Welcome to Class

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In the last few years, Artificial Intelligence (AI) has become a subject of discussion and debate within the education research community. While the introduction of Open AI's ChatGPT caused some educators to reassess the role of home assignments (Winerö, 2022), others have highlighted the educational possibilities of generative AI and other AI-infused applications such as learning analytics, student performance prediction, and data-driven school development (Luckin et al., 2016; Wayne Holmes & Ikka Toumi, 2022; Zawacki-Richter et al., 2019). As AI has sparked debate, teachers and researchers have yet to understand the consequences of bringing this technology into the classrooms. Commercial interests, as well as a policy "push" for introducing AI into educational practices (Linderoth et al., 2024; Rahm, 2024), create tension and possibly decrease teacher agency. As technological advances dominate the educational discourse, teachers are tasked with adapting to the new systems introduced to schools around the globe (Player-Koro et al., 2018; Sperling et al., 2022, 2024). These developments are further driven by techno-solutionist (Sætra, 2023) education policies, which create narratives of possible futures (Sporrong, 2024). These narratives, or sociotechnical imaginaries, create anticipations of what future to expect and prepare for (Jasanoff & Kim, 2015; Jasanoff & Kim, 2009). The imaginaries and anticipations surrounding AI and education can, and should perhaps, be questioned (Hillman et al., 2019; Houlden & Veletsianos, 2022; Sporrong, 2024). Sporrong (2024, p. 197) highlights the issue that "claims that the state of education needs to be improved also convey that something in the current state of education is problematic." Furthermore, Rahm and Rahm-Skågeby (2023) share the understanding that technological "solutions" to educational "problems" frame education as broken somehow.

Visions, imaginaries, and narratives around education can be questioned by drawing on speculative methods (Rahm, 2024; Sporrong, 2024). Recently, education fiction has gained traction as a tool for questioning and re-imagining the future of education. Hrastinski and Jandrić (2023) call it a way to "abandon the chains of academic formality" and imagine a future that has yet to come. These futures can be imagined through collaboration with teachers, or, as in this essay, by utilizing current literature related to the chosen subject. This essay takes on a pessimistic, and rather dystopian point of view when discussing a future where classification, algorithms and data have become an integral part of the educational future. Much like Hillman et.al., (2019) as well as Selwyn and others (2019), who have previously used this method, we use the narratives to discuss the future. The world in the narrative is inspired by a techno-solutionist worldview where more data is good data. As both authors of this paper have previously interviewed computer scientists, teacher educators, and teachers on AI in education, the narratives are inspired by our shared experiences from those. The narratives in the following sections are a means for a broader discussion on efficiency, rationalization, and teacher agency. As Gerlach Hamilton (2003) describes it, using narratives is "a methodology for grasping the social" (p. 168). As such, the central focus of this essay is to unpack the sociality of digitization associated with the introduction of AI technologies in education through education fiction.

First, we will introduce a fictional school setting where an AI system is being developed and implemented. We then ground the narrative in research on the sociality of technological development and the implications of datafication on education and teacher professional practice. Third, we will discuss how these systems might challenge educational practices and question the autonomous agency of teachers by framing AI in education within a discourse of effectivization, rationalization, and management-by-data. The novelty of AI in the school system paves the way for diverse possibilities, making it essential to consider them from multiple perspectives in order to offer insights for future developments. Furthermore, the commercial interests in the development of technology for the school system make it crucial to examine how technology enters schools, and to involve teachers in these implementation processes. We end the essay by looking beyond education to how AI relates to discussions about a welfare sector in crisis.

Scene I: The man in the well-fitted suit

The man in the well-fitted suit had been in the school for more than two weeks when September turned to October. His presence had become a familiar sight in the classrooms, yet his purpose remained somewhat of a mystery to some of the teachers. The students spread rumors that the man was, in fact, a former agent sent to school to inspect their teachers, while others thought he was there to ensure safety. Each morning, he would arrive at precisely 8 o'clock, his polished shoes echoing through the somewhat empty corridors as he made his way over to the teachers' lounge to have his first cup of coffee. He took his coffee black, as he stood – never sat – watching the minutes pass until the school bell rang at 8.10 to mark the beginning of the first lessons. As he made his exit from the teachers' lounge, his colleague, the researcher with whom he collaborated, caught up with him. She nodded to him and offered a smile, which he reciprocated with a slight strain.

As he and the researcher, Ms. June, entered the first class on the agenda for the day, English, he greeted the teacher with a slight nod before installing his pocket-sized camera on a tripod in the middle of the room. He pressed the on-button and watched the 360-camera start up with a blue light indicating it had initiated recording. He situated himself in the back of the room while Ms. June set up the rest of the equipment. As she sat down beside him, her screen hummed to life, displaying the classroom from the teacher's view. The students made their way into the room, avoiding the chairs in the front row of the room. The man in the well-fitted suit, or Mr. Anderson, as he was actually called, opened his laptop and started typing as the teacher, whose name he hadn't memorized, started the lesson.

"Good morning, everyone", the teacher said. "As you can see, we have Mr. Anderson and Ms. June here to record what we are doing today. You've met them during math in previous weeks, I presume".

The lesson proceeded as usual, although Mr. Anderson could feel their presence affecting the classroom with an air of tension. The teacher, whom he learned went by "Mrs. Hill", led a discussion on a novel they had read. He recorded everything with precision, down to every minute of the lesson, and was fed data through the camera in real time. As he recorded the teacher's every move, Ms. June's screen instead recorded the students. He could see how their body language and facial expressions were analyzed in real time. A boy in the back slouched over his desk, the word "inattentive" hovering above his head. A classmate in the row in front of the inattentive boy was marked by a green indicator, the word "focused" marking his digital self. When the students left the room, Mrs. Hill made her way over to them as they were writing up the summary of the data collection.

"May I ask what you found during this lesson?" she asked. Mr. Anderson looked up, nodding to the screen in front of him. "As you know, I'm here to work on the development of your new AI agent, so for today's class, I have noted the focus minute by minute, with the help of that". He gestured towards the camera. "For example, you spent a total of 4 minutes pausing to wait for the students to speak after asking a question, and 2 minutes reminding students of page numbers". She frowned ever so slightly. "And Ms. June here", he continued, not waiting for her to speak "has recorded a mere 36 percent focus in your class, based on a set of biometric data".

"Oh, and what does that mean?"

"It means nothing, yet. When I'm done going through each subject though, I will have subject-specific quantifications on how time is used in your classrooms. And then we'll feed it into the system, train your AI agent and improve teaching – we call it informating the system". He closed his computer and stood, marking his exit from the room. "Thank you. I have to check in with the developers at 9:15". He took his camera and left the room with Mr. June right behind him, leaving Mrs. Hill with a confused look on her face for exactly 12 seconds before gathering her books to leave for the next lesson.

A new system in class

In her seminal genealogy on the informating of work, Zuboff (1988) describes how the embodied and living knowledge of workers has been explicated and transformed into a sort of knowledge susceptible to scientific rationality and effectivization. This means knowledge is datafied and algorithmized through interviews and observations, where embodied and implicit knowledge is dissected and classified, much like the narrative above, where Mr. Anderson collects data on teachers to feed an algorithm. According to Zuboff, this informating process of work leads to confusion, a literal sense-lessness among workers, when practice becomes increasingly datafied and mediated through digital systems. Comprehension and manipulation of symbols take precedence over real-world action, fundamentally altering power relations in work practices. Similarly, Bowker and Star (1999) note how the classification of nurse practice in the Nursing Intervention Classifications (NIC) led to a sense of frustration in explicating their 'invisible work'. One such frustrating explication of professional practice highlighted by Bowker and Star (1999) involved codifying "humor", which resulted in a detailed description of what "humor" consists of and how one could produce (and avoid) it in healthcare settings. The proponents and organizers of these types of work-classification schemas highlight its role in creating a scientific body of knowledge on professional practices. Furthermore, as working life becomes more digitalized, the process of informating practice is seen as imperative to avoid becoming marginalized in a computer-mediated future. This process, then, is seen as a natural development to keep in tune with broader technological, societal, and professional developments.

For both Zuboff and Bowker and Star, a central theme is worker control and agency within a particular professional setting, which is challenged when classificatory managers enter. Different discourses clash when experience needs to transmute into variable, and these new sociotechnical ensembles (Johnson & Verdicchio, 2017) mean professional agency is being redistributed among various actors, illustrated in the narrative by Mr. Anderson's classifications of "hesitation" in Mrs. Hill's classroom. Aside from the redistribution of authority and agency, classification and data-work often entail a sense of meaninglessness among those whose

knowledge is being transmuted. Analogously, Hoeyer and Wadmann (2020), in studying data work in health care settings, note how the "imposition of certain forms of data work potentially undermines professional motivation and the pursuit of meaning". In relation to AI, this calls for a renewed discussion on how the meaningfulness of work is affected when these systems are deployed in classrooms. As Furendal and Jebari (2023) argue, there are different paths to the future of work with AI. While these systems present an opportunity for workers to be augmented and pursue excellence in their work, current examples (such as Amazon fulfilment centers) highlight how AI can also be stunting, transforming workers into appendices of the artificially intelligent machine.

In addition to asking whether AI will replace, enhance, or augment teachers and teacher work, it is important to look at how AI in education increases datafication and how it is fundamentally entwined with algorithmic systems of rational management. In an analysis of documents and guidelines on AI in education, Nemorin et. al. (2023, p.11) conclude that "at the core of many current AI-driven educational initiatives lies a computational understanding of education and learning that reduces student and teacher lifeworlds to sets of data logics that can be managed and understood". This has implications both on how education is understood on a policy level, and how teachers and students come to understand themselves and their practice. The data work carried out by teachers involves, for example, the categorization and quantification of knowledge, attention, and emotion of students on learning platforms, learning analytic dashboards, or through video observation, later to be subjected to statistical analysis. Ben Williamson (2017, p.9) describes this process of datafication as "the transformation of many aspects of education into quantifiable information that can be inserted into databases for purposes of enacting different techniques of measurement and calculations". At first glance, this might not seem like anything more than just collecting information and data. However, this datafication affects many levels of education, and can subsequently alter how we think about learning, teaching and assessment. If real-time assessment can be made using software, why do we need teachers to assess students' knowledge through tests?

Relatedly, Sperling and colleagues (2022) have shown how the introduction of AI entails "invisible" data work for teachers and note how teachers compensate for errors in the software by either making excuses for the algorithms or supporting them through adding other solutions. They state that "human actors enable the actions of the AI Engine in ways that can be described as compensatory in relation to the unfulfilled hope of what AI can do in education, we call this a perceived promise of technology" (Sperling et al., 2022, p.592). As such, the promises of automation come at a price: teachers will act according to the promise of less labor, paradoxically adding more labor. This transmutation, investing the work, authority and situated knowledge of teachers into AI systems, alters the ways in which agency is distributed in educational settings (Bearman & Ajjawi, 2023). The promises and anticipations around what AI could offer education are well-established and need questioning. In the narrative that follows, the introduction of a new AI agent is portrayed through a Silicon Valley-esque launch that lends itself to questions on what problems we are trying to "fix" in education.

Scene II: Welcome to the machine

Welcome, my son, welcome to the machine
Where have you been?
It's alright, we know where you've been
(Pink Floyd – Welcome to the Machine, 1975)

> The introduction could not be described as anything other than a success. Well, it depended on whose shoes you were in, to be fair. In Mr. Anderson's polished shoes and the developers' (presumed) sneakers, it had been a success. Mr. Anderson stood in front of the faculty in the assembly hall, looking out. The smell of coffee lingered in the room as a sign of the early morning. His closest colleague, the educational researcher Ms. June, was done with her data collection in connection with Anderson's development and had not taken part in the design he was now to introduce.

> "Good morning, everyone", he began, his voice steady. "As you know, over the past six months I have visited your lessons, interviewed you and measured blood pressure,

dopamine and student focus, with the help of Ms. June. The goal – to create a perfectly adapted AI agent for your specific needs – has been met". He gestured with his arm towards the projection behind him. The screen turned white, and a set of charts and graphs appeared.

The teachers listened intensely as Mr. Anderson explained the metrics and how the data had been used to develop the new AI agent. "This completely personalized AI agent, Alma, will assist you in managing classroom engagement, optimizing learning and predicting potential challenges even before they occur", he paused as he presented the next slide. It showed a matrix with minutes and tasks from lessons Mr. Anderson had attended. "This is your teaching before the implementation of the new AI software. We will minimize unnecessary unproductivity by following the AI-crafted lesson plans. It will suggest real-time changes to remove instances of hesitance or give feedback to students' questions quicker – let me demonstrate". He pressed a button on his laptop, and the screen showed a blue circle on a white background.

"Alma – what page is Mr. Graham teaching during his Monday lesson?". The blue circle reacted instantaneously. "Mr. Graham is teaching page 75 – division. If you'd like to know more about division, I am happy to help". The voice was cool and crisp. The teachers looked at each other with disbelief, eyebrows raised. Mr. Anderson had seen that look several times over the past two years, as he had implemented personalized school agents in more than 20 municipalities. His favorite part about that look was how it slowly melted away once his demonstration was over.

"This matrix", he said, showing the previous slide with minutes and tasks again, "is in the past". Over the course of an academic year, this school has wasted a total of five hundred twenty-seven point five minutes in mere hesitation. Alma will erase that hesitance and ensure that you and your students have an assistant at the ready around the clock". A teacher in the back raised her hand. Mr. Anderson nodded in her direction and waited for her to speak.

"I'm sorry, so this AI is like Siri, or Alexa?" Mr. Anderson smiled.

"I'm glad you asked. No". He turned again to the screen behind him, showing Alma the blue circle. "Alma, predict the grades of all of year 8 and suggest lesson plans for every individual student". The circle disappeared; a gallery of faces that belonged to their students appeared in its stead. Metrics, graphs and predictions were visible to the right of each student's face. Mr. Anderson clicked on one of the students, a boy in class 8B. "As you'll see here, this boy is struggling with science. If I use Alma's prediction, she will plan the rest of the academic year, complete with exercises, a reading schedule and resources for improving his grade drastically. She will also ensure that the parents are informed of changes in his study activity and behavior, as well as moods during lessons, to ensure optimal teacher-parent collaboration. Alma is nothing like your phone – she will follow up on the progression in real time using the newly installed cameras in your classroom".

A murmuring traveled through the audience. He continued, "Not only will Alma help you with lesson plans, but she will also help with individualizing lessons for each student. A set of pre-set tasks will carry each student through your lessons, with clear and precise learning goals". A teacher at the back of the room raised their hand. Anderson nodded towards him, beckoning him to speak.

"So, let me get this straight – I will not plan the lessons? And I won't grade them? How do I know what each student does during my lessons?".
Anderson smiled and projected the next image – as he had already predicted the question to come.

"Alma will use a system of live feedback to you as teachers. This dashboard will indicate how students move through the software. If students succeed with their assignments, Alma will award them stars in the system. If they fail, they will not receive stars". He then moved to the next image – an image of the school kiosk, where students can purchase

snacks and sweets. "The stars will translate to a sort of new economy in the school, and students will be able to use their stars to purchase what they wish – we call this gamification of learning, a holistic view of the students' school day".

Understanding AI systems in education

In the narratives, a central aspect is how AI is not only a technology, but rather embedded in the sociality of the school system. As such, the AI agent Alma is not only a technological "device" but socially constructed in the ecosystem of the school. This view on technology follows other feminist critiques, which have historically tried to untangle technologies from positivist and objectivist viewpoints and instead emphasized the social dimensions of how technological systems come into being. Similarly, Johnson and Verdicchio (2017) draw on science and technology studies (STS) to suggest that AI should be thought of as sociotechnical ensembles. This means not treating AI as a "thing", or an "it" that "does stuff" and "thinks" separate from its social environment. Rather, it is to be understood within its context, with disparate actors (and mountains of capital1) working to bring the magic of Artificial Intelligence in Education (AIED) about (Sperling, et.al., 2022; Stenliden & Sperling, 2024). This 'Wizard-of-Oz-AI' means combining several statistical innovations and opaque data with human labor in ways that make the seeming magic of AI possible. The systems are made to appear autonomous, but are ultimately programmed by human designers, who massage data in ways that make it coherent within their social context. Bender and colleagues (2021) argue that the seeming coherence of large language models (LLM:s), such as Alma in the previous scene, is only made possible through an illusion of meaning on the user's end. They point out that these systems are stochastic parrots (Bender et al., 2021, p.616), creating coherence not by means of truth, but rather relying on humans to provide meaning and connect the dots between statistical probabilities. Arguing along the same lines, Hicks and others (2024) note how LLM:s – lacking any connection to truth – should rather be understood as bullshit machines. The apparent reason and intelligence of these systems are only made comprehensible and desirable through commercialization in the current hype-cycle and glimmer of

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[1] Some \$335 billion in the US alone (HAI AI-Index-Report-2024 Chapter4.pdf (stanford.edu))

technological innovation – essentially social practices. Grounding these systems in real-world social practice enables ways of engaging with the ethical dilemmas currently discussed within the AIED community by looking at ethical issues not as bugs, but as features of an ensemble with power structures at work with human designers at the keyboards (Johnson & Verdicchio, 2017).

In the context of education, the proliferation of AI also implies importing certain theories about learning and thinking that might be at odds with how the educational sciences usually view teaching and learning today. Drawing on Gert Biesta's concept of learnification, Knox and colleagues (2020) argue that datafication has ushered in a new form of behaviorism in education. As more and more data are being collected on learning platforms, there has been growing interest in making use of this data to enhance education in various ways (cf. Watters, 2021). Through influence from behavioral economics and machine learning methods, the notion of learning is being transformed into behavioral modification and "nudging" of students and teachers (Selwyn, 2022). This development marks a shift from an understanding of students as rational consumers toward an understanding of students as irrational and in need of increased surveillance and hidden disciplining (Knox et. al., 2020). Moreover, Khalil et.al. (2022) show how disparate 'self-theories' guide the development of learning analytics, and how "raw data" make theory seem obsolete. However, as more data are fed into learning analytics and AI systems, students and the sociality of learning are increasingly mediated through data funnels designed by engineers and computer scientists. This mediation influences how teachers understand their students and practice, thus limiting or guiding (our understanding of) learning in certain ways (c.f. Verbeek, 2011). Within the sociotechnical ensembles of AI in education, thinking about thinking and learning are not settled matters. Intelligence might, of course, be the same as statistical correlations, and reinforcement through reward functions might be the same as learning, but interdisciplinary dialogue is needed to bring these possible differences to light and critically engage with AI systems in education. It is important to remain cognizant of the ways in which dominant theories in learning analytics and AI influence how the teaching profession understands itself and its practice, and how children and students understand themselves. Thus, there is power

dynamics involved on multiple levels when different disciplines and theories enter the classroom.

Futuring

Looking beyond education, other parts of the welfare sector are today working to implement AI, and there are several instances that highlight the ethical and judicial risks with these systems (Fjaestad & Vinge, 2024). Framed within a discourse of economic and demographic crisis, effectivization and rationalization through digital technologies, such as the case with Alma, is often seen as a solution. In the context of an educational system viewed as "problematic", AI serves as a technological solution to both economic and pedagogical issues (Rahm & Rahm-Skågeby, 2023). However, enabling a different understanding of the disparate practices involved in creating AI systems may empower teachers to critically assess and engage in discussions on artificial intelligence. Beyond the narratives offered by AI and EdTech companies, as well as global policy organizations, previous research has shown how the active involvement and labor of workers are required for the development of new technologies. We are situated in a time where "selling tech to teachers" is a common endeavor for EdTech companies. Player-Koro and colleagues (2018, p.683) state that "technology use in public schools is shaped by a combination of local interests and international corporations working with each other to construct nationally appropriate agendas". This process of marketization calls for involving teachers in the chain of decision-making even more than before. Professions with a stake in education must ask if pedagogies should be adapted to technology, or if technology should be developed based on teachers' actual needs for pedagogical development. Involving teachers in designing or defining the "problems" should be a priority.

Although the education fiction in this essay may seem like a drastic, over-the-top Silicon Valley science-fiction dystopia, we are facing real issues with applying AI systems into the school system that are not necessarily based on teacher or student needs. Teachers need to discuss and safeguard desirable values and practices in the profession by being part of the discussion on AIED, its theoretical assumptions about learning, the economic and political imperatives of its implementation, and the impacts on professional practice.

Through this essay, we hope to have highlighted some of the intricacies of developing technology by trying to convert experience to variable and by omitting teachers in the definitions of what technology should and should not do in the educational infrastructure. We hope that other scholars engage in speculation through current literature to add to this spectrum of discussion.

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