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Beyond Apps: Digital Literacies in a Platform Society

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In this column, we explore how attention to platforms can help educators grapple with dimensions of digital literacy that are often hidden from view in day-to-day practice. Apps such as FlipGrid, Kahoot, and Photomath are big businesses in education and are increasingly woven into formal classroom learning. A platform orientation can support teachers in evaluating the possibilities and limitations of such apps by clarifying their relations to pedagogy, hardware, and other software. We suggest that this approach to digital literacy offers opportunities both for reflective teaching and for engaging students in authentic inquiry about what it means to live and learn in a society increasingly dependent on digital platforms.

Since the launch of Apple's App Store in 2008, few facets have life been untouched by the proliferation of digital applications. Education is no exception. For the last five years, Phil (first author) has been part of a team interviewing state officials, district administrators, and classroom teachers across the United States to study how various stakeholders are navigating changing demands for college and career readiness (see Desimone et al., 2019). Overwhelmingly, teachers interviewed by this team described the critical role apps played in how they enhanced lessons and supported students, including software packaged with curriculum (e.g., from Pearson or McGraw-Hill) as well as apps for classroom management (e.g., ClassDojo, Google Classroom), assessment (e.g., Kahoot, Socrative), and parent communication (e.g., Seesaw).

Across these interviews, teachers talked about the exciting opportunities such apps offer for diversifying instruction. However, many also voiced frustrations. In an Ohio district, licensing fees for a popular program became too high, leaving teachers scrambling to restructure units that were aligned to the software. In a Texas elementary school, language arts teachers lamented a recent software update that removed favorite features from an app they used to support vocabulary practice. Most teachers attributed these setbacks to the shortcomings of particular programs. However, as we heard similar stories across schools and districts, we noticed a larger pattern emerging. With teaching and learning increasingly dependent on apps, educators and students were left at the mercy of software companies whose products were designed without their input or control. The issue was not the weaknesses of individual apps but the relation between education and the wider ecosystem of app development.

Outside of education, scholars of digital media have begun to study such relations through the emerging field of platform studies (Bogost & Monfort, 2009; Gillespie, 2010), an area of research focused not on individual apps but on the ways that hardware and software relate with each other and with society writ large. In this column, we draw from scholarship in platform studies to explore key features of platforms and the questions they raise for digital literacy instruction and learning.

Why Platforms?

In digital media, the term *platform* has two meanings. First, it refers to the infrastructure on which apps are built. For instance, a video game platform (e.g., Nintendo Switch, PlayStation 4) is the hardware through which its compatible software is run. Second, *platform* refers to digital spaces that facilitate social and economic exchange. Facebook and Twitter, for example, are platforms for users to post content, interact with others, or make purchases. Srnicek (2017) described platforms as "digital infrastructures that…bring together different users: customers, advertisers, service providers, producers, suppliers, even physical objects" (p. 44). These two meanings

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highlight how platforms never operate in isolation but are defined by their relation with other platforms and programs. For example, an iPhone is a platform for the App Store, which is a platform for many apps that may themselves be platforms for other activities. Examining platforms means attending not only to individual apps but also to their interrelations with one another and the wider app ecosystem.

Researchers have identified different frameworks for studying these platform relations: the social, technical, and economic. The social aspects of platforms include the ways people create, consume, or integrate hardware and software into their daily lives. This is how casual users tend to talk about platforms. For instance, when teachers we interviewed described using Seesaw to document student learning or ClassDojo to manage classroom behavior, they were referring to the social function of these apps. Most resources that aid teachers in evaluating and selecting apps to augment instruction foreground this social dimension, delineating how the software enables particular activities and practices (Israelson, 2015). This perspective considers the question, What do platforms allow their users to do?

Importantly, platforms' social functions are made possible by their technical design. Although using an app may seem straightforward, it involves the complex coordination of many moving parts: the physical hardware being handled, the aesthetic design of the program's interface, the algorithms that process user data, and the code that runs the software (Berry, 2011; see Table 1). The technical dimension of a platform refers to these varied components that structure apps and mediate how users experience them. Examining these details involves

asking, How do platforms work? Unfortunately, answering this question can be challenging because these dynamics are often hidden beneath the screen, away from users' view. As such, it is less common for teachers to talk about a platform's technical components, except in moments of malfunction (e.g., when an app crashes or a clunky interface makes navigation difficult). Nevertheless, technical features have profound implications for schooling as they not only condition how useful an application is but also generate data to measure, assess, and guide what happens in (and outside of) schools (Nichols & Stornaiuolo, 2019).

Finally, platforms have an economic dimension. With the rare exception of publicly funded software, most apps are designed to produce value for developers and shareholders. The economic perspective on platforms asks, Who profits from an app's use, and how? This can be straightforward, as when a company charges one-time or subscription-based fees for its product. Often, however, the process is less clear. Many apps are seemingly disconnected from the world of markets and marketers because they are free (e.g., games, social media, content-sharing services). In such instances, companies generate profit not through direct sales but by monetizing data collected through these apps, usually selling it to third parties (Zuboff, 2019). Like the technical aspects of platforms, the economic dimension is not always discussed explicitly among educators because it, too, is often hidden from users' view. Nevertheless, it has significant ethical implications. When teachers' and students' clicks, swipes, and likes are mined for salable data, it becomes critical to consider how a platform's business model might run counter to educators' aims and values.

Table 1
Technical Aspects of Platforms

Technical component	What is it?
Hardware	A physical medium (e.g., laptop, tablet, phone) and its related accessories (e.g., charging cords, keyboards, batteries, cables)
Interface	Visible features (e.g., buttons, scroll bars, graphic design) that mediate how users interact with software's underlying code
Algorithms	Automated instructions that translate user inputs (e.g., personal information, usage history, click data) into particular outputs (e.g., personalized content, services, advertisements)
Code	Machine-readable language that connects hardware and software and structures how an app operates

Taken together, these dimensions highlight how there is more to apps than meets the eye. Although it is common to talk about social uses of apps, these functions are always entangled with the technical and economic dynamics that also underwrite platforms. None of these dimensions stands alone. An educator using ClassDojo is not only managing student activities (i.e., a social function) but also inviting the platform's technical and economic features into their everyday interactions with students, parents, administrators, and colleagues. Considering these relations, and the ethical and pedagogical questions they raise (see Table 2), becomes critical for understanding the place of apps, platforms, and digital literacies in 21st-century classrooms.

The Platform Society

We have suggested that addressing the social, technical, and economic dimensions of apps means thinking beyond individual programs and toward wider platform relations among hardware, software, and the broader social world. One reason for this is that apps are increasingly designed not to be stand-alone products but to interact with one another. Where in the past, programs, websites, blogs, and stores operated independently, today most of these are consolidated into exchanges on just a few sites (e.g., Amazon, Apple, Facebook, Google, Microsoft). Even apps that appear to operate separately from such firms are internally integrated with them. Netflix, Spotify, and Pinterest, for example, are all hosted on Amazon Web Services, as are the usage data and upload content for educational platforms such as Kahoot, Seesaw, and ClassDojo.

Social media researchers called this consolidation of internet resources *platformization* (Helmond, 2015) and suggested that its simultaneous rise alongside the spread of mobile media into more facets of life is now creating a platform society (van Dijck, Poell, & de Waal, 2018), where platforms are not only a feature of everyday life but also a core part of our informal interactions, professional routines, and civic institutions. Indeed, a glance at the App Store's Top Downloads section reveals that platforms have become central to how we do work, leisure, education, friendship, play, and even love. An example of this platformization in education is the expansion of Google's apps for word processing (Google Docs) and presenting (Google Slides) into a full suite of resources for schools (Google Classroom). In our study, many teachers described the central role that Google's services play in how they plan lessons, organize activities, and provide feedback to students. Some even made determinations about what other instructional software to use based on its compatibility with Google programs (e.g., choosing one app over another because it integrated better with Google Classroom).

Such examples demonstrate how platformization extends into schools, nudging educators toward instructional decisions based on technological, rather than pedagogical, alignment. These dynamics also clarify why particular apps might abandon teacher- and student-favorite features, or why acquisition by another company might

Table 2
Platform Dimensions and Considerations for Practice

Dimension	Central question	Some considerations for classrooms
Social	What do platforms allow their users to do?	■ How does a platform's intended and actual uses differ? ■ How does it reconfigure teaching and learning? ■ How does it alter teacher–student–parent relationships? ■ How does it transform existing practices or necessitate new ones?
Technical	How do platforms work?	■ For whom is the hardware in/accessible? ■ What does the interface make in/visible to users? ■ How is content moderated by algorithms? ■ What default settings are coded into the software?
Economic	Who profits from an app's use, and how?	■ Is the platform publicly or privately owned? ■ What is the business model of the platform's owner? ■ What protections are in place for student/teacher privacy? ■ How are the data generated through the platform used?

alter functions of a popular educational app. In a platform society, developers' primary aim is not to make programs more compatible with teachers' instructional practices but to coax teachers' instructional practices to be more compatible with the logic, scale, and economy of platforms. The challenges that the Ohio and Texas teachers we interviewed described, then, were not simply shortcomings of individual apps but frictions that arise as teaching and learning are reshaped by the platform society.

Analyzing Platforms in Literacy Education

For the last few years, we have studied how platform dynamics complicate the meaning, teaching, and practice of digital literacy. We have done so by examining digital platforms across a range of contexts: learning management software (Scott & Nichols, 2017), social networking between school communities (Stornaiuolo & LeBlanc, 2016), and learning analytics in literacy education (Dixon-Román, Nichols, & Nyame-Mensah, 2019). Through these studies, we have explored emerging perspectives from platform studies and their relation both to the literature on digital literacy and to the experiences of teachers and students in today's classrooms.

Our research has shown that platforms exert competing pressures on educators. The social, technical, or economic dynamics that, at times, support educators' aims for teaching can, at others, contradict their sense of good pedagogy. A platform whose social function simplifies classroom procedures, for example, may do so using technical features that tether instruction to commercial software or economic features that compromise student privacy. Crucially, we have also found that disentangling these dynamics is challenging, in part, because the logic of the platform society fuses social, technical, and economic elements together in ways that hide them from view. Such complexities highlight the need for an orientation to digital literacy that goes beyond using software to access, create, or interpret digital content—one that also involves exploring, analyzing, and intervening in platform dynamics that are increasingly central to the ways we live, work, and learn. In what follows, we outline some considerations for how teachers might model this orientation and engage students in more expansive forms of digital literacies.

Classroom Implications

Moving beyond a focus on individual apps to consider wider relations of platforms presents rich opportunities for instruction and practice. We highlight three: weighing alignments of platforms and pedagogy, considering the meanings of *data*, and making platforms a site for student inquiry. Each of these has implications for rethinking how we conceptualize digital literacies in a platform society.

Weighing Alignments of Platforms and Pedagogy

When focused on individual apps, it is easy for educators to foreground how the social function of an app aligns with their desires for the classroom. For example, Seesaw allows teachers to document student learning over time and communicate with parents—practices well aligned to common educational goals. However, a platform orientation makes visible the technical features that shape these social functions. For instance, if Seesaw becomes the principal means through which growth is documented and parent communication occurs, the logic of the app might remake growth and communication in its own image: as something recognizable to Seesaw's algorithms and interface. Over time, parent communication could be defined more by the form this communication takes (e.g., more images, videos, or updates via Seesaw) than the substance or content being communicated (e.g., the richness, depth, or meaning of classroom learning). Teachers, then, might feel pressure to increase the volume of communication with parents and to do so in Seesaw-friendly ways. In other words, although the social function of the platform might be helpful, it comes freighted with technical dynamics that can shape this function in ways that contradict teachers' own sense of robust and responsive pedagogy.

This does not mean that educators must abandon any platform not perfectly aligned to their teaching philosophy. Rather, by recognizing such misalignments, teachers are equipped to articulate those aspects of instruction they wish to preserve amid the pressures of platformization and which forms of student learning might be better served by the generative inefficiencies of trial, error, and play than by algorithms and analytics (see Figure 1). This orientation allows educators to create a comfortable distance between their instructional practice and the software they use so that lessons and curricula are not so tied to third-party apps that, as in the case of

Figure 1
Questions Teachers Might Consider in Aligning Platforms and Pedagogy

- What is the problem for which this platform is the solution?
- How does the platform address this problem differently than other platforms (or nontechnological resources)?
- What new pedagogical or ethical problems might this platform create?
- How might it reshape relationships among teachers, students, parents, and administrators?
- How might its usage need to be amended or monitored to ensure alignment with educators' values and commitments?

the Ohio district we interviewed, a lapse in licensing can compromise their capacities to support students.

Considering the Meanings of Data

Thinking about platforms in classrooms also leads us to ask critical questions about data: What counts as data? How are they collected, and how are they used? Data-driven teaching and learning are central to educational practice. In the United States, this is evinced both in policies that require educators to monitor student growth and in the growing trend of allocating teacher planning time for data analysis. On the surface, the platform society, which is deeply dependent on the production and processing of data, seems well aligned with such priorities. Many educational apps tout this alignment in their promotional materials, claiming to provide teachers with more expansive data sets that illuminate what and how students are learning. Yet, what a platform counts as meaningful data (and what its technical and economic dynamics are configured to generate) may actually be very different from the forms of data educators need to plan instruction and support student flourishing. The *data* in *data-driven* does not necessarily mean the same thing to teachers, policymakers, and platform developers.

This insight is especially important as a growing research base has begun to question whether data analysis, by itself, really leads to improved teaching and learning (Hill, 2020). Although it would be comforting if more data about student performance were correlated with growth, the reality is that the greater the volume of information, the harder it is to discern which data are

most important and how they should be used. Platforms, then, may offer a veneer of data-driven objectivity, but little of that data may be usable for enriching instruction. Further, it is not only this lack of clarity in data that is concerning: platforms also invite other unintended data practices into schools. Because most platforms' orientations to data are conditioned by economic interests, they can expose classrooms to the data mining of third-party profiteers (Zuboff, 2019). Indeed, the business model for many educational platforms depends on such forms of data extraction. Without considering these dynamics, classrooms become spaces where passive and nonconsensual data collection are normalized. Teachers, then, have an ethical responsibility to consider how platforms' data practices can be locally monitored and regulated, and how student privacy can be protected from the commercial interests of developers (see Figure 2).

Making Platforms a Site for Student Inquiry

Research on digital literacy has tended to emphasize the skills and practices students use to navigate, curate, produce, and consume digital media. In other words, it tended to focus on what students do with digital technologies rather than how digital technologies (and their social, technical, and economic underpinnings) condition these digital activities. A platform orientation offers pathways for educators to expand notions of digital literacy to include attention to the dynamics that occur outside users' everyday view. Even more, it opens

Figure 2
Questions Teachers Might Consider Related to Platform Data

- Who profits from the use of this platform?
- How are those profits generated (e.g., one-time fee, ongoing subscription, free access in exchange for salable data)?
- What privacy protections are in place for teacher or student user data?
- Are these protections compliant with teachers' legal responsibilities to students? Are these protections compliant with teachers' personal commitments to students' privacy?
- How might these protections change if the platform is bought or acquired by another company?
- What leverage do educators have to pressure this platform provider to improve their data use or privacy policies?

opportunities for teachers to inquire alongside students into what it means to live and work in a platform society.

Taking this stance does not mean that students, particularly younger students, must engage in deep analysis of platforms' algorithms and economic interests. Rather, it means creating openings to not just work *with*, but to look *at*, digital media and to critically examine what we find. In our research, we have seen teachers begin productive conversations along these lines. For instance, some invite discussion about similarities and differences between drawing on paper, tablets, and laptops to highlight how technical dynamics shape the social uses of technologies. Likewise, we have seen teachers introduce algorithms to students by exploring how search engines such as Google or Bing work—investigations that open doors for future discussions about algorithmic bias and targeted advertising. We have also seen teachers use simple coding software, such as Scratch, to illustrate for students how software is actually composed of code. Such activities make visible hidden architectures of platforms that underpin everyday digital practices. Even more, they orient students toward deeper forms of digital literacy, not only using the tools of digital media but also understanding how they work, who profits from them, and how the pressures they exert might be navigated or resisted (see Table 3).

Conclusion: Rethinking Digital Literacies

There is still important work to be done to better understand the pressures of teaching in platform-saturated classrooms. As this column goes to press, the ongoing COVID-19 pandemic is further pushing teaching into online spaces, highlighting both how central platforms are to educational practice and why there is need to think through their contradictions. In a connective world where apps and platforms have become necessary educational infrastructure—as essential as the electrical grid or the water utility—platform studies and their insights provide another angle on these questions. Thinking through platform studies helps us see how each keystroke, swipe, and username in a classroom contains all kinds of complicated social, technical, and economic dynamics. A focus on platforms calls attention to how all of these activities are intimately bound up with digital relations that are not always immediately visible to us. As teachers, these understandings may make us

Table 3
Some Opportunities for Student Inquiry

Dimension		Lessons related to digital platforms
Social		Have students reflect on their own uses of digital technologies. Do they notice patterns in their usage? Have them imagine a world without those devices: What would be different? What would they miss or not miss?
Technical	Hardware	Invite students to write or draw using different forms of hardware (e.g., paper, tablet, laptop) and compare the strengths and limits of each. How does physical hardware change the composing process? Do certain tools have dis/advantages over others for certain tasks?
	Interface	Have students use photo-editing software (or paper) to reimagine the interface for a favorite app. What features would they want to see? What layout? What are the app's current limitations, and how might they be improved?
	Algorithms	Compare results between different search engines. Inquire with students: How do search engines work? Why are there differences between them? How do websites make use of our search histories?
	Code	Encourage students to explore rudiments of coding using Scratch. Have them create a story in the app and reflect on their process for doing so.
Economic		Introduce the concept of data privacy. Ask: What information are we comfortable sharing with others (family, friends, strangers)? What happens to data once they are shared?

more cautious, but they also allow us to think more broadly about the implications of app integration in our classrooms, our schools, and our practice.

REFERENCES

Berry, D.M. (2011). *The philosophy of software: Code and mediation in the digital age*. New York, NY: Palgrave Macmillan.

Bogost, I., & Monfort, N. (2009). Platform studies: Frequently questioned answers. *Digital Arts and Culture*. Retrieved from http://escholarship.org/uc/item/01r0k9br.pdf

Desimone, L.M., Stornaiuolo, A., Flores, N., Pak, K., Edgerton, A., Nichols, T.P., … Porter, A. (2019). Successes and challenges of the "new" college- and career-ready standards. *Educational Researcher*, 48(3), 167–178. https://doi.org/10.3102/0013189X19837239

Dixon-Román, E., Nichols, T.P., & Nyame-Mensah, A. (2019). The racializing forces of/in AI educational technologies. *Learning, Media and Technology*. Advance online publication. https://doi.org/10.1080/17439884.2020.1667825

Gillespie, T. (2010). The politics of "platforms". *New Media & Society*, 12(3), 347–364. https://doi.org/10.1177/1461444809342738

Helmond, A. (2015). The platformization of the web: Making web data platform ready. *Social Media + Society*, 1(2). https://doi.org/10.1177/2056305115603080

Hill, H.C. (2020, February 7). Does studying student data really raise test scores? *Education Week*. Retrieved from https://www.edweek.org/ew/articles/2020/02/10/does-studying-student-data-really-raise-test.html

Israelson, M.H. (2015). The app map: A tool for systematic evaluation of apps for early literacy learning. *The Reading Teacher*, 69(3), 339–349. https://doi.org/10.1002/trtr.1414

Nichols, T.P., & Stornaiuolo, A. (2019). Assembling "digital literacies": Contingent pasts, possible futures. *Media and Communication*, 7(2), 14–24. https://doi.org/10.17645/mac.v7i2.1946

Scott, J., & Nichols, T.P. (2017). Learning analytics as assemblage: Criticality and contingency in online education. *Research in Education*, 98(1), 83–105. https://doi.org/10.1177/0034523717723391

Srnicek, N. (2017). *Platform capitalism*. Malden, MA: Polity.

Stornaiuolo, A., & LeBlanc, R.J. (2016). Scaling as a literacy activity. *Research in the Teaching of English*, 50(3), 263–287.

van Dijck, J., Poell, T., & de Waal, M. (2018). *The platform society: Public values in a connective world*. New York, NY: Oxford University Press.

Zuboff, S. (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. New York, NY: Public Affairs.

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