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Googlization(s) of education: intermediary work brokering platform dependence in three national school systems

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ABSTRACT

The ‘googlization’ of education is emblematic of the growing power of private tech companies in schools across the globe, challenging education as a public good. While critical scholarship has started unpacking the ideological, pedagogical and economical logics underpinning Google’s digital infrastructure in schools, we have little insight into how googlization unfolds in education systems across the world. This article addresses this by examining the googlization of education across three countries – The US, Australia, and The Netherlands – focusing on the work by new and established intermediary actors which mediate platform power between private tech companies and public education systems. Our findings highlight five different types of intermediary work that broker dependence on Google in schools. The paper concludes by outlining how education researchers and institutions might reclaim public education by intervening in the googlization of education.

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Introduction

Over the last decade, the five largest internet corporations – Google, Apple, Facebook, Amazon, and Microsoft – have moved to extend their influence in public education systems around the world. Rather than following the conventional edtech business model of selling stand-alone tools to schools, these companies offer access to proprietary, vertically integrated and closed ‘technology stacks’ (Veale 2022, 67) – ‘ecosystems’ which interconnect physical devices (Google Chromebooks, Apple iPads, Microsoft Surfaces) and educational software suites (Google Workspace for Education, Apple for Education, Office 365 for Education) with cloud services for data storage and analytics, identity and device management, and artificial intelligence and machine learning. The seamless connection of these components effectively locks education systems into using a company’s products: as the activities of teachers, classrooms, schools, and districts are integrated with a given ecosystem, disentangling them becomes more and more difficult (Kerssens and Van Dijck 2022). This arrangement gives large platform technology companies significant influence over how public education unfolds across national contexts – a subject of increased scholarly attention in the growing critical literature on ‘platform studies in education’ (Decuypere, Grimaldi, and Landri 2021).

Among these platform companies, Google has the largest reach in worldwide public education. This is due, in part, to the company’s role in pioneering the ecosystem approach to capturing online consumers. This method proved successful enough that googlization has now become the blueprint

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most technology firms follow when attempting to break into a new market – be it urban transportation, healthcare, or education (Van Dijck, Poell, and De Waal 2018). Even as Google’s competitors are adopting its methods, however, the company continues to enjoy a comfortable advantage in sectors where it found an early foothold, like education. Today, millions of schools in more than 250 countries use Google Workspace for Education (GwE) for cloud-based teaching and learning (Gulson et al. 2021). This dominance was further strengthened during the global pandemic, when Google products became integral to sustaining online education amid waves of school closures (Cone et al. 2021). In the first months of the pandemic, Google Classroom, the central app of GwE, doubled in active users to more than 100 million (De Vynck and Bergen 2020), and grew to 150 million users by early 2021 (Lazare 2021).

The influence of googlization – as used by Google and imitated by other platform companies – has significant implications for the future of public education. It allows private companies unprecedented control over administration, teaching, and learning (Singer 2017), and it transforms the data generated from such activities into property that developers can leverage to further entrench their products in the life of schools (Van Dijck 2020). From this view, understanding the process by which googlization occurs – how it is initiated, extended, reinforced, and sustained – becomes a pressing concern for critical research in education. Moreover, given the global aspirations of companies like Google, there is a need to articulate the variations in this process as it is grafted onto different national settings.

This article addresses this need through a critical examination of googlization – as practiced by Google itself – across three national education systems: the United States, Australia, and the Netherlands. Our analysis suggests that googlization is not a singular process, but one conditioned by the unique configuration of intermediary actors that broker relations between private tech and public schools in each national system. We offer a provisional taxonomy for distinguishing the types of work these intermediaries do to smooth the path for Google in each country. Attending to these local contingencies, we suggest, provides a more precise accounting of how googlization unfolds, and a better starting point to direct and regulate this process from the local educational context.

Googlization in education

The term ‘googlization’ was first introduced in the early 2000s to describe ‘the growing “creep” of the media company’s search technologies and aesthetics into more and more Web applications and contexts’ (Rogers 2009, 1). Over time, the concept has continued to anchor scholarly explorations of the tactics Google uses to achieve this ‘creep’ – how it extends and mingles its influence with new forms of online activity, becoming a governing logic for e-commerce and social exchange. In his influential book, *The Googlization of Everything* (2011), Siva Vaidhyanathan further popularized the concept, using it to explain how Google’s gradual pivot, from search engine to knowledge-brokering company, consolidated its control over where, when, and how information circulates online. Vaidhyanathan’s analysis of the worrying political implications of this arrangement were paralleled in contemporaneous literatures critiquing the rise of ‘Googlearchy’ (Castells 2009) and ‘Googlecracy’ (Souto-Otero and Beneito-Montagut 2013) as emerging modes of online governance. Over the last decade, Google’s rule has continued expanding: its knowledge-brokering is no longer limited to the web, but is increasingly bound up with wider societal sectors, such as healthcare (Sharon 2016) and education (Singer 2017). This spread – from web search, to online exchanges, to the organization of national institutions – has become a template for other platform companies interested in fusing their private interests and infrastructures with wider public domains at national, and even global, scales (Poell, Nieborg, and Van Dijck 2019).

Google’s educational strategy is not an isolated case; competitors Microsoft and Apple apply its ecosystem methods in the edtech market, while Amazon orients its networked cloud infrastructures toward global education governance (Williamson et al. 2022). Nevertheless, Google’s leading role and proliferation in education, has inspired a body of critical scholarship that unpacks the ideologies,

pedagogies, and economies that underpin the googlization of administration, instruction, and learning. These studies have examined Google's corporate rhetoric (Carlsson 2021; Lindh and Nolin 2016), conducted comprehensive techno-ethical audits of its products (Gleason and Heath 2021; Krutka, Smits, and Wilhelm 2021), and analyzed its infrastructural role in classroom transactions (Perrotta et al. 2020). Scholars have also studied the influence of GWfE on teachers' professional ethics and data safeguarding (Lossec and Millar 2021) and reported on the troubling perception of Google, among educators, as a neutral – or even benevolent – mediator in public education (Lindh, Nolin, and Hedvall 2016). Taken together, such research points to growing interest in understanding the ongoing impacts of googlization in schools, and in mobilizing critical orientations to interrogate and resist the imagined futures for education that Google uses its products to assert (Williamson 2021a).

To date, however, there has been less examination of what precedes these impacts – that is, the process by which googlization is initiated and reinforced in different educational settings. While technology journalists have offered explanations for 'how Google took over the classroom' (Singer 2017), at times these accounts tack closely to the company's own marketing pitches (e.g., that its popularity results from its grassroots enthusiasm among teachers) and extrapolate generic claims about googlization from evidence culled exclusively in U.S. settings. One consequence is that we have a limited understanding of googlization as a contingent 'glocal' process. Outside of education, media scholars have demonstrated that platforms cultivate influence not through a singular or linear procedure, but the dynamic interplay of global tech solutions and local exigencies (Van Dijck, Poell, and De Waal 2018). Put another way, big tech corporations like Google are always dependent on constellations of strategic, local alliances to multiply their usage, reinforce their authority, and advance their political-economic interests in the industries and sectors they target. Investigation of these 'intermediary' actors, then, presents a promising pathway for specifying how googlization unfolds in the life of schools, and what is at stake for the future of public education.

Intermediaries of googlization

'Intermediaries' have proven to be a useful category of analysis across scholarly lineages in media, science, and cultural studies. Bourdieu (1984) conceptualized 'cultural intermediaries' as the actors whose labour enjoins and shapes processes of production and consumption in societies. Latour (2006), similarly, uses the term to trace associations between the people and things that constitute complex social phenomena. Though there are differences in how scholars define and operationalize intermediaries, its common focus on the points of contact between objects, practices, policies, and processes offer rich resources for parsing the entanglements of local and global activities – including, for our purposes here, the creep of global technology companies into the everyday operation of national public school systems.

Our use of intermediaries draws on existing research on platform governance that delineates the diverse, even fluid, roles that intermediary actors play in embedding platform technologies in spheres of social life (e.g., Shrock and Shaffer 2017). Van Dijck and colleagues (2018) distinguish between two categories of intermediary actors: *connectors*, which directly link users to larger platform service providers; and *complementors*, which provide products, services, policies, and support through, or peripheral to, platforms that reinforce their influence. Importantly, these categories are situational, not fixed: a platform like Google Classroom, for instance, is a connector between brick-and-mortar classrooms and Google's services; however, it is also a complementor when its usage strengthens users' ties to other products in the Google's ecosystem. From this view, understanding the googlization of education demands consideration not only of platforms as intermediaries for instruction and learning (e.g., delivering content, goods, and services to schools through multi-sided markets), but also of their dependence on other, complementary intermediaries that help to broker their adoption, use, and spread in different settings.

It is this latter category of intermediary work that has received less attention in the critical literature on platforms in education, and that we attend to here. In doing so, we add to a small,

but growing, research base that is grappling with the role of third-party complementary intermediaries in smoothing relations between private platforms and public education (Decuyper and Landri 2021; Gulson and Witzemberger 2020; Williamson 2021b). Williamson (2021c), for example, has explored the growing role of ‘evidence intermediaries’ in educational governance – experts and organizations that mobilize data and technologies to reinforce the adoption of platform services in administrative and pedagogical decision-making. Likewise, Cone and colleagues (2021) have analyzed the key role of commercial intermediaries in bolstering Google’s hold in public education in Italy during the pandemic. Examining such complementary actors – and other technical, legislative, and institutional complementors of platformization – helps this study to illuminate how a phenomenon like googlization is always a contingent upshot of brokered relations between platform companies and the settings where they are used.

Brokering googlization across national contexts

As three scholars working in the United States, Australia and The Netherlands, we have all noticed googlization as an issue that we are concerned about. We expected that the highly distinct cultural, political and educational landscape in each of these national settings of platform adoption and use would play an active role in conditioning if, how, and to what extent the googlization of public schools occurs, making the selection of these three national contexts a fruitful basis for uncovering and comparing relevant similarities and differences in intermediary work. Our examination of googlization in these national education systems was guided by two overarching questions: (1) what intermediaries (i.e., institutions, organizations, companies, policies, and processes) are involved in initiating and maintaining Google’s influence in each country’s public schools? And (2) how are types of intermediary work similar or different across national settings?

To answer these questions, we began by constructing detailed profiles of the three national education systems and the places, in each, where Google’s products and services were visible. Our research in this stage involved identifying the salient features of each system’s governance structures, regulations for third-party services, and policies related to tech adoption and implementation. We also located where Google services were being used in different tiers of these systems – for instance, by administrators and teachers, or integrated in popular hardware and software packages. We then turned our attention to the intermediaries that helped to broker relations between the systemic structures and policies of each system and the places where Google services were being incorporated. This involved collating information from mainstream media sources and technology journals about tenders, contracts, and rollouts awarded to Google products, as well as local and national initiatives that nurtured favourable conditions for the company’s spread into schools. We also examined online resources that directly support IT professionals, school leaders, and teachers in using Google products: federal guidance, recommendations and ‘best practices’ from educational organizations, professional development networks, and credentialing opportunities. Throughout these stages, we also drew on, and compared emerging insights with, our own previous research on the infusion of platform technologies and data-driven practices in each of these educational systems. This work has included interviews and focus groups with students, teachers, school leaders, district and state administrators, and developers at edtech companies.

In what follows we present our analysis of the intermediary work involved in brokering dependence on Google products and services in each national education system. After presenting these cases, we then turn to a discussion of the variations across these settings and their implications for critical research in education.

The United States

The United States K-12 public education system enrolls more than 50.7 million students in 98,755 schools (NCES 2020). While it is a federal institution, state education agencies have the primary

responsibility for establishing schools, developing curricula, setting graduation requirements, and procuring and regulating the use of digital technologies in classrooms. Each state education agency is divided into districts – 13,452 in all – which are governed by school boards. These boards delegate administrative duties to a superintendent who oversees the district’s central office and the performance of its schools, as measured through annual standards-aligned state assessments. Tasked with reconciling state-level expectations for consistent progress in test-scores and the more prosaic classroom-level needs of teachers and students, administrators have increasingly looked to private companies for support in the form of standards-aligned curriculum packages, test preparation materials, and technologies for streamlining instruction, assessment, and behavioural management (Desimone et al. 2019).

This latter strategy is the most common explanation given for Google’s expansive influence in U.S. schools. Singer’s (2017) coverage in the *New York Times* has documented the company’s efforts to side-step conventional vetting processes for district – and school-level adoption by reaching out directly to educators. The distributed structures for decision-making about technology adoption has allowed Google to make targeted appeals to classroom teachers by offering free services that do not require formalized contracts or licenses to use. This began with the launch of Google’s suite of free office apps – Docs, Spreadsheets, and Slides – which were piloted with working teachers. This allowed the company to build a network of ‘early adopters’ across districts and schools, which it later invited, in 2014, to beta test the next iteration of these services, Google Classroom (Yeskel 2014), as well as give feedback and share ideas and inspiration with other educators about its potential uses.

A central part of this was training educators through Google’s Certified Trainer program. In tandem with the launch of Google Classroom, the company began offering teachers opportunities to become certified trainers who could implement and support the use of Google products across educational settings (Chen 2016). Where the intermediary work of procurement functioned to integrate Google products into teachers’ everyday practices, the work of training effectively converted Google’s ‘early adopters’ into brand ambassadors – allowing the company to expand its reach without competing for district-level contracts through traditional channels (Saldana et al. 2021).

At this point, however, it is important to highlight that googlization has not entirely eschewed appealing to top-down decision-makers. The company has also relied on parallel work that brokers dependence on its products at school-, district-, and state-levels. This was reinforced by direct sales of Chromebooks to meet state-sanctions needs for hardware to facilitate standardized testing. For years, Chromebooks struggled to find an audience in business or general-use markets; however, in the early 2010s, as districts faced pressure to migrate their annual assessments to online environments, Chromebooks began to appeal to cash-strapped administrators. Not only were they inexpensive, but they could be centrally managed through Google’s administrative tools, allowing educators to lock devices en masse during testing. Much like Google courted teachers with free software, it enticed administrators with cheap hardware. By 2016, Chromebooks accounted for 58 percent of mobile devices shipped to U.S. schools (Baker 2017), and these numbers have only continued to climb.

Training, too, has not been an entirely grassroots form of intermediary work. Increasingly, educators are given choices (or recommendations, based on their job performance) for how they will meet yearly requirements for professional learning. These might include: local workshops, attendance at professional conferences, MOOCs and online programs, peer-coaching partnerships, or micro-credentials and badges (Desimone et al. 2019). Within this context, the appeal of Google’s Certified Training Program is reinforced on multiple levels. For individuals, its certificates fill district-level requirements for professional learning; and for administrators, it provides a free professional development option that results in in-house experts who can support other teachers in using Google products and services. The program also appeals to administrators who are eager to demonstrate to parents and communities that their facilities and instruction are not lagging

behind those of competing private schools and technology-rich charter programs. Some schools, for instance, now require all teachers to go through formal certification through Google (Julian 2018). Recognizing the wide range of interests its program serves, Google has continued to expand its forms of credentialing: for educators, it now offers distinct classifications for Trainers, Coaches, and Innovations; and for institutions, it now formally recognizes ‘Reference Schools and Districts’ that serve as models for effective integration of Google products. Taken together, these efforts suggest that the intermediary work of training has played a critical role in nurturing googlization.

As funding and governance of public education are largely deferred to state- and district-levels, there are few comprehensive resources on offer for selecting or vetting classroom technologies. Most policies are highly localized and piecemeal, and they tend to focus on rudimentary privacy protections and acceptable usage. This has left the supply-side market for educational software largely unregulated. The most recent National Education Technology Plan (OET 2017), for example, advises states to prioritize the adoption of technologies that leverage ‘industry standards for single sign-on and data interoperability’. Recommendations like this do important intermediary work for companies like Google that market themselves to schools not as standalone edtech tools, but as comprehensive hardware and software ecosystems. Because interoperability is already central to Google products and services – from Chromebooks and classroom apps to administrative analytics – it becomes an easy choice for administrators and IT professionals. It also means its competitors and other third-party services are under tremendous pressure to adopt its compatibility standards.

Australia

Like many other parts of the world, the role of Google in Australian primary and secondary education has grown exponentially in recent years (Henderson 2018). Based on conservative estimates, there are currently over 100,000 full-time teachers and close to two million K-12 students using some form of Google edu-apps in Australian schools. A 2019 study into the top 50 apps used by Australian primary schools found that five of the top 12 were made by Google and included the Play Store, Google Docs and Drive, with Google Classroom coming in at number 19 (Rennie et al. 2019). The reach of Google has only increased during the global pandemic as the uptake of GWfE is reported as eclipsing all other platforms in the facilitation of remote learning (Victorian Department of Education & Training, personal communication, July 12, 2021).

While Australia has a federal education system, the constitutional responsibilities for curriculum and assessment lie with individual states and territories. Historically, the states and territories of Australia determine policy, curriculum and assessment, and it is similar when it comes to the procurement, rollout and use of digital technologies in schools. For this reason, departments of education have become integral to the platformization of the Australian education system. In some states and territories contracts between Google and the department mean *all* schools and students in that jurisdiction are mandated to use these products. For example, in the Australia Capital Territory (ACT), large scale roll outs of Google Chromebooks and licences for Google Apps have ensured that *all* students and teachers in this jurisdiction are on the Google platform (Colley 2020; Kiernan 2015). At this scale, tech companies specializing in the ‘roll-out’ and ‘integration’ of digital technologies have become integral intermediaries in the googlization process.

Each state or territory in Australia has different curriculum and assessment demands, shaping how googlization takes place at the state and sometimes even school level. In Victoria, the Department of Education and Training (DET) plays a key role in facilitating the use of Google tools, but schools can also negotiate individual contracts with Google independent of the department. Despite this, the googlization of Victorian education is well underway, with at least 24,000 teachers on GWfE. Unlike other states and territories, the googlization of education in Victoria involves no big rollouts, announcements or partnerships. Schools have more autonomy, however, with that comes an extra set of burdens for schools to shoulder. For example, every school is responsible

for their own plan for Information Communication Technology (ICT)/Digital Technology (DT) use in the school. This plan, complete with a budget, ‘Digital Learning Vision’ for the school and future goal setting must be submitted to the state’s DET to review. A planning tool and online resources are provided to help schools prepare these documents, but it is up to individual schools to come up with a vision that they also have the knowledge, expertise and skills to execute.

Given these challenges, it is hardly surprising that GWfE is currently ‘one of the main collaboration and sharing platforms used’ in Australian schools. Schools may deploy their own local version of GWfE, or they can use the Department-provided version of this product free of charge. The Department has a multi-tenant license for GWfE, which means that the Department: takes responsibility for the management and maintenance of the service; provides Privacy Impact Assessments for all schools using the product; and monitors and manages updates on behalf of schools. Schools using the tenant license are also provided with cloud storage and other technology and architecture resources offered by the department. If a school chooses to use the Department version of GWfE then it is accessed via the eduPass Login, which provides remote access to secure Department applications and online services for all students and Department staff. However, if a school chooses to use a local version of GWfE then they are required to do their own storage, security and updates of the software, which would typically require purchase of cybersecurity software and other resources (Pangrazio, Selwyn, and Cumbo 2022).

In states such as Victoria, the DET functions as a key complementor in the googlization of education. It is one of only two platforms on the Department’s multi-tenant license (the other being Microsoft 365), making it easy for schools burdened with having to plan and budget for innovative digital learning to reach their set goals. Schools turn to GWfE because it helps them to be accountable, transparent, as well as easily communicate with families and students to both showcase student work and provide instant feedback – all features now considered best practice in contemporary education. The Department also relies on Google as it helps them to deliver on twenty-first century learning and digital innovation. The googlization of education in Australia is therefore due to this mutual shaping of complementor and connector both in service to a sector under increasing public scrutiny and accountability. National education reforms, social expectations as well as limitations on time and resourcing render Google the most logical choice.

The Netherlands

The uptake of Google hardware and software in Dutch primary education has significantly increased in the past years – Google’s market share grew roughly 30% per year between 2016 and 2019 – with the pandemic crisis functioning as an extremely powerful catalyst (Baars 2021). In 2019, approximately 70% of Dutch primary schools made use of Chromebooks and Google’s education software (Bouma and Van der Klift 2019). Protected by the legal freedom of education (Article 23 of the Dutch constitution), Dutch schools and their boards – there are ca. 6600 schools and 918 boards – enjoy a large degree of autonomy when it comes to the organization and design of their online learning environment, including the purchase and use of digital platforms. However, Dutch schools have a long tradition of partnering with private sector parties to fill in these freedoms – a system of ‘autonomy in dependence’ (Frissen et al. 2016). In the digitization of the classroom learning environment, partnerships between schools and educational ICT companies take up a dominant position. These companies include legacy suppliers which started to provide digital solutions in the past 15 years but have been providing schools with learning materials and teaching aids for many decades (e.g., De Rolf Groep; Heutink). They also include cloud native start-ups that arose about ten years ago with the aim of supporting schools in the transition to online education in the cloud (e.g., Cloudwise; Prowise).

Based on partnership, each of these educational ICT-companies caters sharply to Dutch schools articulated needs for unburdening. Schools request a one-stop-shop, want to be able to easily access and switch between a variety of digital educational applications, and demand that these different

digital products and services interoperate seamlessly (Bisschop et al. 2016). While schools need for a full-service broker delivering turnkey operation drives the central role national ICT companies perform in the digitization of Dutch classrooms, the latter two needs are important drivers for these companies to partner with global tech corporations delivering fully interoperable ecosystems of hardware, educational software and infrastructural cloud services, including identification and authentication services facilitating single-sign-on. All four Dutch ICT companies are official Google Cloud, Google for Education Premier and/or Google Professional Development partners. This brokered partnership between Dutch schools and global tech expands and continues established public-private partnerships which, as mentioned, have been fundamental for the organization of the learning environment of public schools for many years.

In their mission to tailor to the local digitization needs and conditions of primary schools, and strongly driven by the terms of the partnership as unilaterally defined by Google, Dutch ICT companies have come to operate as pivotal googlization intermediaries clustering various forms of intermediary work. As certified partners, they mediate schools procurement of Google products through the sale and development of edu-based Chromebooks, the sale of Google Workspace for Education licenses for the various paid upgrades of the software package (Education Standard, Teaching and Learning, Education Plus) and Chrome Education licenses – exclusively sold by Google for Education partners – necessary for technical management of Chromebooks in the Google admin console. Equally important is their work in facilitating the daily use of Google technology in classrooms. That starts with their offering of workshops by Google certified trainers to Dutch educational professionals on the technical basics of Google Workspace for Education, or achieving the official Google certified Educator Level 1 and 2. Moreover, unburdening schools of technicalities, ICT companies assist schools' migration to cloud-based working and learning in GWfE, their management of chrome devices in the Google admin console and configuring the setup of the Google online environment in accordance with national and sectoral laws and policies regarding security and privacy.

But the most salient category of intermediary work is the development of single-sign-on systems which facilitate technical interoperation between Google's hardware and software and infrastructural services and applications by local Dutch edtech providers. As part of their 'one-stop-shop' package deal – catering to schools articulated need for digital products and services that are seamlessly aligned and accessible through a uniform interface – all of the Dutch ICT companies provide their contracted schools with a single-sign-on-portal (often marketed as a Digital Learning Environment, DLE), such as *COOL* (Cloudwise), *Moo* (Heutink), *Prowise Go* (Prowise), and *ZuluConnect* (Rolf). These DLEs seamlessly integrate with Google's walled garden of interoperability that spans from Chromebooks, Chrome OS, and GWfE, to Google's identity and device management technology and its cloud services for data storage and analytics. This interoperability manifests itself in a far-reaching form within the *COOL* portal (Cloudwise) which is natively built on, and runs on, the Google Cloud Platform (e.g., *COOL* is operationalized on Google AppEngine and Google Cloud Run). For each of the other single sign-on (SSO) portals, interoperability is about portal dependence on Google login and authentication services. Teachers and students sign in to the DLE with a Google account – mandatory in *COOL* – which through Google Account linking can be connected to other cloud identity and authentication services of global providers (eg. Microsoft Azure AD) and local providers (e.g., Basispoort) to enable SSO to Google apps as well as to other edu-apps of international and national developers. DLEs also facilitate the use of Google Classroom through integration with the Classroom Roster API, so student accounts in GWfE are automatically configured through a programmed exchange of learner data registered in the schools' LMS (Google 2023). Designing and developing technical interoperability between Google's integrated line of services and the diverse application landscape of Dutch schools, ICT suppliers strengthen their role as critical intermediaries interconnecting Google's global platform ecosystem with a national edtech market (Kerssens and Van Dijck 2021).

Discussion

Our investigation unpacked intermediary work brokering platform dependence in three national school systems. While there are some similarities across the three countries, there are also some distinct differences. This research has therefore highlighted just how important the local context is in shaping googlization and the factors that precede what takes place in the classroom between teachers and students on Google platforms. Foundational to this is the structure of the education system in each country – including its funding and governance and the values and histories that underpin its contemporary manifestation. Although we have placed the analytical focus on national and regional dynamics – a contrast to the dominant perception of googlization as a monolithic or deterministic process – it is equally important to acknowledge that googlization also has global dimensions: Google is, afterall, a single tech company, pushing a form of western imperialism by expanding and extending strategies and discourses into different national education contexts.

Through our analysis of googlization in the national education systems of the United States, Australia, and The Netherlands we can now see five different types of intermediary work emerging that broker dependence on Google in schools. These take place to varying degrees across the three countries and include: *procurement*, *lobbying*, *training*, *technological integration*, and *technical support*. From our research we can provide a breakdown of each and their meanings (see Table 1). While all five of these categories were present, to some degree, across the settings we investigated, we also found striking variations in how certain forms of intermediary work were foregrounded, backgrounded, compounded, or neutralized in relation to the idiosyncrasies of each national system.

Importantly, in delineating this taxonomy, we do not suggest that these categories provide an exhaustive account of all intermediary work involved in googlization; rather, they are the forms that were most salient in the educational settings that were the focus of our study. We offer them here as a provisional resource for disentangling the layers of activity that underwrite googlization in education. It is our hope that subsequent scholarship, focused on other national education systems, might use, complicate, and amend this heuristic to better reflect the range of intermediary work being carried out between private tech and public education around the world. We now use the typology to briefly compare and contrast intermediaries across the three countries.

In the US there is a robust, and largely unregulated, supply-side market for educational technologies as developers compete for district contracts or, in some cases, directly cultivate user bases among teachers and students. Given these targeted appeals, *procurement* has become an important form of intermediary work in U.S. school systems. However, *procurement* works in tandem with *training* and *credentialing* US teachers to become brand ambassadors. *Technical integration* also figures into the administrative appeal of Google in U.S. schools. One final form of intermediary work helps support googlization in U.S schools in a crucial, if not always visible, way: *lobbying*. Though further removed from the everyday operation of schools than procurement, training, and technical integration, lobbying work cultivates the backdrop in which Google products appear, to states and districts, not just as edtech tools but as vital resources for national workforce

Table 1. Categories of intermediary work in the googlization of education.

| Category | Meaning |
|---------------------------|--|
| Procurement | Work related to a schools' obtaining of Google software, hardware, and related licensing |
| Lobbying | Work related to the legislative, policy, and evidentiary conditions that influence educational decision-makers to adopt Google products and services |
| Training | Work related to the training and credentialing of students, teachers, administrators, and school systems to use Google products and services |
| Technological integration | Work related to the technical interoperation of Google's hardware and software with other local digital infrastructures and services |
| Technical support | Work related to managing and maintaining the technical compatibility of Google products with school IT infrastructures |

development. As in other forms of intermediary work, then, lobbying is reinforced both in – and outside of U.S. public schools, creating ideal conditions for googlization to spread.

This can be contrasted with Australia, where *procurement* at the teacher level is less of an issue given the nature of the education system. Here the education system has moved from being highly centralized to one of centralized decentralization, as individual schools are made more accountable and responsible to the state-based DET. For now, *lobbying* of departments is more significant as they are chief providers of access to the Google platform in the nation's government schools. Not all schools go through the Department procurement process, however, they do so at their own risk as they become responsible for storing and securing data, as well as providing the ongoing maintenance that the software requires. Like other parts of the world, teachers are becoming increasingly important to Google as *credentialing* and *training* through professional development opportunities augment the more direct forms of googlization mandated from departments. More specifically, in the state of Victoria, the DET acts as a complementor, which raises important questions around how government departments are smoothing the way for private companies into public education systems. However, looking at how the education system has changed in recent years, we might expect further decentralization and therefore more direct lobbying of teachers.

In the Netherlands, private sector ICT companies operate as key complementors, clustering intermediary work pivotal for increasing schools' platform dependence. The central role of ICT companies as critical intermediaries, should be understood as a continuation of established modes of one-on-one public-private partnerships between schools and supplier companies which, since long time past, have catered their services closely to the needs and local conditions of schools concerning the arrangement and organization of classroom learning environments. Intermediary work is characteristic for the Dutch educational system where institutional autonomy has historically developed as closely dependent on private sector involvement, which explains why lobbying is much less prominent than in the United States and Australia. Instead of ICT companies influencing educational decision-makers at schools to adopt Google products and services, it is schools that, implicitly or not, encourage suppliers to platform dependence based on their needs for interoperability and single-sign-on.

All this does not alter the fact that local ICT companies actively broker dependence on Google by aligning two potentially conflicting types of governance – one at the national/local level of a public sector, the other one at the level of a global private tech corporation. At the former, these companies act as complementors that operate 'close-to-home' in the local context of the school and the national setting of the Dutch education system, offering one-stop shop solutions for online learning tailored to the needs and conditions of public schooling, which a globally operating tech giant like Google does not want and cannot make. Their intermediary role as complementor, however, is crucially dependent on partner integration with Google. Through their variegated range of local intermediary groundwork – including procurement, training, technical support, and technological integration – these companies facilitate practical and technical interoperation of Dutch digital infrastructures and services with Google's hardware and software, and as local partners extend the reach, scope and infrastructural power of Google's global private platform ecosystem into the local arrangements of the public education sector education in the Netherlands.

Conclusion: governing educational googlization(s)

This article studied and compared local intermediary work as fundamental to the googlization of public education. Although the article focused on Google – because of its market share and pioneering ecosystem approach – it is important to emphasize that intermediaries play similar roles in integrating other Big Tech platforms into education, which highlights the need for more empirical research that examines intermediary work underpinning the platformization of local school systems. This research about googlization – and thus also in a broader sense about platformization – shows that this process is not a simple matter of Big Tech acting as an intermediary between schools

and students. Educational googlization involves dependencies on a constellation of different social, political and technical actors, which complementary intermediaries, to greater and lesser extent, depend on the structure of the education system. Instead of googlization, we are dealing with educational googlizations, in the plural; processes in which the end result – school dependency on the Google tech ecosystem – is similar, but in which this dependency is created through different networks of intermediary actors and processes.

Highlighting types of brokering work by third-party ambassadors, this article does not intend to point an accusing finger in the direction of these intermediaries. Google's pull on public education is extremely strong, and intermediaries respond to this without malicious intentions. Across our three countries, Google helps schools to be accountable, transparent and responsive to the demands of the parent body and education community. The marketization of schools and the increasing pressure on schools for ongoing improvement and increased accountability measures place pressure on school administrators, just as the funding for public schools is being stripped away. Google therefore provides a cheap or free solution that many in the school community feel comfortable with given their familiarity with Google through its ubiquity. At the same time, Krutka, Smits, and Wilhelm (2021) argue, Google simultaneously 'bends education toward its aims – namely productivity, quantification, surveillance, and learning online' (p.427).

While the googlization of education might appear to be an all-encompassing and unyielding process, our research has identified points at which we might intervene. We conclude the paper by outlining these below:

- As education systems become decentralized, educators become a target for Google to lobby to. We recommend greater and independent education around platformization and the procurement of edtech products in pre-service teacher training. Teacher education on these issues is equally important to help schools and educators articulate their demands for digital education towards established and trusted (market) organizations (ICT suppliers, boards, departments) which now act as pivotal intermediaries in googlization;
- Organizing independent forms of digital and platform literacy can also serve as an important condition for school authorities to consider eliminating Google credentialing as a form of professional development. In the US and the Netherlands, this surreptitiously promotes and authenticates Google platforms in schools;
- It is important that national and local actors with control over the development and design of digital education – now often actively involved in processes of googlization, (departments, boards, ICT suppliers) – invest in the development, roll-out, and adoption of alternative and more 'open' platform ecosystems that better reflect the public nature of education;

Developing independent digital literacy and developing alternative, more open, infrastructures built on values of autonomy and transparency, must proceed as twinned processes in safeguarding education's public identity. The design of public digital infrastructures presents a huge challenge within an educational context where the seamless and closed-circuit ecosystems of Big Tech have become so dominant and 'tend to crowd out non-profit, open-source, or public alternatives' (Nieborg, Poell, and Van Dijck 2022, 42). Schools and boards cannot do this alone; that requires intensive collaboration and cooperation between educational institutions, public and private organizations, at local and (trans)national levels (Veale 2022). The organizations that this article identifies as key intermediaries in googlization (departments, ICT-organizations) could play an important leadership role at national levels, if only they would redirect their googlization effort towards the goal of collectively shaping a digital ecosystem that better serves the public mission of education.

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