13. Schooled by Dashboards?

Learning Platforms' Performance-Centered Pedagogy and Its Impact on Teaching

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Abstract

Personalized learning is rapidly becoming a reality in classrooms worldwide through platformization. At the classroom level, digital platforms shape learning toward personal needs through pedagogies encoded into their design—their algorithms, but also into dashboard interfaces teachers increasingly employ as part of their educational toolkit. This study investigates how dashboards can impact teaching in primary school classrooms by examining how their data visualizations configure particular views on learning, which educators increasingly depend on to make pedagogical decisions. It will address two research questions: What are the pedagogical underpinnings of learning dashboards integrated in personalized learning technologies? How may pedagogies encoded into these dashboards affect teaching? To answer these questions, the chapter will start by setting out a theoretical perspective on platform pedagogy. Subsequently, it will describe teaching and learning relationships encoded in the teaching dashboard of the Dutch adaptive learning platform Snappet and argue that its pedagogy of performativity may disempower teachers' control over learning. The concluding section will discuss actions needed to strengthen schools' and teachers' control over the pedagogical dimensions of learning platforms.

Keywords: platform pedagogies, performance-centered pedagogy, educational technology, Snappet

Personalized learning—"customizing instruction based on analytics" (Friesen 2018)—manifests through platformization in public primary

education worldwide (Kerssens and van Dijck 2021). At a global scale, schools have started to implement personalized learning through AI-based adaptive learning platforms—such as *Knewton* in the United States, *Smart Sparrow* in Australia, and *Snappet* in the Netherlands—on which young students engage in learning activities while they work on a laptop or a tablet in a classroom. These intelligent learning platforms use algorithmic analytics to tailor education to a student's learning needs. Teachers interact through these platforms' interfaces, or learning dashboards—"single display[s] that aggregates different indicators about learner(s), learning process(es) and/or learning context(s) into [...] visualizations" (Schwendimann et al. 2016)—which have become pivotal technologies initiating and informing teachers' pedagogical actions for personalized learning (Molenaar and Knoop-Van Campen 2019). And these technologies' persuasive narratives may impact how teachers think about and teach students (Jarke and Macgilchrist 2021).

This study investigates how dashboards can impact teaching in primary school classrooms by examining how their "extracted analytics"—"data that are [visually] presented for interpretation" (Admiraal et al. 2020)—configure particular views on learning, which educators increasingly depend on to make pedagogical decisions. Dashboards, I contend, are not pedagogically neutral but incorporate values about learning and teaching, or "platform pedagogies" (Sefton-Green and Pangrazio 2021). At stake is not a concern about platform pedagogies replacing teachers but rather about teachers' pedagogical actions being exercised through platform algorithms and interfaces. A growing dependence of teachers on dashboard information as the basis for pedagogical decision-making may reshape teaching practice through platform logics and values of "good education," which do not necessarily accord with the educational and pedagogic interests of public schools and teachers and which are often excluded from public debate and examination within the educational field (Zeide 2019).

This chapter addresses the following research questions. RQ1: What are the pedagogical underpinnings of learning dashboards integrated in adaptive learning technologies? RQ2: How may pedagogies encoded into these dashboards affect teaching? To answer these questions, the chapter will start by sketching a theoretical perspective on platform pedagogy. The following section will implement this perspective by analyzing the case-study of the dashboard of the Dutch adaptive learning platform Snappet. Snappet's dashboard pedagogy, I argue, is performance-centered and may impact teaching by nudging teachers' pedagogical actions toward performance judgements and performance optimization, hence demanding that teachers perform the role of manager. In the concluding section, I will

briefly discuss what actions are needed to protect the pedagogical values of schools and teachers and to strengthen public control over learning platforms' pedagogical dimensions.

Platform Pedagogies

Do educational platforms have pedagogies? The answer to such a question is nothing but self-evident, as it is still highly common for educational professionals and scholars to approach technologies as neutral tools for improving teaching and learning. In the educational sciences, attributing pedagogical power to technology is deeply inconsistent with accepted views of pedagogy. One of these established views has been articulated by educational scholars Chris Watkins and Peter Mortimore, who define pedagogy as "any conscious activity by one person designed to enhance learning in another" (1999, 3). This definition illustrates at least two key points: 1) pedagogy is about power and exercising control over learning; and 2) pedagogy is human-biased; it is about people-effecting control.

In the educational sciences, such a human-biased view of pedagogy is wedded to a widespread instrumental perception of educational technology (Kerssens and de Haan 2022). For example, in their study of the dashboard use by teachers in Dutch primary school classrooms, educational scholars Inge Molenaar and Carolien Knoop-van Campen draw upon distributed cognition theory to investigate whether dashboard analytics provide efficient means to pedagogical ends: "a 'new' instrument that supports the selection of effective pedagogical actions by teachers" (2019, 1). Through classroom observations and interviews with teachers, Molenaar and Knoop-van Campen demonstrate that "teachers make dashboard information actionable" through the interpretation of displayed information to arrive at effective pedagogical practices for the personalization of learning (1). To interpret dashboard information, Molenaar and Knoop-van Campen describe, teachers activate diverse forms of existing knowledge about students and the class. This at least shows that teachers do not allow themselves to be blindly guided by dashboard information, which challenges any understanding of platforms' pedagogical logic as deterministic. Moreover, they conclude that their study provides first indications of how "dashboards progressively impact teaching practice and more profound behavioral changes seem to follow as teachers become more proficient in using dashboards" (7). Although these are important conclusions, to understand such impact, it is equally important to truly account for technologies' role in this process. Through

an instrumental perspective on educational technologies as potentially effective means to teachers' pedagogical ends, we are unable to account for the pedagogical logics incorporated in educational platforms and for how teachers' pedagogical actions and forms of activated knowledge about students may already be channeled and shaped by platforms' particular pedagogical dimensions.

This chapter draws on a concept of "platform pedagogy" to make sense of the framing and configuration of teaching and learning by dashboards within educational platforms (Sefton-Green and Pangrazio 2021). Although platform pedagogy as a conceptual tool centers analytical focus on platforms' potential shaping of human conduct, it does not in any way perceive pedagogical logics of platforms as deterministic. In contrast, it directs analytical attention to what science and technology studies scholar Philip Agre labeled "grammars of action" (1995)—that is, frameworks through which a platform architecture "seeks to shape participation" (Perrotta et al. 2021). As programmed structures, digital education platforms do not determine but rather provide a framework for human action, which may train particular forms of behavior and participation (Sefton-Green and Pangrazio 2021). A notion of platform pedagogy, then, challenges humanist bias in established concepts of pedagogy as a theory of power over learning—not just humans but also platform algorithms and interfaces can mediate, structure, and shape teaching and learning relationships.

Algorithmic analytics arranging adaptivity in learning technology has already been criticized in terms of how its pedagogy of automatically adapting education to student needs contests both student and teacher autonomy. Critical scholar of educational technology Norm Friesen has argued that algorithms coded into personalized learning platforms underpin a behaviorist model of learning, which may usher in a revival of "new behaviorism" in primary school classrooms (Friesen 2018). Friesen perceives such behaviorist reform of education as a threat to student autonomy, since platform algorithms nudge students toward behaviors predefined by learning analytics, which he considers antithetical "to the most basic priorities and purposes of education: to cultivate in students a sense of ownership in their own learning" (2018, 1). Law scholar Elena Zeide, on the other hand, points out that algorithmic analytics challenge the pedagogical authority of teachers, who have little insight in pedagogical decision-making encoded into algorithmic processing (2019).

Yet teachers' pedagogical actions are most significantly mediated through the pedagogical dimensions of learning platforms' interfaces—that is, the "extracted analytics" by which dashboards present data visually for

interpretation (Admiraal et al. 2020). Dashboard analytics have not yet been critiqued in terms of their inscribed pedagogies as the behaviorist logic of algorithmic adaptivity has. Such critique is equally important, as dashboard interfaces are "permeated with normative and evaluative ideas about good (e.g., 'green') or bad (e.g., 'red') education" (Decuypere et al. 2021). How interface pedagogies mediate learning and teaching, however, is not transparent to teachers, since assumedly objective dashboards present a "realist epistemology" to their users (Kitchin, Lauriault, and McArdle 2015). Dashboards make it appear to teachers that they truthfully represent the sometimes messy reality of learning through modes of data display that make learning visible, knowable, and manageable in real-time. Yet dashboard analytics offer teachers only a limited and restricted view of the complex reality of learning, as data available for visual presentation are already selective. Moreover, analytics render visible for interpretation only "particular representations of that data" (Williamson 2016), often through "increased emphasis on metrics, indicators and measures" (Bartlett and Tkacz 2017, 8).

Sketching the implications of dashboards' particular metric views for public governance, critical media scholar Nathaniel Tkacz and tech journalist Jamie Bartlett argue that dashboards "encourage more intensified forms of monitoring and analysis," "change the empirical basis from which decisions are made," and are fundamental for giving shape to an "ambience of performance" across government in which user views "become more attuned to how whatever is measured is performing" (Bartlett and Tkacz 2017, 8). In public education, learning dashboards seem to introduce a new performance-centered technology at the level of classroom interactions, which may significantly affect the pedagogical decision-making of their key users: teachers. Almost twenty years ago, sociologist Stephen Ball argued that education had become increasingly subject to *performativity*—"a technology, a culture and a mode of regulation that employs judgements, comparisons and displays as means of incentive, control, attrition and change" (Ball 2003).[1] Importantly, Ball argued that performativity had come to play a pivotal role in the construction of new teacher subjects, "changing what it means to be a teacher" (217). The pervasion of dashboard technology in educational learning spaces and its integration with teaching raise important

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1   Notably, the "performance" in Ball's performativity (2003) refers to the perceivable acts and output of labor as a site of control and optimization and differs from other well-known conceptualizations of "performativity" within the humanities as an ontological term that indicates the unfolding nature of a given phenomenon (Derrida 1988; Butler 1990; Barad 2003).

questions about what role this intelligent technology, like other AI-based educational technologies, play in the production of a performative classroom culture and in reshaping the role of the teacher.

In the following section, I will demonstrate how a pedagogy of performativity manifests in the teaching dashboard of the Dutch adaptive learning platform Snappet by describing its encoded grammar of teaching and learning relationships (RQ1). For this analysis, I collected and examined screenshots of the user interface of Snappet's dashboard, which contain visualizations of learner data on which teachers base their pedagogical decision-making for personalized learning. To better understand dashboard functionalities and their role in classroom teaching, I consulted the user manual of the Snappet dashboard (Version 3.0) and held a brief (informal) interview with a primary school teacher using Snappet on a daily basis. The section concludes with a reflection on how dashboards' pedagogy of performance may affect teaching and reshape teachers' professional role (RQ2).

Snappet's Performance-Centered Pedagogy

Snappet is used by 2,800 elementary schools in the Netherlands, accounting for 45% of all primary schools (Molenaar 2021). Its pedagogy, as I will demonstrate, is structured around *performativity*—making learning visible and actionable through various modes of displaying learner performance. Through its exceptional focus on performance display, I argue, Snappet's dashboard pushes into teaching a pedagogical logic based on persistent evaluation and optimization of student performance. But before I demonstrate how such pedagogy manifests at the level of user interface, I will briefly trace its cultural roots to a pedagogical rationale of performance-based teaching and learning, which dominantly influenced the organization of classroom pedagogy in Dutch primary schools from 2007 onward, before the popularization of platform dashboards.

Performativity as a Culture and a Mode of Interface Display

For more than a decade, performativity as a culture—as a rationale of teaching and learning focused on improving learning performance—has been actively promoted and implemented by the Dutch government in their program of "performance-based working" (Kerssens and de Haan 2022). Performance-based working refers to schools that "work systematically and purposefully to maximize the performance of its students" (IoE 2010,

4). Its pedagogical rationale is rooted in the managerial philosophy of New Public Management (NPM), which from the early 1990s onward affected educational reforms internationally (Gunter et al. 2016). From NPM, the Dutch performance-based approach inherited its view of datafication—the systematic registration, tracking, and analysis of data about learners and learning—as a key *instrument* for gaining insight into, controlling, and maximizing learning processes and learning performance (Kerssens and de Haan 2022). Performance-based learning wedded datafication to the objective of personalization, tailoring education to students' individual level of competence. Providing advanced technological possibilities for datafication and personalization, new digital platform technologies such as adaptive learning technologies, learning analytics, and dashboards landed comfortably in performance-based pedagogy, which was in search of tools for optimizing learning performance.

Performativity as a culture is formalized within Snappet's dashboard interface, which configures a performance-centered mode of display. Snappet's dashboard makes learning visible through color-coded information in various modes of visualizing learner performance, such as real-time progress, classification through a skill meter, performance growth graphs, and performance relative to target levels and peers. Teacher actions are mediated through performance displays in three dashboard tabs: "lessons," "tracking," and "reports." Under the "lessons" tab, teachers can prepare and start lessons, which students can view and practice on their device (tablet or laptop). The tab also offers teachers at-a-glance insight into the learning objectives for different domains (e.g., math) and subdomains (e.g., multiplication tables) and the performance of the student or class per learning objective compared to the target level (blue check mark means class is at target level; blue check mark with number in yellow means class at target level except for a few students, etc.). The target level indicates a future skill level that is expected to be attainable for the child concerned. It is automatically predicted using individual learning results per student and per subject through Snappet's implementation of the ELO algorithm and is established after approximately six hundred completed tasks per subject. As a result, children always work toward their own target level— meaning that the degree of difficulty of exercises differs per child—and any evaluation of student performance in the lessons tab always proceeds relative to students' past performance.

The "follow" tab displays student progress and performance to teachers on different learning goals per lesson, per group, and of individual students in real-time while students are doing exercises in Snappet.

The dashboard indicates how many problems students have solved and whether the problems were answered correctly. Circles indicate problems answered. Green indicates a correct answer, red an incorrect response, and combined green with red circles indicate a correct response on the second attempt. Teachers can also view how students perform on learning goals they have worked on, or are working on, compared to their previous performances. If students have completed at least twenty-five to thirty-five problems for a specific learning objective, a score is calculated and displayed in a bar with zero to four stars (zero stars, lowest-scoring learning goal or just started; four stars, highest-scoring learning goals). These stars are assigned based on the average performance of the student (Faber and Visscher 2016). A progress indicator (human icon in front of students' names) shows teachers which students are making progress (green icon), are not making progress (red icon), or are currently unknown (grey icon). These indicators enable teachers to see in real-time whether student performance is growing or declining compared to their earlier performances. If progress is lagging behind, teachers can invite students for an extended lesson.

The "reports" tab displays to teachers all information about the skill and growth of the individual student per selected subject and learning objective. A skill meter designed as a colored bar displays in a percentile score students' mastery of skill for a particular domain compared to the national average; this is calculated based on the performance of all other students in the Netherlands in the same year group who work with Snappet. A percentile score of 68% means that the student scores better than 68% of all students. Based on this score, the student is classified in a category ranging from "far below average" to "far above average." A growth chart visualizes the student's skill growth in a particular subject area over time (e.g., from grade 3 to grade 6). The chart as well visualizes the performance of students on different learning goals compared to other students in the Netherlands, enabling teachers to rapidly compare student scores with the average scores of other Dutch students from the same year group. Snappet, like almost all learning dashboards, has a strong emphasis on comparison and competition with peers, using comparison as "a representative frame of reference for evaluating their performance" (Jivet et al. 2018, 32). The graph also offers teachers a quick view of performance growth based on past learning data compared to expected growth for a coming period, displayed as a dotted line. If a student grows faster or less quickly than expected, teachers can manually adjust the target level.

Dashboard Performativity Reshaping Teaching

Performativity inscribed into Snappet's dashboard is ultimately about focus—it is about the dashboard encoding a pedagogical grammar in which performance serves as a central organizational principle, framing learning through variables that can be optimized to maximize student performance, while "the variables that have nothing to do with key performance [...is] what the dashboard screens out" (Mattern 2015, n.p.). By spotlighting performance as the true locus of teacher control and manipulation, Snappet's dashboard may encourage teachers to view student learning as something that is always susceptible to further enhancement and improvement in terms of efficiency and effectiveness. Continuously signaling teachers with information—on real-time progress, performance relative to target levels and peers, competence level—the dashboard provides them with actionable levers they can pull to tweak learning, pushing students to shift from red to green, from "below average" to "average."

Importantly, Snappet's pedagogy does not involve replacing teachers. On the contrary, Snappet's dashboard exercises power over learning *through* teachers. Teaching-by-dashboard, after all, means that educators base pedagogical actions for personalized learning on dashboard analytics and visualizations that are reshaping teaching into a practice increasingly "initiated and determined by systems of data analysis" (Knox, Williamson, and Bayne 2020, 34). Growing the dependence of teachers on dashboards, in effect, can mean that teachers are pushed toward behaviors that match with particular pedagogies formalized in these algorithms and interfaces, to the detriment of others. By encouraging certain pedagogical actions towards the optimization of learning—"driving out poor performance, inefficiencies and redundancies" (Ball 2008, 27)—Snappet's dashboard may strengthen and intensify an already established culture of performance-based work in Dutch classrooms.

Teacher dependency on dashboards, for that matter, may as well signal a more significant shift in the educator's role with dashboards and their performance-centered pedagogies "interpellating" teachers as managers (Jarke and Macgilchrist 2021). This shift may risk challenging teachers' pedagogical autonomy. As Ball described, teachers subject to a culture of performativity experienced "a potential 'splitting' between [their] own judgements about 'good practice' and students 'needs' and the rigours of performance" (2003, 221). Dashboards, then, may actually disempower teachers' control over learning, since their own pedagogical judgements and intuition are subjected to, and channeled by, dashboards' performance-centered pedagogies.

Conclusions: How to Strengthen Public Control over Platform Pedagogies

Personalized learning is rapidly becoming a reality in classrooms worldwide through platformization. Platforms shape learning at classroom level through pedagogies encoded in their design—in their algorithms, but also in dashboard interfaces teachers increasingly employ as part of their educational toolkit. Dashboards, as I showed, are not pedagogically neutral. The interface arrangement of Snappet's dashboard is based on a pedagogy of performance, which employs personalization as a means to a larger end of maximizing learning outcomes. Its pedagogy perfectly accords with a cultural rationale of performativity already deeply rooted in Dutch education. Yet Snappet facilitates this rationale's intensification at the level of classroom interactions, where it may push teachers to squeeze their pedagogical actions into the dashboard's straitjacket of performativity. Importantly, any platform's pedagogical logic is not to be seen as deterministic. Teachers interpret dashboard information to arrive at meaningful and effective pedagogical actions for adapting education to student needs. To better understand how performance-centered platform pedagogies affect teacher interpretations and pedagogical decision-making, more empirical research using forms of ethnographic observation and/or interviews with educational professionals is needed.

Nonetheless, teaching is unquestionably influenced by platforms' pedagogical dimensions. At stake is not so much the fact that platforms and their dashboards have pedagogies (all digital platforms have pedagogical dimensions), but that platforms, rather than schools and teachers, seem to be dictating pedagogy increasingly; platform algorithms and interfaces prescribe what "good education" is and what agency teachers should have to exert control over learning. Importantly, these platform pedagogies do not necessarily represent the educational and pedagogical values of public schools and teachers, and they are often not transparent to educational professionals. Platforms' and dashboards' underpinning pedagogical values are not central to public debate on platformization within the Dutch education sector and therefore do not constitute *public* values. Yet with the intensification of educational platformization in the past years, it has become even more urgent to critically inspect their pedagogical impact—and not only their privacy impact—and publicly weigh platforms' internal pedagogical logic and the values it represents (e.g., performance) against values that teachers and schools represent (e.g., teacher autonomy).

The pedagogical accountability of digital education platforms and pedagogical autonomy of teachers may be fostered through "pedagogical impact

assessments" (PIAs). PIAs can be carried out at schools through dialogical frameworks like the Data Ethics Decision Aid (DEDA) developed for reviewing the social impact of government data projects (Franzke, Muis, and Schäfer 2021). For education, PIAs can engage educational professionals in a dialogue about the pedagogical impact of platforms in use and considered for use, reflecting on their embedded theories and values of learning and teaching and the required teaching literacy. Such dialogue necessitates educational professionals who challenge established instrumental views of educational technology and bring issues about values into the discussion on the use and adoption of digital platform technologies. These impact assessments should then also work toward developing platform-compliant literacy conceptualizations. Many teachers view educational technologies as tools serving their pedagogical aims and view literacy as the ability to use these tools effectively. Yet digital education platforms are not pedagogically neutral instruments, and educators need to make sense of how they impact teaching and learning.

But as the pedagogic dimensions of platforms are encoded into user interfaces and algorithms, they are not transparent for teachers and thus not directly accessible for critical review. To strengthen the accountability of pedagogical decision-making processes encoded into platforms, PIAs should be based on scholarly investigation of platform pedagogies following Sefton-Green's and Pangrazio's research agenda (2021). To conclude, PIAs can make an important contribution to governing edtech as a public good and to helping teachers account for platform pedagogies. This makes it all the more important that their development and application proceed through democratic debate and inspection within the educational field and through cooperation between all stakeholders, including schools, educational professionals, educational scholars, and educational technology providers.

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