Chapter 5
What are Data and Who Benefits?

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5.1 Introduction

What are the challenges and opportunities to education afforded by data (i.e., datafication)? At first sight, technological changes seem trivial; new devices or processes superadd to educational institutions, which are longstanding and stable. Now, however, it appears that much more is at stake as technology seems to be impinging on educational purposes and values.

Why, now, has so much been questioned? In part because data technologies influence *how and why we do things*. Our investigation of data reveals a basic question: What should we do and why? This question immediately suggests a further question: Who have we been and who do we want to become?

To address the above questions, this paper explores the issues that data and datafication raise for educators. The first section sketches why datafication is a challenge for education by reflecting on what data are and what data do. Because data are tools and tools entail users and purposes, tracing out the implications of data requires thinking through the purposes and wider visions for data. Here, we borrow the term 'imaginary' from Jasanoff and Kim (2013). As creating an imaginary requires some context, the second section describes our contemporary technological situation, and the third section provides some specific positive and negative impacts of datafication in education. The fourth section proposes a vision (or imaginary) where education retains its central purposes and uses these to justify the control and direction of datafication. In this imaginary, individuality is the key value, so I discuss some of the ways it applies to students, teachers, and schools. Various thinkers are especially instrumental in the analysis, in particular, John Dewey. In addition, the fourth section identifies a situated need illustrated in the first three sections – i.e., the

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need to control and orient technology so it advances the purposes educators set rather than those stemming from choices and designs made by technology's designers and business agents. The final section summarizes the *purpose* of an educational imaginary in light of present cultural circumstances.

5.2 Datafication and Data: A Few Preliminaries

> 'Datafication' is a relatively recent term, implying that something is made into 'data.' Data is the 'material produced by abstracting the world into categories, measures and other representational forms … that constitute the building blocks from which information and knowledge are created. (Mejias and Couldry 2019: 1–2)

The term 'datafication' was introduced in by Mayer-Schönberger and Cukier (2013) relating to 'big data' processes across business and the social sciences. The following quotation is extracted from Mejias and Couldry's commentary on Mayer-Schönberger and Cukier's 2013 review:

> '[T]o datafy a phenomenon is to put it in quantified form so that it can be tabulated and analyzed'. … Datafication, the authors [Mayer-Schönberger and Cukier] argued, involves much more than converting symbolic material into digital form, for it is datafication, not digitization, that 'made [digital] text indexable and thus searchable'. … Through this process, large domains of human life became susceptible to being processed via forms of analysis that could be automated on a large-scale. (Mejias and Couldry 2019: 2)

5.2.1 Mind, Data, and Knowledge

There are various ways to understand data, and of course, mind and knowledge. I follow Dewey's naturalist, instrumentalist, fallibilist approach to mind, data, and knowing. Dewey, in my view, successfully assembled a philosophy capable of moving beyond fixed dualisms (e.g., mind/matter, appearance/reality, fact/value) which led, he argued, to intractable debates affecting social and ethical conditions. Dewey was, one might say, a post-metaphysical and post-epistemological thinker, but unlike some neopragmatists such as Richard Rorty, he believed that there were constructive and substantive things to be said about being (or 'experience'), knowing (or 'inquiry'), logic, and the scientific method. Dewey wanted to reconstruct these traditional areas of philosophy, not make them disappear, so they could be put to work on human problems.

My discussion adapts Dewey's approach and understands data as integral to the conduct of inquiry, which itself arises from and is evaluated by practical social and ethical purposes. Were he alive today, Dewey would not align with data representationalists, for whom data name or designate reality per se, nor would he tack to the

other side, the so-called relational approach, which presses an account of data that is much more malleable, shaped by vocabularies and language games.[1]

Instead, I think, Dewey's position on the ontology of data takes the same 'beyond' approach just mentioned in regard to metaphysics and epistemology. For Dewey, there is no fundamental question about the ontology of data to be answered. Questions about data must return to questions about specific experiments and methods that, in our present circumstances, address the purposes we deem worthy.

With this standpoint in mind, let us consider, philosophically, what data and information mean before exploring our main topic – the influence of datafication on education. Following Dewey, I consider data and information as things one has in mind. By 'in mind' do not think of a container holding objects but more like 'minding' – i.e., a way of engaging with the world.

The ideas – the data and the information – mind uses in this activity are tools. Tools like ideas or data include questions raised, evidence collected, and hypotheses proposed – i.e., when we conduct an 'inquiry', as Dewey puts it. What comes to be called 'knowledge' is shorthand for those interactions accomplishing some purpose with the potential to be useful.

5.2.2 *Data Are Not Things; Data Are Functions Determined by Purposes*

This epistemic context helps clarify why the word 'data' cannot be used too abstractly. To speak of 'data' implies their generation by some particular past inquiry; a dataset does not arise *ab extra* but comes about because agents with specific histories, values, and goals create it. Moreover, data are created for some aim or purpose. To forget this pragmatic genealogy is to treat data as self-evident, which is false. Data are like musical notes or phrases awaiting insertion into a musical composition. The usefulness of data in some future deployment makes it 'data'. Dewey explains this phenomenon in *Logic: The Theory of Inquiry*:

> The need for selective discrimination of certain existential or factual material to be data proves that an evaluative estimate is operating. ... All competent and authentic inquiry demands that out of the complex welter of existential and potentially observable and recordable material, certain material be selected and weighed *as* data or the 'facts of the case.' This process is one of adjudgment, of appraisal or evaluation. (Dewey LW12: 491)

[1] The literature about competing approaches to data is lengthy and exceeds the limits of this paper. See Jacoby (2021) for an interesting assessment of the competition between representational and relational approaches. In addition, Leonelli (2015), Bogen and Woodward (1988), and Boyd and Bogen (2021) have some interesting things to say about these approaches.

5.2.3 What Data Do

Once selected or *taken up*, data function in inquiry; data help define the problem, the evidence, and a possible range of solutions:

> [Data are] *taken* rather than given. . . . They are not isolated, complete or self-sufficient. To be a datum is to have a special function in control of the subject-matter of inquiry. It [helps fix] the problem in a way which indicates a possible solution. It also helps to provide evidence which tests the solution that is hypothetically entertained. (Dewey LW12: 127)

For example, a school administrator charged with raising test scores selects certain data. What she counts *as* data (e.g., past scores) also excludes what does *not* count as data (e.g., family income). Her definition of useful data will inevitably influence her hypotheses (e.g., that more test preparation and testing will improve student performance), and the range of possible outcomes. Later, attaining these outcomes via the means uncovered in the data may become established and enforced as policies (e.g., curriculum revision).

5.2.4 Data Change

So far, data have been portrayed as (a) functions not things that are (b) selected from a welter of possible material (recorded and observable) according to (c) interests and values. Data selected further color what counts as a relevant fact (or evidence) for hypotheses, experiments, and policies. A further consideration is that what counts (or could count) *as* data changes:

> As culture changes, the conceptions that are dominant in a culture change. Of necessity new standpoints for viewing, appraising and ordering data arise. History is then rewritten. Material that had formerly been passed by, offers itself as data because the new conceptions propose new problems for solution, requiring new factual material for statement and test. (Dewey LW12:233)

5.2.5 Data for What? Data for Whom? Beyond Imaginaries of Prediction and Control

The first takeaway should be that data are decidedly non-neutral; data are always *for* something and someone, gathered and (eventually) networked for some individual's or group's goals and purposes. Like a move in a game, *these* data only have value if we want to play *that* game.

A further question raised by some educators regards whether typical uses of datafication (e.g., prediction and control) are the only paths toward desired solutions. As data are assumed to be necessary and valuable, they are now extensively monetized. However, this normalization of data *also* normalizes prediction and

control as the best, even the *exclusive*, way to determine how to act and what to plan. By questioning these assumptions, some thinkers mention an older caution, namely that tools are more than just ways to solve problems but also create a particular *way of life*.

The idea that tools are used to create a particular way of living can also be found, for example, in the writings of William James, John Dewey, Martin Heidegger, Ludwig Wittgenstein, and Lewis Mumford. More recently, Sheila Jasanoff has elevated these issues in terms of 'co-production', a shorthand, she writes, for 'the proposition that the ways in which we know and represent the world, (both nature and society) are inseparable from the ways in which we choose to live in it' (Jasanoff 2004: 2). The question, raised acutely by Dewey and Jasanoff, is whether we *should choose* to produce a world, a 'socio-technical imaginary' (Jasanoff's term) using data that are meant to be used for prediction and control (cf. Juhl 2024) (this volume).

There is reason to be cautious. We not only live in a space of prediction and control but also in a universe of chance, spontaneity, emotion, and adventure. Encounters with indeterminacy lead to ambiguity; sometimes these encounters require choice, but sometimes they simply shape existence. Each indeterminacy has something about it that resists further analysis, reduction, or quantification. Some of them shine so they do not require analysis. This is not meant as an obscure metaphysical point; rather, it attempts to describe those cases where datafication (reductive analysis) is inappropriate. Sometimes there is nothing to be done; other times, such moments may be strung together into something like play.

Thus, a fundamental issue to explore regarding datafication concerns not only *whose* purposes drive it, but also when it is *not* appropriate. Those inappropriate cases help illuminate other imaginaries that are possible for education.

5.3 The Current Cultural and Technological Situation

5.3.1 The World Outside School

Discussions and analyses of education focus, appropriately, on what happens *in* schools, addressing topics such as curricula, methods, funding, equity, bureaucratic organization, and architecture. However, a large share of the influences at play arise *outside* schools in the wider culture. As we address questions of data and datafication, it is worth looking at what Dewey had to say about the topic:

> The place in which to look for significant educational changes, those which are most likely to endure and fructify, is not education at all, but is important social changes which go on irrespective of education. For alterations of the former sort come and go; the latter shape the aims and agencies of education. (Dewey MW10:118)

Teacher's concerns about students' divided attention and distractions are now common, and there is alarm about how natural language processing via artificial

intelligence (e.g., ChatGPT) affect the instruction of composition and writing, as well as other subjects. (With varying limitations, AI tools can respond to prompts to solve math problems, execute computer code, create visual and musical works, and more.)

Before discussing data in education more specifically, let me take a moment to characterize this general technological moment. These are the kinds of social changes Dewey discusses above, and these social changes must inform any new imaginary devised to address new needs and concerns about data and datafication.

Various aspects of personal daily life are facilitated and mediated by information and digital technologies, including appliances, alarm systems, phones, fitness watches, thermostats, and automobile navigation. Artificial intelligence manages the operations of many devices, connecting to elaborate networks hosted by cloud computers. Adoption of such technologies is increasingly widespread, and there is significant ideological boosterism from those in the industries creating and selling them. Such boosterism is hard to deflect.

Nevertheless, there is increasing awareness that these technologies contribute to stress and other psychological issues including information overload, distraction, interruption, and surveillance. In the political realm, there is growing concern about whether information is accurate and decision-making is autonomous given the more powerful forms of disinformation and propaganda propagating across devices and platforms. As I write, there is significant concern about social media interference, political disinformation, and propaganda such as deep fakes, which can take the form of audio, image, or video.

5.3.2 Surveillance Capitalism and Instrumentarian Power

Shoshana Zuboff has written one of the most relevant, recent critiques of contemporary technology. Her critique directly relates to the datafication of education. Here, I offer a brief sketch of her most salient points.

In *The Age of Surveillance Capitalism* (2019) Zuboff provides an economic and psychological account of the genesis and present operation of what she calls the 'instrumentarian power' behind recent technological systems. Increasingly, both online and smart devices can monitor and record human conduct and then aggregate and analyze the data mined from these activities. The product of this 'extraction architecture' is big data which is valuable because it can be used to predict and sometimes manipulate future conduct.

Extraction techniques have become increasingly intrusive, extending beyond online conduct into private and personal life; these techniques seek what Zuboff calls psychological 'depth,' the 'highly lucrative behavioral surplus [that] would be plumbed from the intimate patterns of the self. . . . [Extraction's] supply operations are aimed at your personality, moods, and emotions, your lies and vulnerabilities.' (Zuboff 2019: 199) The payoff for understanding users' activities and moods (along with patterns of what they say, where they are, and who they are with) is the ability to

nudge (i.e., manipulate), behavior: '[T]he surest way to predict behavior is to intervene at its source and shape it. … [M]achine processes are configured to intervene in the state of play in the real world among real people and things. … They nudge, tune, herd, manipulate, and modify behavior in specific directions.' (Zuboff 2019: 200)

The key point, in Zuboff's view, is that the early impetus to predict behavior has led to developments in technology which, increasingly, shape and condition behavior to make *it* more predictable. John Danaher expands on the ethical problems of such technological features. Contemporary strategies that manipulate users through algorithm-driven systems are often, he argues, 'subtle forms of manipulation' or 'hypernudging' and such an 'algocratic' system 'operates beneath the radar of conscious awareness and happens in a dynamic and highly personalized fashion' (Danaher 2022: 265). Danaher continues: '[this brings] nudging to an extreme. Instead of creating a one-size-fits-all choice architecture that is updated slowly… you can create a highly personalized choice architecture that learns and adapts to an individual user. This can make it much more difficult to identify and reject the nudges.' (Danaher 2022: 265) As one software engineer admitted to Zuboff, '[y]ou can make people *do* things with this technology' (Zuboff 2019: 294).

In addition to questions of surveillance and manipulation, these technologies raise questions about how they can alter and accelerate how we perceive and anticipate the world, as well as how we socialize and communicate. Scientific conclusions about the effects of regular online activity are being studied but to date lack broad consensus. However, interesting research is being done.

5.3.3 The Long-term Problem of Speeding Up

Concerns about the challenges of modern life go back a long way. In 1854, Henry David Thoreau warned that America was 'an unwieldy and overgrown establishment, cluttered with furniture and tripped up by its own traps, ruined by luxury and heedless expense, by want of calculation and a worthy aim' and that we must '[s]implify, simplify' to get our bearings and care for ourselves (Thoreau 1910: 120). Such sentiments survive in Dewey, but his work as a psychologist, philosopher, and educator enabled him to examine experience and action more empirically. Consider Dewey's remarks about modern life's effects on habits of perception.

Taking aim at modernity's disruptive effect on aesthetic experience, especially on the *continuity* of perceiving, Dewey bemoaned the destructive impact of fragmentation and interruption, the habits that are 'formed in working on a moving belt in a speeded-up industry' (Dewey LW10: 266). He noticed this many years before society at large was concerned about elementary education which sought to educate by entertaining children. Educating children by entertaining them is a fool's errand as it 'alternates between periods of overstimulation and of inertness' to garner temporary attention, but in the long run it creates a 'distraction and dissipation of

energy' as children become habituated to a 'dependence upon external suggestion, and [a] lack of resources when left to themselves' (Dewey MW7: 159).

Clearly, Dewey's view has not been taken up by today's technology designers. Whereas Dewey decries attention being chopped into little pieces, instrumentarians see this as *exactly* their goal: bite-sized gulps of attention cultivated by texts, images, and memes. Such content is commodifiable and monetizable and leads, predictably, to continued dependence on such external sources. As we will see in the following sections, this opposition helps inform the type of imaginary that might resist the depreciation of experience, and with it, education.

5.4 Educational Issues around Datafication and Digitalization

Before discussing datafication's implications for education, let us examine some facts about the perceived need for it and how it is deployed.

One glance at the burgeoning literature reveals how important datafication is becoming for education. Recent works chronicle complexities caused by data's presence, deployment, and impacts across a wide range of domains (cf. Slade and Prinsloo 2013; Dishon 2017; Mejias and Couldry 2019; Pargman and Jahnke 2019; Dieterle et al. 2021). In some instances, big data means educational data mining (using data patterns to form predictions about groups) and in other instances connotes learning analytics, (i.e., information helpful for understanding learners' particular skills and circumstances). Datafication has also been defined in several ways, including its relation to a wider range of applications and devices across a range of venues (Pargman and Jahnke 2019: 3).

Given the complexity of these phenomena, it is tricky to make judgements about the benefits and detriments of big data or datafication. Greenwalt and Masters suggest that since data have become a 'dirty word' for some teachers and administrators, careful thought is needed regarding the types of data most needed (Greenwalt and Masters 2021: 250). Waks (2022) advances a similar (and Deweyan) point of view, pointing out that literacy in science and scientific reasoning can help a wide range of educators innovate and experiment because such reasoning helps illuminate 'especially remote consequences which would, without scientific insight, remain hidden from view' (Waks 2022: 13; Dewey from LW5: 11).

Ethical scrutiny of data is also increasing. Datafication can open up various ethical divides related to access, data collection bias, algorithm bias, interpretation deficits, and citizenship asymmetries (Dieterle et al. 2021: 137).[2]

[2] As Dieterle et al. (2021) explain, when certain people lack access to technology, their data are not collected and datasets are skewed; when skewed data are used to create algorithms, misunderstandings can be amplified and greater problems result. Moreover, lack of training about how to interpret data (especially poorly sourced data) creates more mischaracterizations and more mismanagement.

5.4.1 Positive Contributions of Datafication

It is too easy to be either a technophile or a technophobe, but reality is usually less black and white. To assess data and datafication in education, I examine both positive and negative contributions of datafication.

Because big data has the 'unprecedented capacity to collect large and diverse data sets in naturalistic learning environments,' it also has the potential to 'improve social interaction and active participation in determining shared ends' (Dishon 2017: 282). Of course, this requires the intent to facilitate interaction among students, leveraging data (about a particular student's skills or biographical details) to foster sympathy and collaboration. 'Due to the capacity to collect data over extended periods of time, and in varying contexts, big data are positioned to offer novel contributions to the foundational effort of mapping how the learning takes place in school interacts with other contexts in students' lives.' (Dishon 2017: 284) Slade and Prinsloo note that learning analytics can also contribute, providing 'an improved comprehension of the lifeworlds and choices of students, allowing … better and informed choices and [faster responses] to actionable and identified needs' (Slade and Prinsloo 2013: 1513).

Data can play a role in community-based, collaborative inquiry larger than usually envisioned. Greenwalt and Masters detail a case where data facilitated local, cooperative inquiry. Moreover, the data were longitudinal, mindful of side effects, and incorporated into dialogues. These approaches use data as a 'handshake' or 'hug' rather than as a top-down 'hammer' to sort, rank, and fail those evaluated (Greenwalt and Masters 2021: 250). Data can also enhance classroom argumentation and deliberation; these aspects of education have been difficult to analyze because of the complexities of these activities.

One additional opportunity involving data regards agency of students about their own data. Dishon proposes students be encouraged to analyze and make choices about their own data (Dishon 2017: 283). Finally, big data might inform the creation of 'refined virtual environments, which simulate collaborative and complex real-world practices' (Dishon 2017: 284). One can imagine a teacher helping students learn about racial prejudice using VR to create a role-playing simulation where the user experiences being pulled over by a police officer or being followed by a department store security guard.

5.4.2 Negative Contributions of Data and Datafication

The foregoing provided several powerful positive cases of datafication advancing educational objectives. Let us consider some negative ones. Data collection requires

Finally, accumulation of several of these divides can lead to information 'haves' and 'have-nots,' and creating disparities among citizens trying to participate in democratic life.

tracking, recording, and aggregating users' behaviors (e.g., students, teachers, and administrators), data that will be analyzed and ultimately used to make decisions regarding, for example, policy or curricula. Users may be aware or unaware their data are being used in these ways. Widespread use of surveillance cameras, smart phone cameras, and targeted online ad placement help create the general perception that surveillance (and sousveillance, i.e., bottom-up surveilling) is the new normal. Some educators question the effects of surveillance on students and teachers, especially when awareness of such surveillance causes students (or teachers) to alter their conduct. Such effects can be dramatic given that student identities are still developing, and there are ethical implications around how (and how long) to store data about learners (see Slade and Prinsloo 2013). A more philosophical point, made memorably by Nietzsche, pertains to the need to be forgotten – i.e., to act without worrying that every statement, gesture, or mistake will be remembered forever.[3]

Clearly this is a large psychological phenomenon; my point is simply the impact of surveillance must be factored into general evaluations of the role of datafication. If Turkle (2011, 2015) and Twenge (2017) are correct, online surveillance has some responsibility for younger people's fear of intimacy, anxiety around social identity presentation, and difficulties with face-to-face interaction. It is necessary to assure that school surveillance does not exacerbate existing problems.

There is evidence that teachers, faculty, and even administrators change their behaviors due to surveillance or sousveillance (via teaching observations, students recording teachers, teachers monitoring one another, parent's online surveillance), and data reporting. These techniques are typically rationalized by reference to pedagogical efficacy and child safety. It is clear that such phenomena have the potential to disrupt existing power relations and institute new roles and responsibilities (cf. Page 2017: 992; Slade and Prinsloo 2013: 1515).

By formulating its portrait of 'the' learner, data promise to personalize education, i.e., be shaped according to each student's needs. This raises a question about the ontology of the learner: What is a student? Is she as discrete, isolated, and atomized as the data suggest? These portraits shape the methods and measurements used in education. Moreover, they create norms for the school's self-conception. Some criticize this portrayal and its implications. Dishon (2017) argues for a portrait of

[3] About this phenomenon, 'Mayer-Schönberger warns that forgetting is a 'fundamental human capacity'. Students should be allowed to evolve and adjust and learn from past experiences without those experiences, because of their digital nature, becoming permanent blemishes on their development history. Student profiles should not become 'etched like a tattoo into . . . [their] digital skins' (Mayer-Schönberger 2009: 14)' (Slade and Prinsloo 2013: 1520).

Similar warnings by Nietzsche perfectly suit such cases. As Turner points out, '[w]ithout active forgetting, [Nietzsche] implies, we would become alienated from ourselves . . . [W]e would take a past event—whether it be a success or a failure—as a reference point, to which we would constantly refer', perhaps leading to 'projecting an ego-ideal that can never be reached' or, in the case of a remembered failure or trauma, 'an incapacity to act at all'; however, when we are able to forget, 'the self is liberated from itself: the "I" is suspended, even if only briefly. . . . open to new possibilities and can increase its capacity to imagine new projects' (Turner 2019: 51).

students as naturally social and collaborative beings, a view that Dishon considers to be a more accurate understanding of actual life. Dishon follows Dewey's line of thinking that education fails when it disregards students' intersubjective and relational nature. In part, this nature defines any community, including school communities. When data are used, wittingly or unwittingly, without considering the lived experiences of students as naturally social and collaborative beings, education will miss its mark.

5.4.3 What Is Learning? Prediction Or Practice?

The ends of learning must also be made explicit. Once the learner's data are used to profile the learner, what happens next? Is the goal better prediction and control? Or is the goal to increase students' freedom to experiment or innovate? As

> [m]any institutions are employing learning analytics to nudge students toward study choices or to adopt support strategies that are assumed to offer greater potential for success. . . . what is the obligation for the *student* to either accept explicit guidance or seek support that may be in conflict with his or her own preferences or study goals? There is a risk of a 'return to behaviorism as a learning theory if we confine analytics to behavioral data'. (Slade and Prinsloo 2013: 1516)

Data convey a picture that runs counter to other conceptions such as those who take everyday practice as the 'unit of analysis' to assess technologies in education (Pargman and Jahnke 2019: 15). In this view, practice is 'embodied, collective action – coherent social activity developed over time and underpinned by specific values that give structure and meaning to what we do' (Pargman and Jahnke 2019: 6).

5.4.4 The Closed Loop of Data Collection and Teacher Freedom to Innovate

Another danger raised about data-driven education regards data's effect on teachers. It is commonplace (in the USA at least) for teachers to design their syllabi and teaching to ensure that their students perform well on required standardized tests – i.e., teachers feel pressure to reverse engineer their curriculum, pace, and methods for end of term standardized tests. This pressure to make sure students do well on such tests impinges on their professional freedom as educators; more disturbingly, this pressure may prejudice the kinds of curricula developed.

> As [learning analytics and educational data mining] improve their capacity to quantify complex learning processes, researchers and teachers are more likely to prefer contexts in which such data could be collected. . . . Even if educators focus on complex socially oriented processes, this could result in an impoverished model of education that over-prioritizes measurable contexts. (Dishon 2017: 285)

Such data-driven availability of pattern-recognition can deter innovation in favor of repetition, 'keeping individuals prisoner to past choices' with hints, as Eli Pariser puts it, of 'autopropaganda, indoctrinating us with our own ideas, amplifying our desire for things that are familiar' (Slade and Prinsloo 2013: 1517). In other words, datafication algorithms 'invariably reflect and perpetuate current biases and prejudices' but because student identity is dynamic, it is obligatory that 'we take reasonable care to allow students to act outside of imposed algorithms and models' (Slade and Prinsloo 2013: 1517). If we do not keep these dynamic, human factors in mind, as Waks points out, we risk merely 'rationalizing current practice' which 'retards the creative thinking needed for innovation and experimentation' (Waks 2022: 12).

5.4.5 What Is Technology For? Keeping Efficiency in Check

These various concerns share a general worry: the creation, by technologists, of a caricature of the education process, one that wrests agency away from teachers and students. This caricature derives from the false assumption that educational technologies are neutral; they are not. As Pargman and Jahnke argue, educational technologies are neither neutral nor objective nor apolitical as 'every technology embodies specific values in its design that are enacted when the technology is put into use' (Pargman and Jahnke 2019: 7). Typically, the value promoted is *efficiency*.

Efficiency is promoted in triumphalist and near-mythic ways because users believe that new technology 'is a means for ensuring learners' and teachers' efficiency and performance *without making any profound difference in how learning or teaching is conducted*' (Pargman and Jahnke 2019: 8) (my emphasis). This idea – that technology can be introduced *without* changing how we teach or live – is easily proven false in *every* area of our lives, including education. As Neil Postman used to incant, '[t]echnology giveth and technology taketh away, and not always in equal measure' (Postman 1990: 2).

The myth's tenacity helps illuminate the degree ideology is at work. There is a *push* for these new technologies. We must scrutinize what Dewey called 'the mechanical' so we can 'discover whether it is within or beyond its due bounds' (Dewey MW10: 118–119). Too often, technocratic approaches exceed their bounds because users forget 'that what counts as "effective" crucially depends on judgments about what is educationally desirable' (Biesta in Slade and Prinsloo 2013: 1519). If we recognize this, we have a better chance of reasserting what education *should* be about, despite the changing landscape: 'A discussion on educational values is needed in our field. We need to speak more precisely and substantially about the underpinning values of learning and teaching in the digital age.' (Pargman and Jahnke 2019: 17)

5.4.6 *Quandary: Whither Education in the Digital Age?*

Datafication has enormous potential to reshape much of education. In addition to methods and metrics, these tools press upon central commitments such as how to define learners, teachers, and schools. Suspicions about datafication run along lines described by Zuboff (2019), i.e., 'instrumentarian power' and the ability of technology to impose order from the top down. Such suspicions are driven by the belief that students, teachers, and humane traditions of education are threatened by those outside the educational realm with motives fueled by enormous profits.

The quandary, then, is this: How can educators formulate an imaginary, a vision, for education that indicates what is indispensable to it, and why? By spelling this out, in light of current technological challenges, educators gain principled guidance regarding how, when, and why datafication should have a role in education. Such an imaginary empowers educators to remain the master, rather than the slave, to new technologies. In the next section, I propose the core elements of just such an imaginary, relying in part on John Dewey's philosophy of education.

5.5 Education Controlling Technology – An Imaginary

The first section investigates the meaning of data with an eye to the variability of context. The second section provides a brief account of the wider context, which includes both contemporary technologies (smart phones, social media, surveillance, networked big data, etc.) and some of the concomitant psychological and political concerns they raise. The third section examines some positive and negative effects of datafication on students and educators, particularly on existing purposes and values. The fourth section addresses this challenge by answering this question: How can educators formulate a socio-technical imaginary that preserves central educational values while acknowledging and using datafication? In other words, how can education blend technology (including datafication) with its purposes to create *its* imaginary?

In what follows, I propose educational values that could be pillars for a fully-articulated imaginary. The master value is individuality. In addition to explaining this value, I parse it for students, teachers, and schools. This proposal provides some basis for an elaborated imaginary, one capable of adjudicating educators' decisions about how to accept, reject, or modify existing and emerging technologies.

5.5.1 *The Master Value of Individuality*

One candidate for a master value in education is individuality. Dewey identifies the locus of value in human participants as irreplaceability and uniqueness:

> Human beings are not like the nickel or mechanical products which are as much like each other as peas in the pod. As long as we get peas enough we do not care which individual pea. They become substitutes for each other. When we get human individuals, we get the principle that each individual has something that is unique or irreplaceable. No one else will quite take his place in the world or do quite the same thing that he will do. . . . The principle of individuality, then, is having a place and work in the world that no one else can quite do. This gives us a measure . . . as we rise to what is vital, rise in the sphere of life to what is spiritual, moral and intellectual, the principle of individuality counts for more and more. That is why the principle of individuality has such claims in education. It is the measure of whatever is elevating in the rank of life in spiritual, moral and intellectual beings. (Dewey MW15: 170–171)

As Dewey makes clear throughout his writings, individuals are not the atomized selves of classic liberalism or economics, but are ecological, relational, and social selves. This view helps orient how educators should receive and use technology. To parse this concept, let us examine individuality in several respects – in qualitative situations, in students, in teachers, and in schools.

5.5.2 Individuality in Local, Qualitative Situations

Classrooms have long been unique spaces, and education has long been dealt with the consequences of 'scientific' attitudes, efficiency, and standardization (Waks 2022: 10). Nearly a century ago, Dewey noted how industrializing forces were challenging educational imaginaries:

> The imagination of everybody today, their unconscious way of seeing things, is more influenced by industrial considerations than we realize. The way business is done influences unconsciously all our ideas. So we have from business practices carried over into education too much standardization, too much concentration of responsibility. (Dewey MW15: 187–188)

Then, as now, there was a tendency to import efficiency metrics and goals into education without wider reflection. As Harry Boyte puts it, the 'credo of efficiency assumes ends as uninterrogated givens' (Boyte 2017: 19).

Educators may see this as a negative or critical value – scrutinizing efficiency and keeping it in check – or as a positive, constructive value. Constructively, one restrains the motive for efficiency, the quantitative dimension, to make space for the *qualitative*, *local*, or *situational* dimensions, for these constitute classrooms: '[C]lassroom reality [is] the actual, infinitely variable, qualitatively presented, expressive features of individual pupils and behaviors. Like new works of art, these always exceed educational concepts, standards, or learning objectives.' (Waks 2022: 18) The qualitative *does* have standards and accountability, but standards are developed with others, in communities of practice, as opposed to top-down from organizational hierarchies. Judgments of quality come from 'study, observation, experience, [and] professional interaction' not from objectives prescribed in advance (Waks 2022: 19–20).

5.5.3 *Individuality in Students: Interest, Motivation, Effort, and Social Relationships*

Individuality is social. Grasping this, education gains direction if premised on what individualism means for students – and what it does *not* mean. It does not mean individuality as modeled by consumer capitalism, where discrete datasets contour social media feeds and fine tune targeted advertising. This approach creates educational learning analytics that reify learners as atomized individuals. That picture amounts to the 'misapprehension . . . that individuality means a sort of isolation; that it is unsocial rather than social. Now exactly the contrary is the case. Only in social groups does a person have a chance to develop individuality.' (Dewey MW15: 175–176) Education that recognizes that individuality is enhanced by social interaction, sees that 'the best stimulus to the inventiveness and the ingenuity of the child, the calling out of his own individuality, is found when the individual is working with others, where there is a common project, something of interest to them all, but where each has his own part' (Dewey MW15: 176).

Individuality includes students' attention, interests, and motivations. Problems of student attention and effort remains central in education, but technological fixes fail when based on abstract information and categories. 'What is needed,' Dewey writes, 'is not an inventory of personal motives which we suppose children to have, but a consideration of their *powers*, their tendencies in action, and the ways in which these can be carried forward by a given subject-matter' (Dewey MW7: 182). In other words, when motivation and effort are understood as rooted in unique individuals, the focus becomes the growth of their 'existing concrete capabilities' with appropriate conditions and materials. What is sought is not a higher test score or more of homework; a better measure would be absorption in a task, a so-called flow state. This eliminates the problem of motivation. Arrange the right situation and 'the end or object in its vital connection with the person's activities *is* a motive' (Dewey MW7: 182).

Therefore, the challenge for educators is to align lessons with 'the direction of the agent's own growth,' with 'the predominating direction of his attention, his feelings, his disposition . . . while . . . engaged upon this task' (Dewey MW7: 156–157). It may *seem* that this is the goal of data-driven learning analytics – which, after all, attempt to aggregate detailed facts about students. The question, however, is whether the data collection *design* fully appreciates the individual *qua* original individual, i.e., their history, feelings, hopes, personalities, social connections, and present circumstances. Can anyone *really* pretend that this is done?

5.5.4 *Individuality in Teachers: Artistry, Personal Connection, and Freedom from Prescription*

If education succeeds when it aligns materials and conditions with students' actual abilities and interests – and if technological approaches largely fail to appreciate

these factors – then who can accomplish education's mission? The answer is the individual teacher.

Within contemporary technologies, teachers may seem like another line of code in the algorithm. A better, more powerful way of framing their role is as artists. The teacher is an artist, Waks argues, because teaching cannot be reduced to regimes of prediction and control. That is, teaching is an inherently qualitative process that deals with human individuals not reducible to their membership in this group or that category: 'Every student and every expressive act', Waks writes, 'are new, and not comprehended by prior categories' (Waks 2022: 17). Like artists, teachers cannot 'subordinate their personal vision to mechanical technique' because in so doing 'they become mere technicians following the plans of others, not free creative individuals' (Waks 2022: 14; cf. Dewey MW15: 187). Novel students require situations, devised in anticipation of their individuality and in collaboration with them as individuals: 'We cannot apprehend new works by imposing old categories. We must feel our way to appreciation of the new. . . . [and] the real business is to respond to pupils as individuals, and to their acts as works of art' (Waks 2022: 15).

Teaching, then, resists datafication *insofar* as datafication's aim is prediction and control. Such aims impose abstractions (e.g., 'metrics') drawn from the past in ways that imprison individuals attempting to express and create their own future. Teachers *as* artists facilitate student innovation and resist datafication when it seeks to produce results from past metrics.

Personal connection is another aspect threatened by datafication. Nearly a century ago, Dewey lamented the loss of *personal* connection between teacher and learner: 'I sometimes think the greatest human loss there is at the present time is in the loss of experience as to our human contacts with each other.' (Dewey MW15: 189) Here, Dewey is responding to the rise of abstract, impersonal standards pervading the raison d'être of the educational enterprise. His warning is even more salient for us because contemporary tools are much more powerful. The question becomes, who and what will schools support? How do they see their mission, and can they preserve the value of individuality in students, teachers, and the wider school community?

5.5.5 Individuality in Schools: Laboratories for Communities

How should schools (at every level) express their individuality? What is involved? At a minimum, schools must not prevent students or teachers from developing their individuality:

> It is the classroom teacher who is in contact with the individuals who are being educated. We might well say that all the rest of the system, organization and administration, is really so much superstructure for enabling the classroom teacher to do his or her work more effectively. . . . If these factors of organization, administration and supervision of instruction do not stimulate, assist and reinforce the worker in the classroom, then they are useless, or even worse, since they become encumbrances in the way of the teacher. (Dewey MW15: 182–183)

Any school that needs a simple rule about how *not* to use data can take this warning as a regulative principle.

More positively, genuine school individuality can emerge naturally *if* students' and teachers' unique individuality is secure. Each school remains, of course, expressive of its town, region, and country. But data need not be the enemy of such expressiveness; as Greenwalt and Masters showed, data *can* be collected and used in ways that reinforce particular communities, but this requires that instrumentarian goals and methods are mindfully set aside.

Schools that become original individuals as portrayed above do critical democratic work. As Boyte points out, when schools question standard models of efficiency, they become 'free spaces' and 'social centers' where diverse people can work together (Boyte 2017: 15). In these spaces, personal relationships are nurtured so that habits of shared inquiry and public problem-solving can be fostered (Boyte 2017: 15). Such schools take a page from Dewey's 1902 speech, 'The School as Social Center', which formulated lessons Jane Addams innovated at Hull House. Boyte provides a summary of the speech (quoting Dewey):

> Thus, for Dewey, the first element of schools as social centers involved creating a 'means for bringing people and their ideas and beliefs together, in such ways as will lessen friction and instability and introduce deeper sympathy and wider understanding.' In today's context, where the 'relational' is being replaced with the 'informational,' such an idea of educational sites as places for mingling, developing understanding, and building human relationship has renewed importance. (Boyte 2017: 26)

For Dewey, school individuality should not be underestimated. The work of a 'school as social center' respects student and teacher individuality, creating a unique community and lessening social friction and instability, a form of what Boyte calls 'ethical civic repair' (Boyte 2017: 26). Such work is a precondition for the reinvention task required by democracy in its social (and Deweyan) sense.

5.6 Conclusion

We live in a confusing and disorienting age. We are constantly connected, bombarded by information, and relentlessly accelerating. Digital and data-driven tools promise harried persons control over the flux, (i.e., some way of slowing things down). In all of this, some element of choice is being missed. These developments have intention and purpose behind them, specific agendas devised in ways that are often neither public nor transparent. Too often, there is an urge among educators to remain *au courant*, to give in to wider trends. This is dangerous to genuine educational progress:

> This sense of being scientifically up-to-date does endless harm. It retards the creation of a new type of education, because it obscures the one thing deeply needful: a new personal attitude in which a teacher shall be an inventive pioneer in use of what is known, and shall learn in the process of experience to formulate and deal with those problems which a

> premature 'science' of education now tries to state and solve in advance of experience. (Dewey MW13: 328)

I have argued that despite appearances, many of our purposes and resources remain the same. By remembering and expressing them, in light of new circumstances and incursions by technology, educators can retain mastery of their domain. They can incorporate new tools discriminately and avoid capture by tools whose inbuilt biases and purposes work against education's imaginary. We will keep our moorings if the standpoint of the individual is kept in mind, and if we accept that the goal is not primarily skills for material production or quantifiable educational results, but the growth of the active powers of students. This growth is ultimately our 'moral gain' (Dewey MW7: 183).

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