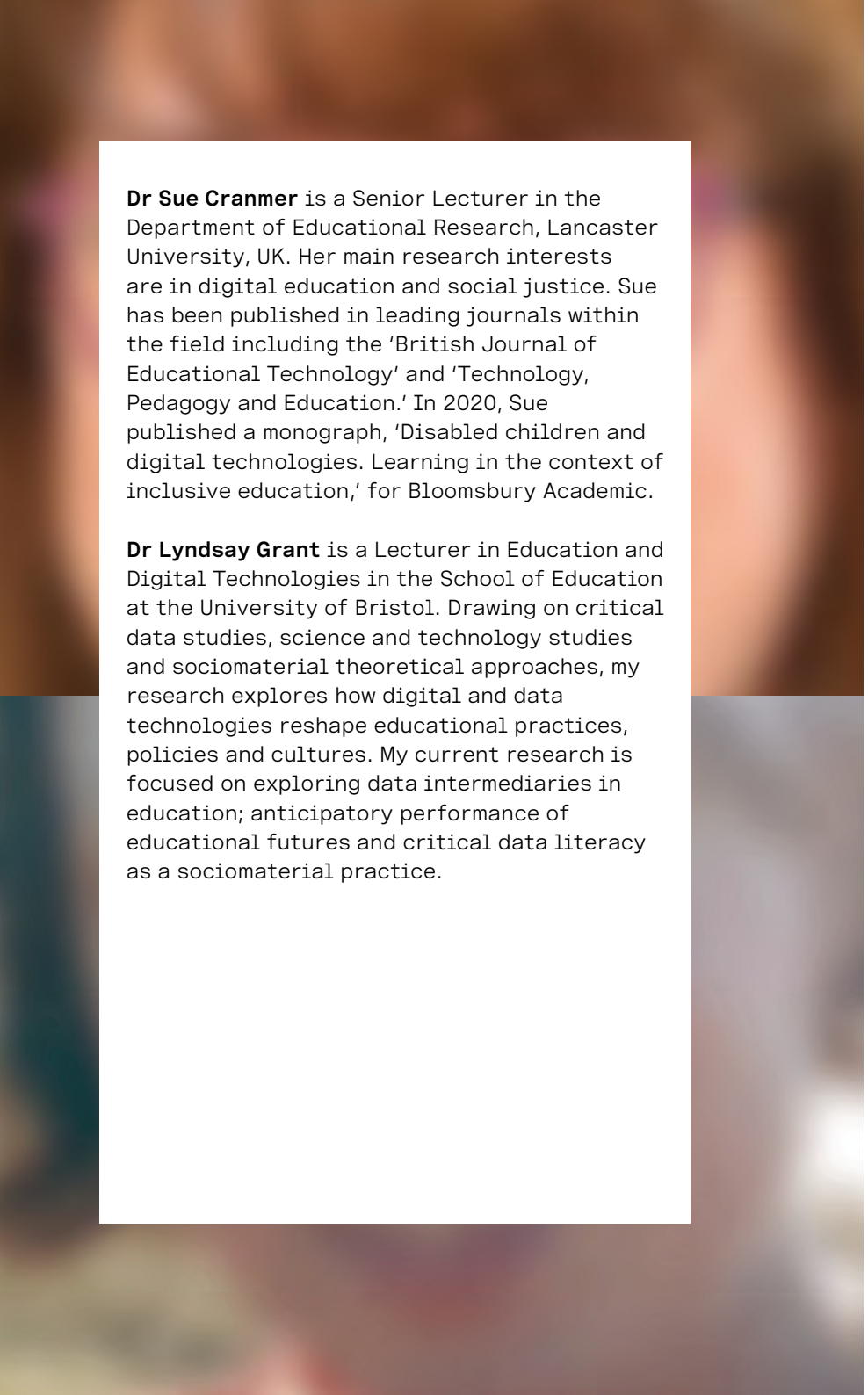

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Can disabled children benefit from education data?

Sue Cranmer, Lancaster University and
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In this essay we discuss the possible benefits for disabled children of the collection, processing and use of their education data in schools. Our conceptualisation of 'disabled children' is based on theories of childhood (McLaughlin, 2008) that argue that all children are entitled to the high 'expectations, opportunities, and aspirations afforded to the so-called typically developing children' (Goodley et al., 2016, p. 6). These approaches challenge prevalent notions of disabled children defined against typical children's development 'norms' seen to have undermined the value accorded to disabled children's 'ordinary' and 'productive childhoods' (Curran & Runswick-Cole, 2014, p. 1619). The term 'disabled children' is used here, therefore, to emphasise the social model of disability and how social, economic and political systems impact disabled children's lives. By 'education data' we follow the definition taken by the Digital Futures Commission, 'data collected about children at school and through their participation in school' (Livingstone et al., 2021, p. 3). Our viewpoint is framed by Human Rights legislation and informed by a commitment to inclusive education for disabled children (UN, 2016; UNICEF, 2017).

Trend of rising datafication in education

While the collection of education data is not new in itself (Lawn, 2013), the last 20 years has seen an intensification of the volume and scope of data collected about children at school and how it is applied to make decisions around education governance, pedagogy and practice (Grek, 2009; Ozga, 2009). Alongside this has been a corresponding trend towards the digitisation of education, under the premise that educational 'big data … can be used to [both] gain insights into the problems of education, and to find solutions at the same time' (Williamson, 2017, p. 3). The datafication of education, comprising the collection of previously unimaginable volume of data, alongside digital algorithmic and artificial intelligence (AI) processing, is now increasingly used to determine educational decisions (Grant, 2017; Jarke & Breiter, 2019; Mayer-Schönberger & Cukier, 2014; Williamson, 2017).

Limited empirical evidence for benefits of education data

Many claims have been made for the potential of education data to improve pupils' and schools' educational performance, but so far the evidence of a positive impact on learning outcomes in real-world educational settings is limited (Viberg et al., 2018; Williamson & Eynon, 2020). As for the positive impact of education data technologies specifically on disabled children's learning, there is a mixed picture. While there are useful examples of the research and development of digital technologies to support disabled learners (e.g., Metatla et al., 2020), there is limited published research that focuses on the impact of education data on disabled children's learning and outcomes (Baek et al., 2022). This could exclude them from any potential benefits their peers may gain (Zheng et al., 2019).

There is, however, an emerging body of research identifying critical questions as well as risks associated with the datafication of education for children more generally. For example, reductive approaches to teaching and learning including narrowing of the curriculum and 'teaching to the test' (e.g., Bradbury, 2019; Grant, 2017; Knight & Buckingham Shum, 2017); the reproduction and amplification of biases and inequalities in automated systems (e.g., Andrejevic & Selwyn, 2020; boyd & Crawford, 2012; Selwyn, 2015); and threats to children's wellbeing and privacy (e.g., Lupton & Williamson, 2017; Manolev et al., 2018). Research on the risks and harms of algorithmic technologies (including surveillance, discrimination and bias) for disabled children is beginning to gain increased attention, but is still in its infancy (Brown et al., 2022).

Establishing principles for beneficial data use for disabled children

While acknowledging that the use of education data in schools raises a number of areas of concern, we also need to ask whether it might be possible for it to be used in ways that are genuinely empowering for disabled children. Clearly, any potential advantages of collecting, processing and applying education data in schools must be able to reap significant benefits for disabled children's learning, inclusion and wellbeing to justify potential risks. Disabled children's digital practices must support their best interests alongside protection of their rights.

Our approach to this is underpinned by our experiences of conducting research with disabled children, digital technologies and education data in UK schools (Cranmer, 2020a, 2020b; Grant, 2022). Our understanding is informed by principles intended to foster inclusive education to ensure an equitable education for disabled children globally, enshrined in international law and founded on human rights (Pijl et al., 1997; UNICEF, 2017). However, the aims for inclusive education are often not fully realised. In practice, disabled children are integrated into schools in ways that need them to adapt to existing approaches rather than identifying and removing the barriers that prevent their inclusion. Teachers are ill prepared to support full inclusion, with disabled children often being 'referred out' or requiring adjunctive support to 'bridge' learning in the moment (Webster & Blatchford, 2017, p. 3). This potentially creates stigma, requires children to 'work around' inaccessible resources and activities, and undermines their independence.

We argue that for education data to be used in the best interests of disabled children, it should aim to support full participation in a genuinely inclusive education that challenges inequalities and deficit assumptions of disability to further

empower disabled children's agency around learning. We will consider the potential benefits and challenges of using education data in relation to inclusive education using UNICEF's framework (Figure 1), derived from Article 24 of the Convention on the Rights of Persons with Disabilities (UN, 2016; UNICEF, 2017).

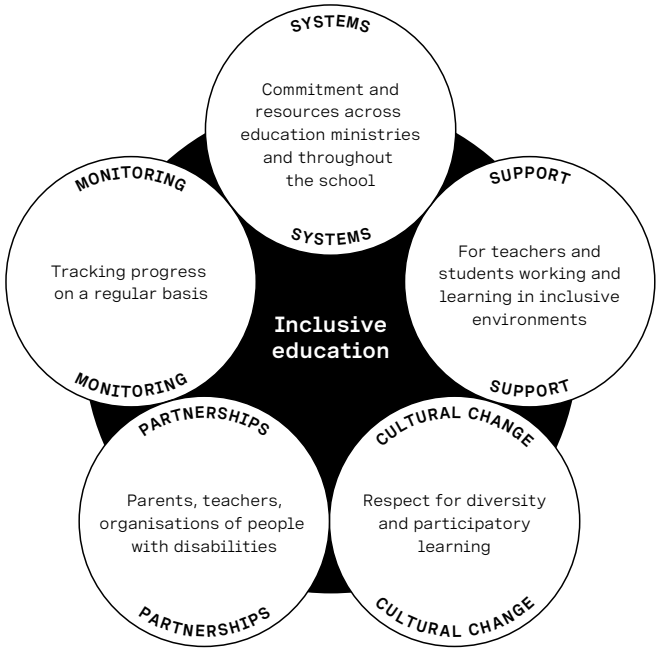

Figure 1
Source: UNICEF (2017)

Given the limited existing empirical evidence available on the benefits of education data for disabled children, in the following we draw on theoretical understandings of education data and datafication, empirical evidence from the use of education data with other groups of children as well as theoretical, empirical and policy research on disability and inclusive education to begin to articulate the *potential* benefits for disabled children's education within the five areas of the inclusive education framework introduced above. Each suggestion is a double-edged sword, however, because the possible benefits are likely to bring with them potential harms, so we also set out the associated potential challenges within each category.

Systems: Commitment and resources across education ministries and throughout the school

Potential benefits

The collection of systematic evidence about disabled children's current educational experiences and perspectives may support improvements in education policy. At a personal, institutional and national level, education data – including not just disabled children's assessed performance, but also their embodied and affective experiences of schooling – could be used to support policy-level changes including advocating for more (and more equitable access to) funding (e.g., Gallagher & Spina, 2021), specialist support and changes to pedagogical practice. Buckingham Shum (2012), for example, outlined how 'macro-level analytics' could enable cross-institutional analyses useful for evaluating and developing institutional and national improvements that foreground disabled children's experiences and voices. At school level, education data could be used as part of a process of action research and inquiry (see, for example, Armstrong & Moore, 2004), prompting investigation into disabled children's experiences and conducted with disabled children themselves, to identify where improvements are needed, and design and evaluate the impacts of change.

Challenges

The context in which education data may support inclusive and empowering system-level change for disabled children is crucial. High-stakes accountability measures such as published league tables, punitive school inspections and teacher evaluations can encourage performative approaches that prioritise improving data measures over more balanced approaches. This includes, for example, 'teaching to the test', or prioritising resources to those children on grade thresholds who are likely to make the biggest difference to school accountability measures (Bradbury et al., 2021; Grant, 2017).

Similarly, while data can provide useful evidence to support improvement, it will not in and of itself bring about necessary improvements without the political will, organisation and

funding to do so. The burden of collecting and providing data in order to access equitable and inclusive education also needs to be considered, as this potentially places further demands on disabled children and their families to 'prove' the reality of their lived experiences (D'Ignazio & Klein, 2018) or become a distraction for teachers from their core work of meeting students' needs (Gallagher & Spina, 2021).

Support: For teachers and students working and learning in inclusive environments

Potential benefits

Many claims for the benefits of education data to support learning focus on 'personalising' children's learning through assessing and monitoring progress to offer targeted interventions and next steps (Thompson & Cook, 2017). For disabled children, suggestions for data-driven personalisation include the early identification of disability-related difficulties (Jiménez-Gómez et al., 2015), identification of accessibility issues that can prevent access to learning opportunities, better targeting and allocation of resources and content, automated record keeping and feedback, identification of interventions to increase support and adaptation of resources and materials (Livingstone et al., 2021). Examples include Language ENvironmental Analysis (LENA) and Ubisense, a real-time indoor location system, to capture spatial, speech and time data work to identify physical improvements in classrooms for those at risk of communication difficulties (Sangwan et al., 2015); games-usage analytics to consider the impact of motion-based games (i.e., Kinect) on children with a range of disabilities (Kosmas et al., 2018); and video-coding software (e.g., Studiocode) automated data-coding to support learning by all students including those with disabilities (Kaczorowski & Raimondi, 2014). Even so, in both of the latter projects, results from automated data analysis were complemented by data collected by more traditional methods such as interviews and field notes.

Challenges

Challenges associated with data-driven personalisation and support may lead to reductive approaches to education, in which decisions about disabled children's learning and access to the curriculum is decided by algorithm, with neither teachers nor children aware of or involved in the decisions that concern their education (Knight & Buckingham Shum, 2017). For disabled children, highly targeted personalised content can potentially risk excluding them from the opportunities offered to all children, fuelling the 'intervention culture' in which children are removed from mainstream classrooms and activities in order to catch up with expected standards (e.g., Bradbury, 2019; Grant, 2017).

While education data may provide a useful part of the picture in terms of early diagnosis of disabilities and identification of accessibility issues, where it is focused on overcoming impairments and offering alternative opportunities, this risks perpetuating current approaches that tend to stigmatise disabled children and lead to a loss of independent learning (Cranmer, 2020a). Being diagnosed with a disability is a highly sensitive process and needs to be approached with care and caution. Automated diagnoses may be inaccurate. Not all children (or their parents and caregivers) wish to receive a formal diagnosis, and over-reliance on data-driven diagnoses risks labelling and perpetuating the current status quo whereby some individuals are identified as having specific 'needs' requiring extra support rather than ensuring that all children are provided with an equitable and inclusive education.

It is also important to consider how automated decision-making systems in many areas of life have been shown to reproduce existing social inequalities and exclusions. For example, facial recognition technology used in virtual proctoring software may fail to recognise individuals whose disabilities affect their appearance and is more likely to misgender women and individuals with darker skin (Brown et al., 2022; Buolamwini & Gebru, 2018).

Monitoring: Tracking progress on a regular basis

Potential benefits

Monitoring children's progress to support learning necessarily overlaps with the previous category. Even so, it is possible to draw out examples, whereby monitoring is the predominant

feature. These include the identification of internal and external factors that can support or hinder learning progress through automated record keeping; combining large datasets to build new insights; collection of longitudinal data; wellbeing issues such as attendance and behaviour management; and supporting administrative tasks such as performance management, resource and funding allocation (Livingstone et al., 2021). Lenz et al. (2016), for instance, have speculated about how trends in 'big data' could potentially support neurodivergent students such as those with dyslexia and dyscalculia to learn. They argue that the increased use of mobile and wearable devices, including outside of school, will enable comprehensive, long-term monitoring of behaviour to enable more appropriate support.

Challenges

In general, automated and data-driven monitoring of disabled children's education and learning may fail to recognise the specificity of disabled children's experience, for example, whether 'disability' is included as a category at all and the heterogeneity that exists among disabled children (Wald, 2021), or how children's agency governs their preferences and experiences. Some disabled children, for instance, like using mobile devices for learning while others reject them outright (Cranmer, 2020b).

Tracking individual progress towards specified performance targets is based on normative expectations of what a child 'should' achieve or how quickly they should progress (e.g., Llewellyn, 2016), how much they should attend school, or behavioural expectations that may not be appropriate for disabled children (or indeed, for many children). Performance targets are often derived from averaged data that do not reflect any individual child, let alone those who might be 'outliers' from the mean.

Disabled children may be particularly exposed to such risks of disciplinary surveillance in automated monitoring software. For example, virtual exam proctoring software is more likely to flag disabled students as 'suspicious' because of their access needs, and interpret neurodivergent behaviours and language differences as evidence of 'threat' (Brown et al., 2022).

Finally, the risks to disabled children's personal privacy and data protection are significant. Surveillance and monitoring have become normalised in schools, with children's digital activities and social media use being closely monitored even outside of school, and often without pupils or parents giving meaningful consent or adequate compliance with data protection guidance and legislation (Defend Digital Me, 2020). Furthermore, data about disability is sensitive. This means that privacy and data protection concerns are tantamount, particularly given the increasing number of cybersecurity breaches, for example the recent leak of around 820,000 New York students' personal data, including special education status, by an online platform (Elsen-Rooney, 2022).

Partnerships: Parents and caregivers, teachers, organisations of people with disabilities

Potential benefits

A suggestion that could be considered under this heading is that of multiagency hubs (Livingstone et al., 2021). Sharing disabled children's education data between different agencies, with appropriate data protection safeguards in place, may be one way to aid shared decision-making in the best interests of disabled children and involve parents and caregivers, teachers and other support personnel in understanding a child's experiences. Data may be able to make collaboration processes, such as sharing information and decision-making, more open in terms of how disabled children are supported effectively by teachers, families and other organisations to provide a foundation for further development and sharing best practice.

Challenges

The sharing of information does not, of itself, ensure that appropriate action is taken. For example, one study found that education data visualisations intended to inform school choice were largely ignored by parents, who found them difficult to locate and interpret (Fontaine & Dave, 2018). Dashboards designed for data sharing create particular expectations around student progress, imply certain roles for those involved in their education and can exclude children themselves from

interpretation and decision-making. For example, extrapolating predictions based on past performance can embed expectations that certain outcomes, such as dropping out of school, are inevitable in ways that 'reduce student agency, strengthen systemic disadvantage and foreclose the anticipation of different, unusual, unexpected futures for students' (Jarke & Macgilchrist, 2021, p. 3).

Further, while data sharing as the beginning of a multiagency conversation may be productive, in a context of high-stakes accountability targets, it can all too easily lead to more managerialist approaches to education, in which teachers become education data 'managers,' with reduced scope for more professional and contextualised decision-making (Ball, 2015; Lewis & Holloway, 2019; Selwyn, 2015).

Cultural change: Respect for diversity and participatory learning

Potential benefits

This category is challenging, but in principle, it is possible to use data to represent the diversity and variety of experience and perspectives rather than using it to define norms and averages, as in current uses of data. Data practices could also be used to challenge ableism by collecting data that questions deficit models of disability and makes more visible disabled children and people's achievements and abilities.

Challenges

In practice, education data is currently used to 'optimise' pupil performance through close monitoring towards a set of tightly defined and nationally standardised targets rather than to recognise and represent diversity (Amsler & Facer, 2017). Such narrowly defined forms of 'success' cannot account for multiple forms of achievement among groups of children with diverse skills, strengths and knowledge, including disabled children. Education data practices that truly respect diversity and participatory learning need to step away from current models that focus on individual assessment data, to account for learning as a participatory and collaborative collective endeavour.

Moving forward

Drawing on principles of inclusive education, alongside theoretical and empirical evidence from critical data studies broadly, and in education more specifically, we can begin to consider what the conditions for a genuinely empowering approach to education data for disabled children might be. This could usefully draw on recent approaches that centre the lived experiences and situated knowledges of people and groups to directly challenge power inequalities and act towards greater social justice, for example, intersectional data feminism, data activism and data justice (D'Ignazio & Klein, 2018; Dencik & Kaun, 2020; Kennedy, 2018).

Using education data to benefit disabled children means a significant shift towards disabled children themselves, their families and key support personnel, in who has the agency to make decisions about, for example, what data is collected, how that data is interpreted, and how it is used to determine decisions. This might enable disabled children and those who support them to identify and evidence issues that could be improved, and find ways of using existing data sources to show the scale of the issue and advocate for better educational opportunities. It might also explore what opportunities for disabled children's agency exist or could be developed in existing data arrangements, for example, understanding whether disabled children are able to opt in or out of data collected about them, question or refuse data-driven decisions made about them, and explore how disabled children experience and feel in relation to how their data is collected and used (Kennedy, 2018).

Centring disabled children themselves in education data practices is essential to challenge the multifaceted barriers to inclusive education in educational structures, approaches, inclusive/exclusive pedagogies and content (UN, 2016, in Slee, 2018, pp. 23-4). An example of centring children's voices and needs in data is UNICEF's Data for Children Collaborative,[1] which develops collaborative and child-centred data collection and analysis projects aimed at improving outcomes for children.

We also need to be clear about when education data becomes a solution in search of a problem. The most important

issues facing disabled children in their education are not necessarily amenable to data-driven solutions. We see some potential for more empowering uses of data that foreground the experiences of disabled children, and for the use of education data to support arguments for structural and institutional change based on increased awareness of barriers to inclusive education, increased funding (e.g., Gallagher & Spina, 2021), training and resources. However, there is a risk that an over-emphasis on education as a form of 'technological solutionism' (Morozov, 2013) can overshadow or displace the need for attention on other potential responses to support disabled children's education and inclusion, including structural reforms and political interventions that recognise and uphold disabled children's right to a genuinely inclusive education.

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