciences, University of Oslo for critical and thought-provoking suggestions.

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