



132 Words: A Critical Examination of Digital Technology, Education, and Citizenship

Dan Mamlok^{1,2} · Kathleen Knight Abowitz^{1,2}

Accepted: 10 June 2021

© The Author(s), under exclusive licence to Springer Nature B.V. 2021

Abstract

This article explores the potential of digital technology to advance democratic citizenship. Drawing on critical theory and following a critical, comparative qualitative study which examined the relationships among digital technology, education, and democracy in the US and Israel, the authors explore epistemological assumptions of teaching and learning with digital tools. The article examines the tension between the promise of digital technology to transform education, and the instrumental hegemony of the neoliberal imperative. At the heart of this article, the authors contend that current teachers' understanding of using digital technology, and the practices used in classrooms constrain the promotion of digital citizenship. The authors argue that transforming education through digital technology and advancing civic aims require epistemological transformation which will move beyond instrumental understanding of digital tools. They conclude with a recommendation of a theoretical framework for digital citizenship.

Keywords Technology education · Media literacy · Citizenship education · Democracy and education · Critical qualitative study

1 Introduction

The influence of digital technology¹ on almost every domain in life has led to the proliferation of research regarding integrating technology and education. Much of this research deals with the instrumental aspects of technology and education, such as designing effective pedagogical methods when using digital technology, training pre-service and in-service teachers, improving administrative work through technology, and preparing students to attain twenty-first century skills (See for example: Abbitt, 2011; Angelo, 2012; OECD,

¹ We refer digital technology to computers, tablets, smartphones, videos, presentations, digital whiteboards, and any accessible digital device that enables the use of Information and Communication Technology (ICT) for teaching, learning, communicating, and acquiring information.

✉ Dan Mamlok
danmamlok@tauex.tau.ac.il

¹ School of Education, Tel Aviv University, P.O. Box 39040, 6997801 Tel Aviv, Israel

² Department of Educational Leadership, Miami University, Oxford, OH, USA

2015; Tondeur et al., 2012; Waters, 2015). In contemporary research on educational technologies, a growing attention has been given to teachers' perceptions of integrating digital technology in education. For example, Ertmer et al. (2012) investigated the consistency of teachers' beliefs about utilizing digital technology for instruction, and their teaching practices in the classroom. Following a study in a southwestern U.S. School district, Li et al. (2019) suggest that unfolding "pedagogical beliefs, technological beliefs, and perceived professional development" (p. 504) are important for predicting the integration of digital technology in the classroom. Several studies (Graham et al., 2014; Regan et al., 2019) examined teachers' attitudes towards using digital tools for teaching writing, and explored ways to expand the use of digital tools beyond searching for content, and representing knowledge via visual displays (i.e., Power Point slides, class website, blogs). In a similar vein, Sahin et al. (2016) examined the relationship between teachers' experience and their comfort level of utilizing digital technology, with an emphasis on using Chromebook laptops. Another area of research reflects the growing interest in digital games and learning. For instance, Rowan (2017) conducted a three-year study in Australia, examining "how games have impacted upon the educational or social experiences of particular children" (p. 296). A more critical view of integrating digital technology in education is offered by Selwyn et al. (2017), where they explored the influences of digital tools on teachers' work, and how digital technology, at least to some extent, diminishes teacher autonomy.

While there is a large body of research related to teachers' digital competencies, pedagogical strategies, and administrative issues, there is less empirical research focusing on the relationship between teachers' understanding of digital technology and its ramifications on the advancement of democratic citizenship. The purpose of this article is to fill this gap by considering the epistemological assumptions of utilizing digital technology in education, and to propose a pragmatic framework for the advancement of digital citizenship. In particular, we examine two dominant epistemological premises. The first premise refers to the perception of digital technologies as neutral. The second epistemological premise relates to the instrumentalization of knowledge (Means, 2018; Williamson, 2013). This premise is greatly informed by the neoliberal imperative. We use the term neoliberalism to refer to a political-economic theory based on the free market as a key principle for economic and social progress. Neoliberalism asserts that for attaining economic, social, and global prosperity, public services should be privatized, and values of competition, free choice, accountability, and individualism should be emphasized (Montgomery, 2007). In this sense, this article aspires to examine the tension between the promise of digital technology to transform reality and neoliberal reasoning.

This article follows a critical qualitative study (Mamlok, 2017), which examined the relationships among digital technology, education, and democracy in the United States and Israel. The findings of this study illuminate teachers' understandings of digital technology in their pedagogy, and how the practices used in classrooms advance or constrain the promotion of digital citizenship. We contend that advancing a more critical and inclusive understanding of democracy and citizenship is necessary for developing digital citizenship and, by necessity, the way we employ digital technology tools in classrooms.

In the first part, we introduce and explain the Habermasian (1973, 1987) critical theory forming the theoretical framework of the study. Then we discuss democratic citizenship, and specifically challenge current conventional approaches of democracy and citizenship. In the third part, we probe some of the study's findings, arguing that the current model of educational technology is informed by business models and values. Neoliberalism thus not only strongly shapes epistemologies of the classroom—questions of knowledge and what constitutes knowledge in the curriculum—but neoliberalism also displaces the democratic

and civic values that we argue should be at the heart of schooling. The discussion section includes a theoretical recommendation of an alternative approach for teaching and learning with digital technology. We argue that education for digital citizenship requires epistemological transformation; that is, a reconsideration of what constitutes human knowledge and knowing, as it is conceived for purposes of democratic citizenship.

2 Theoretical Framework

In this section, we provide an overview of two important theoretical tenets of our study. First, we encapsulate some basic ideas of critical theory, with an emphasis on the critique of Jürgen Habermas. Then we provide a brief overview of democratic citizenship.

2.1 Critical Theory, Technology, and Society

In considering the epistemological assumptions of technology use, we focus on what educators and students believe is worth knowing in relation to the use of digital media devices in classrooms. This article utilizes critical theory, and the framework of the Frankfurt School, to interpret epistemological meanings in the use of digital media in classrooms. We borrow the idea of critical study from Horkheimer's (1972) definition: "By criticism we mean that intellectual, and eventually practical, effort which is not satisfied to accept the prevailing ideas, actions, and social conditions unthinkingly and from mere habit" (p.180). This notion of critical study attempts to reconcile the tension between the empirical studies of social sciences, and the importance of revealing the philosophical, social, cultural, and economic relationships (Honneth, 1995).

We employ the theory of Habermas as a starting point for our analysis. Habermas' critique explains the influences of technology in society, and is vital for elucidating the link between how certain forms of rationality and knowledge can promote or constrain democratic citizenship. Habermas (1973) distinguishes between the *practical (lifeworld)* and the *technical (techne)* realms. The lifeworld realm refers to everyday communications between people, which are mediated by a wider understanding of cultural norms, group identities, and social codes (Feenberg, 2010). The technical realm refers to instrumental reason required for organizing actions, as well as for communicating with people (Habermas, 1973). The prevalence of the technical realm rests on efficiency, technical skills, and control, and misses the importance of creating the conditions for prolific and freer communication among individuals (Bernstein, 1978). Habermas recognizes the importance of balancing between the two realms. He deems that a one-sided reliance upon the technical realm is a danger to democracy and involves individuals whose worldview has been confined to a technocratic understanding of what it means to be a citizen. Conversely, relying upon the lifeworld involves a romantic and naïve view of society, which can lead to social and cultural stagnation. Therefore, he suggests that for attaining more emancipatory social aims, it is vital to balance between the technical and the practical realms.

The distinction between *techne* and *lifeworld* in Habermas' early works (1972,1973) paved the way to systematic analysis of social life in his mature work. In *Theory of Communicative Action* (1987), Habermas adds an important element to his accounts on the tension between different forms of rationality and knowledge. If in his early work the distinction was between the lifeworld and the technical realm, then in his later work the distinction is between the lifeworld and the system, or more accurately, two social systems: the political

and the economic. For Habermas, the development of the political and economic systems is interrelated to the lifeworld, and they both have essential role in administrating, regulating, and arranging social life (Deakin Crick & Joldersma, 2007). However, Habermas contends that as society developed, those subsystems “increasingly unhooked from the lifeworld” (Deakin Crick & Joldersma, 2007, p. 80), and lost the cultural hermeneutic dimension that is crucial for social cohesion. In this sense, Habermas argues that the lifeworld has been colonized by the systems, or by instrumental and technical rationalities (Habermas, 1987).

The importance of Habermas’ theory for this study is twofold. First, the theory provides a recognition of the tensions between the lifeworld and other forms of rationality, and the need to move beyond narrow instrumental understanding of digital tools to develop a broader sense of digital literacy that will connect the learner and their larger social realms (Murphy, 2010). The second reason pertains more directly to our interest in democratic citizenship education. Deakin Crick and Joldersma (2007) suggest that in pluralistic societies, where peoples’ lifeworld[s] are varied, “communication is increasingly required for social integrality” (p. 79). Having a society in which the social systems colonized the practical realm will not provide the full range of possibilities of societal integration and effective civic participation.

Whereas educational scholars had previously considered the potential of Habermas’ work to support a more nuanced understanding of democracy and citizenship in education (see for example: Brookfield, 2010; Deakin Crick & Joldersma, 2007; Murphy, 2010), analyzing the integration of digital technology in education through the Habermasian perspective is less developed. Hammond (2015) offers an elucidating examination of integrating digital technology in education, where he deliberates about advancing a “joint meaning” (p. 227) through online spaces. Tilak and Glassman (2020) suggest that knowledge creation in the digital age have the potential to instigate alternative lifeworlds through online education. The particular aspects of social life with which we are concerned in this study are (1) how instrumental rationality governs the dominant perception of citizenship; and (2) how digital technologies have reinforced and reproduced narrow understandings of citizenship.

2.2 Democratic Citizenship

Digital tools hold the potential to enhance our work as citizens, especially as we consider forms of communication. Citizenship, at least theoretically, confers membership, identity, values, and rights of participation and assumes a body of common political knowledge. The institutions of state-sponsored schooling were formed with citizenship goals, among others, in mind. We often think of the social studies curriculum in particular as conveying citizenship instruction in the form of knowledge, skills and attitudes around political membership and values.

Discursive analyses of citizenship (Knight-Abowitz & Harnish, 2006) have plotted seven distinct yet overlapping frameworks for understanding contemporary Western citizenship conceptions and practices: the dominant civic republican and liberal, and the critical challengers to these which include feminist, cultural, reconstructionist, queer, and transnational citizenship discourses. Two of these citizenship discourses predominate our common understandings of the term particularly as it is conveyed in PK-12 schools: the civic-republican discourse, and the liberal discourse. Though these discourses took shape well before the advent of digital life, they strongly shape how policy-makers and educators view emerging meanings of “digital citizenship” as well.

Civic republican discourse emphasizes loyal membership in one's political community, highlighting love and service as virtues. Texts or persons representing this view of citizenship often "highlight the need for better civic literacy and the importance of a central body of civic knowledge for good citizenship." Further, "civic republicans wish to promote a civic identity among young people characterized by commitment to the political community, respect for its symbols, and active participation in its common good" (Knight-Abowitz & Harnish, 2006, p. 657). This discourse of citizenship shapes ideas of digital citizenship embraced by, for example, the U.S. Department of Education. The 2017 National Educational Technology Plan (NETP) states: "Helping students learn to use proper online etiquette, recognize how their personal information may be collected and used online... can help prepare them for successfully navigating life in a connected world" (U.S. Department of Education, 2017, p. 11). Digital citizenship in this discourse takes on meanings of mastering skills of online citizenship. Namely, following the etiquette and laws of good behavior, the rules for using information and sources, and of participating civilly in digital platforms.

The liberal discourses of citizenship, on the other hand, prioritize values of individual rights and freedoms. Citizenship in this discourse is practiced by the rights-bearing individual who has extensive freedoms to pursue visions of a good life (albeit ones that do not harm others), and a commitment to a diverse polity that assigns equal rights to all citizens. Knowledge and values for individual rights and the ability to engage politically and culturally with other citizens are values of liberal citizenship. Virtues of respect and tolerance are highlighted in this discourse. This discourse is seen in digital contexts in multiple ways; take, for example, the explicit naming of "online privacy and safety" issues as key factors of digital citizenship described in the NETP (U.S. Department of Education, 2010, pp. 13–14). Digital citizenship education can be narrowly interpreted here as pedagogy enabling students to protect themselves online, safeguarding their rights to privacy as well as well-being. This is an individualist notion of safety in keeping with the liberal focus on the rights of the individual in the political realm.

In recent decades, there is growing literature of scholarship advocating for a more critical, inclusive, and agential understandings of citizenship to challenge both the dominant civic republic and liberal discourses, and to respond to the general neoliberalist assault on democratic aims. Trends of globalization have driven several promising new versions of critical global citizenship models (Ellis, 2016; Mikander, 2016) which call social studies educators to teach the colonialist legacies of empire so as to create citizens who understand, and can act to reverse the histories and structures of today's conditions of global inequality. Stitzelin (2012) has written on the "positive right to dissent" as an important and neglected element of citizenship education (p. 42). For Ben-Porath (2012), the idea of citizenship requires the recognition of what she calls "shared fate" (p. 381). Beyond the basic need of realizing the diverse worldviews, she suggests that "shared fate relates to the aspects of civic and political life that individuals can reasonably be expected to either share or relate to" (p. 381). Emejulu and McGregor (2019) refer more directly to education and digital citizenship. They attempt to develop emancipatory practices, and to challenge structural inequalities, pertaining to racial, patriarchal, and other forms of unjust power relations.

In general, however, citizenship discourses which were firmly in place prior to digital revolutions of the current era powerfully shape how educators and others are positioned to understanding meanings of digital citizenship. These discourses are, we will see, insufficient for navigating the complexities of the digital life in a globalized, politically complex, culturally diverse neoliberal world. Alternative citizenship discourses, such as the critical

forms of social reconstructionist as well as cultural citizenship, are needed to broaden our meanings of political participation in the neoliberal era (Knight-Abowitz & Harnish, 2006). Making citizenship values and practices more critical and more culturally supple will be necessary for a relevant digital citizenship concept moving forward. Our study examines the citizenship values that are emergent as teachers employ digital technologies in their pedagogies, building an important link between critical interrogations of educational technologies and the citizenship lessons they (explicitly or implicitly) teach.

3 Methodology and Methods

As pointed out earlier, this article draws from a larger critical qualitative study (Mamlok, 2017), which included teacher interviews, and classroom observations in the United States and Israel. Qualitative studies attempt to highlight social actions, subjective experience, and social conditions (Carspecken, 1996). At the heart of critical research is the assumption that generating knowledge is intertwined with raising awareness, and advancing social change (Carspecken, 2012). Canella and Lincoln (2012) point out that “critical perspectives seek to illuminate the hidden structures of power deployed in the construction of its own power...Frequently, these power structures (whether hidden or obvious) are/can be tied to late capitalism and more currently, neoliberalism and its counterpart, invasive hyper-capitalism” (p. 105). Following the theoretical framework, we endeavored to highlight philosophical problems through empirical research.

3.1 Methodological Approach

As part of our attempt to bridge theory and practice, we develop our philosophical argument through empirical research. Wilson and Santoro (2015) argue that integrating empirical methods in philosophical research “(1) adopts a broadly pragmatic experimental approach to inquiry, (2) explores the moral and ethical dimension of education, and (3) aims to improve precision of conceptual frameworks in different areas of educational research and practice” (p. 118). These goals are well-aligned with the traditions of critical theory, the theoretical framework used in the study.

Critical theory presupposes that understanding and shared meanings are placed within political, cultural, and economic contexts. Therefore, this research provides a philosophical investigation which elucidates the ideological powers that figure the lifeworld of digital media usage in classrooms. The study explores how teachers’ actions relate to the present political and cultural context, and more directly to education under the apparatus of neoliberalism.

3.2 Data Collection

Classroom observations and interviews were taken between December 2015 to May 2016. Semi-structured interviews were utilized to reveal meanings of digital technology use in the classroom lifeworld of the participants (Kvale & Brinkmann, 2009). In addition, the

data collection involved samples of daily life, in order to evaluate subjective and normative reconstruction (Carspecken, 1996).

3.3 Participants

The sample ($n=10$) of this study (Mamlok, 2017) included an assistant principal and three teachers (two science teachers, and one social studies teacher) teaching in a middle school in southwest Ohio, and an assistant principal and five teachers (two science teachers, and three English teachers) teaching in a middle school in the area of Tel-Aviv, Israel. A purposeful sampling (Creswell, 2011; Patton, 1990) was used to select the sites and the participants. Critical sampling aims to “select information-rich cases whose study will illuminate the questions under study” (Patton, 1990, p. 169). Research sites were chosen in public schools where students were using advanced technologies on a daily basis, and which employed teachers who fully or partially integrate digital technology in their classes. It should be noted that our investigations do not employ traditional notions of comparative study. The focus here is less on identifying similarities and differences of the United States and Israeli contexts, and more on discerning overarching practices and assumptions that teachers use in their classroom contexts across two nation-state systems. Such a comparative examination helps to reveal what Varenne (2014) would call the meta-ideologies and meta-linguistic aspects of utilizing digital technology in schools.

3.4 Data Analysis

The data analysis followed Carspecken’s theoretical framework, aiming to connect subjective experience with broader political and cultural contexts. The coding process was comprised of two stages: (1) low level coding was utilized to speculate on general themes and abstractions; (2) horizon analysis, drawing from classical phenomenology and critical pragmatic theory, Carspecken (1996) uses this term to demystify how actions and practices symbolize broader social and cultural contexts. The heart of the analysis focused on examining each of the identified themes in the schools and in the interviews and juxtaposing them with the theoretical framework, social structures, and educational policies (See Table 1 for examples). Triangulation and peer debriefing were utilized to validate the data (Creswell, 2011).

4 Findings and Analysis

In light of the desire to enhance democratic values in the realm of citizenship and in digital citizenship practices in particular, we consider four prominent assumptions of utilizing digital technology in education that emerged in the study’s (Mamlok, 2017) findings: (1) The neutrality of technology; (2) standardizing education; (3) efficiency as an essential element in education; and (4) competition as a common practice.

4.1 The Neutrality of Technology

One of the common assumptions regarding digital technology is that technological tools are neutral, and this framework of ideas was pervasive in how teachers discussed their use

Table 1 Main identified themes and relevant examples

Themes and Sub-themes	Coding method/source	Examples
Neutrality	Interview (US)	It's not using it as a bells and whistles, it is really just a tool
	Interview (IL)	Digital literacy is the ability to find information, to compile information, and to present information
	Interview (US)	I think that's [digital technology] the economy the US currently lives in, so part of what school is and does, is to get students ready for the economy we have currently, and part of that is students being able to use technology in a variety of ways; being able to use the tools available, and to explore and to play these tools to accomplish any given task, and I think that is really important to get them ready for this new twenty-first century new type of economy
Standardization	Interview (IL)	I would say that in the twenty-first century technology should be an integral part of the tools we use. I would change the way we get ready to use it... that we would have a faster response [to the technical needs]. Even training some students from every class, that would do what the technicians do
	Interview (US)	State standardized tests, [and] all the daily pressure of things you have been asked to do, along with these district initiatives, that at times I feel like detract from what our overall educational goals should be
	Class observation (IL)	[English class]The students work on the third part of the story. Here they listen and read the story. While they listen, the teacher points on the text (which is screened on the whiteboard), and explains once more the importance of training the listening part for the "meitzav" (Israeli standardized testing)
Efficiency	Interview (US)	[In terms of] the efficiency part I have mentioned- it can make my life easier by using technology instead of using pencil& paper. The feedback is quicker for students
	Observation (US)	The teacher shows me GradeCam, an automatic device for evaluating students' test forms: The students submit the form, which looks very similar to barcode. The teacher scans the forms, and receives the grades right away
	Interview (IL)	I use the computer, and in some classes I use "Kahoot." They log in to the game with their cellphones and take a short quiz. It works on their ability to answer fast and accurate. They see their score during the game and can compare their grade to the general score
Competition	Interview (US)	I think that the competition of what these kids are being exposed to through apps is now pushed up from the bottom. So as the kids are coming up, there is that expectation [to be competitive in a technological world]
	Observation (US, IL)	Excessive use of computer-based games (such as Kahoot and Quizlet), which encourage competition among students, as well as reinforcing a limited understanding of knowledge

of digital technologies. This assumption implies that technology is simply and merely a tool, regardless of underlying ideologies or external elements of its design (Emejulu & McGregor, 2019). The understanding of digital technology as neutral has been consistently reflected by the participants in this study. For example, Mr. Rasmussen, the assistant principal in the U.S. school, pointed out: “it’s [digital technology] not using it as a bells and whistles; it is really just a tool” (Mr. Rasmussen 2016, personal communication). Mr. Evans, 8th grade science teacher in the U.S. school pointed out that, “Technology is a tool like anything else, like a ruler, you know... It’s not going to change how I approach a topic, unless I see a value in it making me more effective” (Mr. Evans 2016, personal communication). In a similar manner, the Israeli teachers depicted how technological tools are helpful for acquiring knowledge, evaluating student performance, and engaging students through group work and computer-based games.

The participants’ understanding of digital technology as neutral echoes what is revealed in national policy documents. For example, the introduction to the *2017 National Education Technology Plan* (NETP) (U.S. Department of Education, 2017) states that it is crucial “to realize fully the benefits of technology in our education system and provide authentic learning experiences, educators need to use technology effectively in their practice” (p. 3). In a similar manner, the *Israeli National Information and Communications Technology (ICT) Plan* (Israeli Ministry of Education, 2010) states that the plan aims to advance new pedagogies through digital technology. According to the ICT plan, integrating digital technology in education is essential for improving education by providing students relevant tools that will prepare them for the competitive market of the twenty-first century (Israeli Ministry of Education, 2010). The policy documents and the teachers’ accounts on digital technology are emblematic of the common perception of technology as neutral.

Indeed, computers, smartphones, and educational software are useful for finding information, and to stimulate student engagement through different technological platforms. Yet understanding technological tools as neutral ignores how computers are designed, marketed, and developed by for-profit companies. In this respect, it is noteworthy to review two useful approaches to technology: *Technological determinism* and *social constructivism*. Technological determinism refers to technological progress as independent from social and cultural conditions. Namely, its advancement moves to the same directions in all societies, regardless the sociocultural differences. The notion of technological determinism implies that societies have no significant role in the design of new technologies, and that technology brings change to all spheres, all groups, all corners of societies. Social constructivism, however, suggest that scientific and technological developments are shaped within social contexts. In other words, unlike technological determinism, which views technology as neutral, social constructivism rests on the assumption that alongside the technical aspects, technological advancement is influenced by social forces, which have important role in determining the desired solutions for technological problems, as well as social needs (Feenberg, 2010). Both approaches attempt to abstract the techno-social relationship, but do not move toward a deeper understanding of the nature of technology as a socio-political phenomenon. A helpful approach that reconciles the tension between technological determinism and social reconstruction is found in Feenberg’s concept of *technical code*.

The concept of technical code is related to social practices and rationalities that constitute technical design and technological practices (Feenberg, 2010). This idea rests on the following assumptions: First, the hegemony of scientific rationality involves a powerful influence and control on social habits. Second, the scientific hegemony helps to advance scientific and technological solutions, based on techno-managerial rationality, regardless of the social conditions, or social needs. Feenberg calls this phenomenon *operational*

autonomy: “The ‘metagoal’ of preserving and enlarging [operational] autonomy is gradually incorporated into the standards, procedures, and ways of doing things, prejudging the solution to every practical problem in terms of certain typical responses” (Feenberg, 1991, p. 79). The operational autonomy is an integral element of creating standards, and constituting technical codes that are congruent with the hegemony of the scientific and technological rationalities, which are grounded in modern capitalism.

Those standards and technical codes have the potential of shaping strategic decisions based on the hegemonic rationality, while ignoring other possible rationalities. Such understanding of technology confines one’s worldview and perpetuates the status quo. However, unlike technological determinism, Feenberg (1991, 2010) suggests that the technical code is based on interplay between the technical and the discursive elements. Namely, the development of a technical solution is not independent from the sociocultural context in which it designed. For example, the design of hybrid or electric cars cannot be separated from the environmental discourse, and the growing attention to climate changes. The same holds for the ways in which educational technologies are designed. For example, the desire to enhance standardization, efficiency, and competition in education through digital solutions are contingent on a hegemonic neoliberal agenda and influenced by business models in education. Digital technology, in this sense, responds to the desire to collect data and control over students’ performance and teaching practices (Saltman, 2017).

The participants in the study (Author 1 2017) consistently portrayed how the digital tools are harnessed to advance student performance, and to help them to meet the standards. Mr. Rasmussen pointed out how the school’s management system produces information needed to track students and teachers:

I can pull out the information of any of the students here, and to compare between the internal and external grades. You can look at their [students’] discipline. You can find demographic information, and even what bus [each child] students take... so basically, we have here all the things that we used to do with papers, are compiled now in a digital storage area. (Mr. Rasmussen 2016, personal communication)

The design of the school management system demonstrates well the interplay between the technical and the discursive elements. In the following passages, we will elaborate on the examples of standardization, efficiency, and competition as prominent epistemological assumptions that inform the design of educational technologies.

4.2 Standardization

Standardization plays a major role in both U.S. and Israeli policy plans, and its effects are felt in the daily assumptions and practices of teachings using digital technologies in classrooms. Technological tools are understood as effective means for increasing efficiency of student assessment and teacher accountability (Israeli Ministry of Education, 2010; U.S. Department of Education, 2017). In the previous section, we reviewed the tendency of technological determinism to conceptualize technologies as neutral. In a similar manner, we suggest that the deterministic view of education is based on the premise that utilizing digital tools for standardizing education will have a similar effect in different places. Throughout NETP (2017) there is a great emphasis on the importance of maximizing the digital power to collect, analyze and share students’ learning data for meeting with the standards, and presses educators to take advantage of the data mining features: “Education data systems do not always maximize the use

of interoperability standards that would enable easy and secure sharing of information with educators, schools, districts, states, students, and their families” (p. 57). In Israel, the plan similarly renders the importance of assessing and evaluating student performance. For evaluating the effectiveness of the program, the plan recommends conducting a continuous evaluation of the contribution of digital tools to student progress in the core curricular subjects (English, native language, math, and sciences), and student performance in the standardized tests (Israeli Ministry of Education, 2010).

In both contexts, digital technology is understood as a means for accelerating standardization through student evaluation, tracking student performance, individualizing instruction, and using student data for administrative purposes as well as for pedagogical decisions at school district and state level. Such understandings of digital technology reinforce a narrow epistemological assumption regarding education. Education in current times is governed by the standardized rationality, which equates education with training student to reach mastery level of knowledge. This is not to imply that preparing students to have basic knowledge is undesirable. Endeavoring to provide students high standards is indeed crucial for students learning. However, one should differ between standards and standardization practices, which sort students, and use data for teacher accountability (Ravitch, 2011).

This critique is specifically pertinent in light of the promise of the U.S. and Israeli plans for transforming education thorough digital technology. The plans recognize the potential of harnessing digital tools for creating alternative educational spaces, developing new forms of communication, stimulating creativity, and more. Advancing critical citizenship requires educators to move beyond instrumental understanding of technology with the aim of increasing efficiency.

In the study (Mamlok, 2017), teachers expressed their concern regarding the ways in which some of the digital tools are designed for preparing students in a standardized way. For example, one of the digital platforms used in the U.S. schools is Google for Education. Though Google provides the software to schools for free, its involvement in education is far from neutral. Consider how the Google search engine has tremendously transformed the ways people understand and use digital devices. Google is a prime example of how the efficient technical solutions are interwoven with individual technologies, aiming to maximize the private profit by commodifying information, and shape user habits (Twell, 2016). The involvement of Google in education denotes the permeation of its ideology to education. In this respect, Ball (2012) notes: “Increasingly, these companies act as linkage devices, ‘interpreters’ of policy operating between the state and public sector organization—making reform sensible and manageable” (p. 95). The key problem lies in the fact that big companies such as Google do not merely provide efficient tools for teaching and learning. Google has transformed the ways in which individuals and societies obtain, appreciate and interact with different forms of knowledge. It is not to devalue the great benefits of tools such as those developed by Google, but to emphasize that big companies such as Google are driven by corporate interest, endeavoring towards the maximization of private profits through commodifying information (and knowledge), using big data to collect information about users, and sorting the information offered to users based on business interest (Roberts-Mahoney et al., 2016). In this sense, Google exhibits how its ideological goals have been demutualized by technology, which appears as neutral and efficient technological tools for searching.

In the context of education, the technical code aligns with the neoliberal apparatus that follow business models and foster standardization, as Saltman (2014) notes: “Corporate school reform seeks solutions to public problems in private sector ways...a wholesale

embrace of numerical benchmarking and database tracking” (p. 251). Though standardizing education had expanded prior to the digital information revolution, the advent of digital technology has accelerated these trends. One of the prominent concerns the participants raised relates to the overemphasis on standards which directly influence on teaching practices and the ways in which knowledge is perceived, as Mr. Hopkins, 8th grader social studies teacher in the U.S. school noted:

I would say that the main danger is that teachers have the standards that they teach to, and they [the standards] are created by the state or through the government, and I think that those standards are focused on the content. But as a teacher and as a young adult, living in a democracy I care strongly about, I am worried that we, as a nation, focus too much on the content, instead of focusing the things that really matter — the things like being a good citizen, and knowing how to participate in a democracy, and things that relate to being a good person, and having good values and morals. We don't make points to teach those things to our students, because teachers are so demanded by standards to rush throughout this all content. (Mr. Hopkins 2016, personal communication)

Given the prevalence of the techno-managerial rationality in education, it is not surprising that digital tools are crafted to facilitate student training and standardizing education. Akin to Habermas's claim regarding the colonization of the lifeworld by the system, practices of assessment and accountability have colonized education (Ravitch, 2011). It is based on the epistemological assumption that the prime goal of schooling is constrained to investment in human capital for the purpose of economic growth. As Brown (2015) rightly claims: “Human capital is distinctly not concerned with acquiring the knowledge and experience needed for democratic citizenship” (p. 177). We argue that while both U.S. and Israeli policy plans recognize the importance of moving beyond the technical aspects of education, and providing students with different competencies, the syntax of the digital tools is governed by the techno-managerial rationality, and confines one's capacity to develop a reflective and critical sense of everyday life.

4.3 Efficiency

Alongside standardization, educational technologies serve as efficient tools for various aspects of a school day, such as school and class management software, student evaluation, and instant communication with teachers. A second finding of the study revolves around the seductions of digital technologies which enable schooling efficiencies for teachers and school authorities. The communication revolution has fortified the relationship between schooling and efficiency by opening new possibilities of easily acquiring informational knowledge, and controlling a large amount of data. As digital revolution has changed human experience (Wajcman, 2015), it has stimulated the process of developing curriculum that aims to serve the demands of the market for efficient human capital. The efficiency of digital technologies pushes the concept of standardization further, and provides the ability to share and stratify schools' and students' data in large measures. As stated in NETP (2017):

States, districts, and others should design, develop, and implement learning dashboards, response systems, and communication pathways that give students, educators, families, and other stakeholders timely and actionable feedback about student learning to improve achievement and instructional practices. (p. 67)

The tendency to technicize education and to focus on the performative and instrumental elements have been distinctly evident both in the U.S. and the Israeli cases. Indeed, one cannot ignore the advantages of digital technologies as efficient tools for monitoring and measuring performance. Efficiency, according to this rationality, is associated primarily with speed and productivity.

We do not suggest that these elements are unimportant. Yet our concern lies in the underlying ideology behind those practices, and the overemphasizing of the instrumental aspects of education, which are treated as the goals instead as the means (Gardner-McTaggart & Palmer, 2018). One cannot separate the tendency to maximize efficiency in education from the socio-political zeitgeist, driven by the neoliberal agenda. The domination of neoliberal ideology and its influence on U.S. education has been widely analyzed and criticized (see for example: Giroux, 2011; Labaree, 1997; Saltman, 2014, 2017). In Israel, the advent of neoliberalism has transformed the societal values, which had relied on social-democratic principles, to a decentralized education system, with the attempt to make education more competitive and efficient, as Ichilov (2009) notes:

Economic efficiency take precedence over ideological and social consideration, commodifying services of infra-structural importance, which have been viewed as domains of government ownership and control (such as water, electricity, and transportation), and social services, such as health and education that were seen as governmental responsibilities, and as inseparable element of the exercise of governmental authority. (p. 77)

The hegemony of neoliberalism in the United States, Israel and other countries has not only demarked a significant change in the commitment of the state to its citizens. It also signaled a deeper reconfiguration of the relationships between the state and its citizens, which has turned from what Biesta (2010) calls “formal relationship” into “strictly formal relationships” (p. 54), more interested in setting achievement goals rather than advancing the complex interplay between subject matter, the student, and the society. The prime example is the overwhelming spread of student assessments. Biesta (2010) incisively compares the accountability practices to quality assurance, and remarks: “Quality assurance is about efficiency and effectiveness of processes, not about what these processes are supposed to bring about” (p. 54). Making education efficient is based on the desire to nurture the idea among students that the ultimate goal of education is to train student for jobs, and to look at the world through what Wendy Brown (2005) defines as *homo aeconomicus*, or the ontological view of human-as-economic-consumer-and-producer.

As in standardization, the technical code of educational technologies in respect to efficiency reflects the interplay between the technical element and the discursive elements. Digital technology, in this sense, is imagined as an effective tool that can serve as social utility which can advance the hegemonic techno-managerial rationality of education (Slakmon, 2017), which does not leave much room for developing a more reflective and critical understanding of the lifeworld. We deem that despite the potential of today’s students to become more informed and educated than their parents, under the current ideology of increasing standardization and efficiency, it is unlikely that students will make the connections between historical, political, and cultural events that are needed for advancing a more complex understanding of democracy and citizenship.

4.4 Competition

The discussion about standardization and efficiency demonstrates how business models have been adopted in education. In a similar manner, competition echoes the hegemony of the neoliberal apparatus in education, and was a persistent value seen in the teachers' practices and narration of their digital technology use in teaching. These elements cannot be disconnected from the epistemological premise of competition as indispensable part of the preparing students to be part of the global economy (Israeli Ministry of Education, 2010; U.S. Department of Education, 2017). The following example of a Kahoot game in a public middle school in Israel reflects how competition is perceived as an intrinsic element education:

At 12:30 pm in a classroom full of middle-school students, a teacher launches the first round of a computerized learning activity using Kahoot, a free game-based platform. The teacher has designed a game to suit her educational objectives. Students get out their smartphones to start the game, and the teacher turns off the lights and the techno music of the game fills the room. The game begins [as in video games, there is a countdown prior to the game]. The questions set as multiple answers questions. The game is a contest between students. After each question, there is indication on the screen on how many students selected each of the possible answer. Importantly, for teacher control of the game, students do not see the questions on their smartphones. The questions are screened on the board for several seconds, and the answers have different colors and shapes. The students see on their smartphones the shapes and the colors (not the answers), and based on what they see on the screen, they click the answers (which are signaled by a color and a shape). Some students stand on the tables as they play the game; others gather in the center of the classroom. They are clearly enlivened by the game, laughing, screaming, happily dancing when they get more points, or expressing frustration when their answers are wrong. By 12:45, the teacher concludes Round 1 of the game by reminding the students that this is a way to review some of the words that they will need to learn for the test. In a few weeks, they will need to know 132 words for this unit.

Practices of competition in education are not new. However, one of the increasing trends in current digitized education is the use of computer-based games. The tendency to utilize games in schooling relies on the desire to increase student engagement by making education fun (Buckingham, 2007). While the motivation of engaging students is welcome, it merits a caveat, and specifically requires one to pay attention to the difference between entertaining and motivating students (Ford & Opitz, 2015). Whereas entertaining students can be relatively easy task, developing challenging tasks requires teachers to recognize the interest of the students, and to encourage students to explore curricular matters critically, through ongoing reflection. Nevertheless, games for education are oriented primarily for entertaining students, as Buckingham (2007) comments: “[The] industries’ obsessive insistence on fun learning reflects an implicit rejection of the contrary view—that learning might actually involve work, and that work might not always be pleasurable” (p. 110). Though the obsession with entertaining students begs some questions regarding the role of education, our concern here is primarily focused on the congruency between the technical design of computer-based games and the technical employment of business practices, such as competition and standardization.

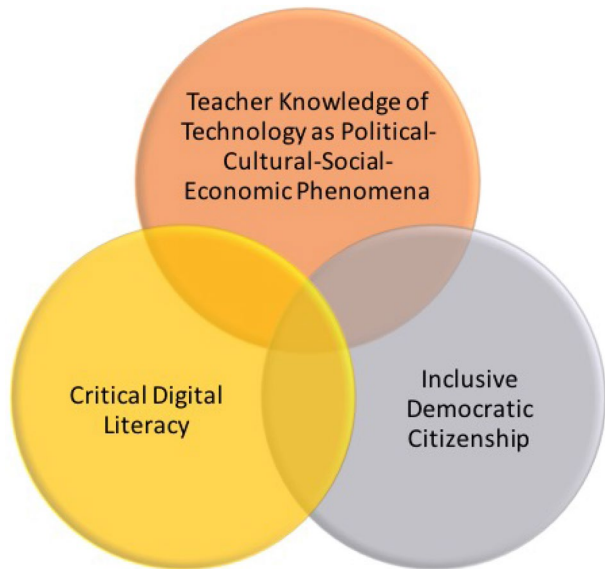
The Kahoot example demonstrates how the technical code constitutes the curriculum, aligning with the demands for standardized education. The teacher emphasis on preparing students to learn 132 words indicate how digital tools are perceived as effective means for training students to memorize discrete facts. It is not to suggest that games such as Kahoot do not enliven students. However, we argue that digital games advance certain forms of reasoning over others, and reinforce positivist and dogmatic notions of isolating content matters from everyday life. In addition, the focus on competition increases individualistic values, and forges learning habits based on rewards and punishment (Singer, 2016). Namely, the prime concern here is that against the promise of digital technology to transform education, and to foster active learning, student inquiry, and supporting students' cognitive capacities and the emotional needs (Israeli Ministry of Education, 2010), the common use of competition in digital games maintains a technical understanding of education as preparing students to acquire standardized knowledge, as well as decontextualizing and de-politicizing knowledge from everyday life.

5 Discussion and Recommendations: Moving Toward Digital Citizenship

In this article, we examined epistemological assumptions of teaching and learning with digital tools. While both the U.S. and Israeli plans intend to transform education by providing extensive frameworks for integrating digital technology in schools, they are governed by the neoliberal apparatus, and do not fulfill the potential of advancing democratic citizenship. Although this article has not been able to provide an extensive analysis of the interviews, it is noteworthy that the participants in this study acknowledged the importance of fostering democratic values through education. Yet, under current conditions, when education is oriented by business models, the main focus is on training students to the workplace; developing democratic and civic values are not at the heart of schooling (Kohn, 2009). It is important to note that digital technology, in and of itself, cannot be recognized as independent means for inhibiting or fostering democratic citizenship. As discussed, it is crucial for teachers to develop critical knowledge of technology, and specifically regarding its lack of neutrality, in order to unpack what digital citizenship might mean. In addition, it is important to develop alternative understanding of democratic citizenship, that moves beyond the liberal and civic republican discourses (Knight-Abowitz & Harnish, 2006).

Educational researchers and scholars are making progress in realizing the sociopolitical ramifications on the design of educational technologies. Yet when considering the relationship between digital technology, education, and democracy, it seems that critical perspectives relevant to democratic aims have remained disconnected from teacher education and practice. Citizenship is too often omitted in how we are conceiving of digital technology in our pedagogy and classrooms. In the concluding section of this article, we propose a pragmatic, integrative approach to digital citizenship, that takes into account the conglomeration of three elements: (1) understanding technology as political-cultural-social-economic phenomena; (2) recognizing the concept of inclusive democratic citizenship, which moves beyond hegemonic discourses; and (3) developing critical digital literacy across the curriculum (see Fig. 1).

Fig. 1 Three Elements of Digital Citizenship



5.1 Understanding Technology as Political-cultural-socioeconomic Phenomena

Earlier, we discussed the nature of digital technology and the notion of the technical code. Modern life is greatly shaped by digital technologies, and these technologies are largely influenced by the socio-political climate. Being an informed user of digital technology is essential for developing an agentic approach to digital technologies (Emejulu & McGregor, 2019; Feenberg, 2010). Educators can help their students recognize the biases, ideologies, and socio-political aspects they are embedded in technological design in general, and in digital tools for education in particular. Demystifying the relationships between technology and society, and the ways in which technological tools reflect the business practices, can help teachers and students to develop a critical understanding of these tools, as well as developing alternative ways of using them.

5.2 Recognizing the Concept of Inclusive Democratic Citizenship

The second element requires us to reconsider our understanding of democracy. As a launching point for this process of reconsideration, one should distinguish between the free market and democracy (Giroux, 2003). In addition, as previously discussed, attaining inclusive meanings of democracy involves informed citizens, who are reflective, critical and active agents striving to advance social equity and equality (Knight-Abowitz & Harnish, 2006; Emejulu & McGregor, 2019). Finally, it involves moving beyond the liberal and republican discourses, and to consider alternative discourses of democratic citizenship, such as the cultural and the reconstructionist forms, bringing greater recognition to the rich diversity of citizenship identities and projects, and naming citizenship as a force for social change. These discourses challenge the hegemonic views of neoliberal society which diminish democratic values, and can help students use digital technology to learn about different

realities and cultures, as well as consider their world view based on a deeper understanding of the sociocultural realities and power relations (Knight-Abowitz & Harnish, 2006).

5.3 Developing Critical Digital Literacy Across the Curriculum

The last and important element refers to developing critical digital literacy. The participants in the study described digital literacy as a set of functional and technical aspects of using digital devices (Mamlok, 2017). What is missed in this view is realizing how the world is represented and mediated through digital technology, as well as its sociopolitical dimensions. In an age of “alternative facts” and fake news, critical media literacy is particularly essential (McGrew et al., 2018). As in other domains in education, encouraging students to self-reflect and explore how their ideological and predispositions influence on their digital practices is desired for enhancing their position as engaged and agential citizens. Such self-reflection “involves some degree of discomfort” (Pangrazio, 2016, p. 172). Moving beyond one’s comfort zone regarding social and political issues holds the potential to transform one’s views, and to foster political engagement.

Developing critical digital literacy may also require educators to consider the ways in which digital practices are perceived by individual people through internal and external meaning-making. Internal meaning refers to one’s ability to discern, evaluate, and analyze online contents. External meaning refers to the sociocultural in which a meaning is constructed (Hinrichsen & Coombs, 2013). Interpreting a political conflict will vary from one community and person to another, based on the different historical, cultural, and political backgrounds. In addition, critical media literacy requires educators to recognize the intricate layers of online contents, such as how different issues are represented; how online language (both verbal and visual) conveys ideas; and how online contents are produced (or what might be the underlying interests or motivations of the observed contents) (Buckingham, 2007, 2015). Any of these senses of critical media literacy requires educators to consider ways to move beyond the functional and technical aspects.

6 Limitations and Future Directions

As with all research, this study is not devoid of limitations. Whereas this study has been able to elaborate on the overarching practices and assumptions that teachers use in their classroom contexts across two nation-state systems, it is limited in its number of research sites. Exploring several more sites and national contexts could strengthen and complicate the argument and deepen understanding regarding the complex relationships among digital technology, society, and democracy. This future direction can go beyond studying Western countries and examine the socio-political ramification of integrating digital technology and education on non-Western countries. In addition, moving beyond teachers’ perspectives, and juxtaposing teachers’ and students’ language and practices can be useful for generating more cohesive findings.

7 Conclusion

Teachers and policy-makers who seek to develop digital citizenship must move beyond the neoliberal discourses that currently shape pedagogies and practices; we must understand the ways digital technologies are created and designed, reconsider our dominant notions of citizenship towards more active, critical, and alternative conceptions, and to that end, develop critical digital literacy approaches across the curriculum. In this article, we pointed out that in both U.S. and Israel, digital technology has raised a great hope for transforming education, which in our view first requires an epistemological transformation, moving beyond a simplistic instrumental understanding of digital tools. Our hope is that this framework will generate more contributions to this transformation.

Funding The authors received no financial support for the research, authorship, and/or publication of this article.

Declarations

Conflicts of interest We report that this manuscript has no potential conflict of interest.

References

- Abbitt, J. T. (2011). An investigation of the relationship between self-efficacy beliefs about technology integration and technological pedagogical content knowledge (TPACK) among preservice teachers. *Journal of Digital Learning in Teacher Education*, 27(4), 134–143.
- Angelo, T. (2012). Designing subjects for learning: Practical, research-based principles and guidelines. In L. Hunt & D. Chalmers (Eds.), *University teaching in focus: A learning-centered approach* (pp. 93–111). ACER Press.
- Ball, S. J. (2012). *Global education INC.: New policy networks and the neo-liberal imaginary*. Routledge.
- Ben-Porath, S. (2012). Citizenship as shared fate: Education for membership in a diverse democracy. *Educational Theory*, 62(4), 381–395. <https://doi.org/10.1111/j.1741-5446.2012.00452.x>
- Bernstein, R. J. (1978). *The restructuring of social and political theory*. University of Pennsylvania Press.
- Biesta, G. (2010). *Good education in an age of measurement*. Paradigm.
- Brown, W. (2005). *Edgework: Critical essays on knowledge and politics*. Princeton University Press.
- Brown, W. (2015). *Undoing the demos*. Zone Books.
- Brookfield, S. (2010). Learning democratic reason: The adult education program of Jürgen Habermas. In M. Murphy & T. Fleming (Eds.), *Habermas, critical theory and education* (pp. 125–136). Routledge.
- Buckingham, D. (2007). *Beyond technology: Children's learning in the age of digital culture*. Polity.
- Buckingham, D. (2015). Defining digital literacy: What do young people need to know about digital media? *Nordic Journal of Digital Literacy*, 10, 21–35.
- Canella, G. S., & Lincoln, Y. S. (2012). Deploying qualitative methods for critical social purposes. In S. Steinberg & G. S. Canella (Eds.), *Critical qualitative reader* (pp. 104–114). Peter Lang.
- Carspecken, P. F. (1996). *Critical ethnography in educational research: A theoretical and practical guide*. Routledge.
- Carspecken, P. F. (2012). Basic concepts in critical methodological theory: Action, structure and system within a communicative pragmatic framework. In S. Steinberg & G. S. Canella (Eds.), *Critical qualitative reader* (pp. 43–66). Peter Lang.
- Creswell, J. W. (2011). *Qualitative inquiry & research design: Choosing among five approaches*. Sage Publications.
- Deakin Crick, R., & Joldersma, C. W. (2007). Habermas, lifelong learning and citizenship education. *Study in Philosophy and Education*, 26, 77–95.
- Ellis, M. (2016). *The critical global educator: Global citizenship education as sustainable development*. Routledge.

- Emejulu, A., & McGregor, C. C. (2019). Towards a radical digital citizenship in digital education. *Critical Studies in Education*, 60(1), 131–147.
- Ertmer, P. A., Ottenbreit-Leftwich, A. T., Sadik, O., Sendurur, E., & Sendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers & Education*, 59(2), 423–435. <https://doi.org/10.1016/j.compedu.2012.02.001>
- Feenberg, A. (1991). *Critical theory of technology*. Oxford University Press.
- Feenberg, A. (2010). *Between reason and experience*. MIT Press.
- Ford, M. P., & Opitz, M. F. (2015). Helping young children discover the joy of learning. *Review of Human Factor Studies*, 21(1), 27–42.
- Gardner-McTaggart, A., & Palmer, N. (2018). Global citizenship education, technology, and being. *Globalisation, Societies and Education*, 16(2), 268–281.
- Giroux, H. A. (2003). *The abandoned generation: Democracy beyond the culture of fear*. Palgrave Macmillan.
- Giroux, H. A. (2011). The promise of critical pedagogy in the age of globalization: Toward a pedagogy of democratization. In H. H. Giroux (Ed.), *On critical pedagogy* (pp. 69–85). The Continuum International Publishing Group.
- Graham, S., Capizzi, A., Harris, K. R., Hebert, M., & Morphy, P. (2014). Teaching middle school students: A national survey. *Reading and Writing*, 27, 1015–1042. <https://doi.org/10.1007/s11145-013-9495-7>
- Hammond, M. (2015). A Habermasian perspective on joint meaning making online: What does it offer and what are the difficulties? *International Journal of Computer-Supported Collaborative Learning*, 10(3), 223–237. <https://doi.org/10.1007/s11412-015-9215-1>
- Habermas, J. (1972). *Knowledge and human interests* (J. Shapiro, Trans.). Boston, MA: Beacon Press.
- Habermas, J. (1973). *Theory and practice* (J. Viertel, Trans.). Boston, MA: Beacon Press.
- Habermas, J. (1987). *The theory of communicative action, volume. 2* (T. McCarthy, Trans.). Boston, MA: Beacon Press.
- Hinrichsen, J., & Coombs, A. (2013). The five resources of critical digital literacy: A framework for curriculum integration. *Research in Learning Technology*, 21, 1–16. <https://doi.org/10.3402/rlt.v21.21334>
- Honneth, A. (1995). *The fragmented world of the social: Essays in social and political philosophy*. (C.W. Wright, ed.). State University of New York Press.
- Horizon Report. (2014). *Higher education edition*. NMC. <http://www.nmc.org/publications/2014-horizon-report-higher-ed>
- Horkheimer, M. (1972). *Critical theory; selected essays*. Herder and Herder Press.
- Ichilov, O. (2009). *The retreat from public education [electronic resource] : global and Israeli perspectives*. Springer. <https://doi.org/10.1007/978-1-4020-9570-21>
- Israeli Ministry of Education. (2010). *2010–2015 Guide for the Digitized School*. http://sites.education.gov.il/cloud/home/tikshuv/Documents/mdrich_ashalem_tikshuv.pdf
- Knight-Abowitz, K., & Harnish, J. (2006). Contemporary discourses of citizenship. *Review of Educational Research*, 76(4), 653–690. <https://doi.org/10.3102/00346543076004653>
- Kohn, A. (2009). When 21st-century schooling just isn't good enough: A modest proposal. *District Administration*, 45(2), 38–39.
- Kvale, S., & Brinkmann, S. (2009). *InterViews: Learning the craft of qualitative research interviewing*. Sage Publications.
- Labaree, D. F. (1997). Public goods, private goods: The American struggle over educational goals. *American Educational Research Journal*, 34(1), 39–81.
- Li, Y., Garza, V., Keicher, A., & Popov, V. (2019). Predicting high school teacher use of technology: Pedagogical beliefs, technological beliefs and attitudes, and teacher training. *Technology, Knowledge and Learning*, 24(3), 501–518. <https://doi.org/10.1007/s10758-018-9355-2>
- Mamluk, D. (2017). Digital technology and education in the age of globalization [Doctoral dissertation, Miami University], Ohio. http://rave.ohiolink.edu/etdc/view?acc_num=miami1492461952509602.
- McGrew, S., Breakstone, J., Ortega, T., Smith, M., & Wineburg, S. (2018). Can students evaluate online sources? learning from assessments of civic online reasoning. *Theory and Research in Social Education*, 46(2), 165–193. <https://doi.org/10.1080/00933104.2017.1416320>
- Means, A. J. (2018). *Learning to Save the future: Rethinking education and work in an era of digital capitalism*. Routledge.
- Mikander, P. (2016). Globalization as continuing colonialism: Critical global citizenship education in an unequal world. *Journal of Social Science Education*, 15(2), 70–79. <https://doi.org/10.4119/UNIBI/jsse-v15-i2-1475>
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017–1054. <https://doi.org/10.1111/j.1467-9620.2006.00684.x>

- Montgomery, J. (2007). The logic of neo-liberalism and the political economy of consumer debt- led growth. In S. Lee & S. McBride (Eds.), *Neo-liberalism, state power and global governance* (pp. 157–172). Springer.
- Murphy, M. (2010). Forms of rationality and public sector reform: Habermas, education and social policy. In M. Murphy & T. Fleming (Eds.), *Habermas, critical theory and education* (pp. 78–93). Routledge.
- Noble, D. D. (1996). Mad rushes into the future: The overselling of educational technology. *Educational Leadership*, 54(3), 18–23.
- OECD [The Organization for Economic Cooperation and Development]. (2015). *Students, computers and learning: Making the connection*. Paris: OECD Publishing. Retrieved on March 29, 2020, from: <http://www.oecd.org/publications/students-computers-and-learning-9789264239555-en.htm>
- Patton, M. Q. (1990). *Qualitative evaluation and research methods*. Sage.
- Pangrazio, L. (2016). Reconceptualising critical digital literacy. *Discourse Studies in the Cultural Politics of Education*, 37(2), 163–174. <https://doi.org/10.1080/01596306.2014.942836>
- Ravitch, D. (2011). *The death and life of the great American school system: How testing and choice are undermining education*. Basic Books.
- Regan, K., Evmenova, A. S., Sacco, D., Schwartzter, J., Chirinos, D. S., & Hughes, M. D. (2019). Teacher perceptions of integrating technology in writing. *Technology, Pedagogy and Education*, 28(1), 1–19. <https://doi.org/10.1080/1475939X.2018.1561507>
- Roberts-Mahoney, H., Means, A. J., & Garrison, M. J. (2016). Netflixing human capital development: Personalized learning technology and the corporatization of k-12 education. *Journal of Education Policy*, 31, 405–420. <https://doi.org/10.1080/02680939.2015.1132774>
- Roehl, A., Reddy, S. L., & Shannon, G. J. (2013). The flipped classroom: An opportunity to engage millennial students through active learning strategies. *Journal of Family & Consumer Sciences*, 105(2), 44–49.
- Rowan, L. (2017). Teachers' beliefs about the impact of games on the academic and social experiences of diverse and at-risk children in schools: A Deleuzian perspective. *Learning, Media and Technology*, 42(3), 295–307. <https://doi.org/10.1080/17439884.2016.1160925>
- Sahin, A., Top, N., & Delen, E. (2016). Teachers' first-year experience with Chromebook laptops and their attitudes towards technology integration. *Technology, Knowledge and Learning*, 21(3), 361–378. <https://doi.org/10.1007/s10758-016-9277-9>
- Saltman, K. J. (2014). Neoliberalism and corporate school reform: 'Failure' and 'creative destruction.' *Review of Education, Pedagogy, and Cultural Studies*, 36(4), 249–259. <https://doi.org/10.1080/10714413.2014.938564>
- Saltman, K. J. (2017). *Scripted bodies: Corporate Power, Smart Technologies, and the undoing of public education*. Routledge.
- Selwyn, N., Nemorin, S., & Johnson, N. (2017). High-tech, hard work: An investigation of teachers' work in the digital age. *Learning, Media and Technology*, 42(4), 390–405. <https://doi.org/10.1080/17439884.2016.1252770>
- Singer, N. (2016). Kahoot app brings urgency of a quiz show to the classroom. *The New-York Times*. <http://www.nytimes.com/2016/04/17/technology/kahoot-app-brings-urgency-of-a-quiz-show-to-the-classroom.html>
- Slakmon, B. (2017). Educational technology policy in Israel. *Pedagogy, Culture & Society*, 25(1), 137–149. <https://doi.org/10.1080/14681366.2016.1231709>
- Sützein, S. M. (2020). *Learning how to hope*. Oxford University Press.
- Tewell, E. (2016). Toward the resistant reading of information: Google, resistant spectatorship, and critical information literacy. *Portal Libraries and the Academy*, 16(2), 289–310.
- Tilak, S., & Glassman, M. (2020). Alternative lifeworlds on the internet: Habermas and democratic distance education. *Distance Education*, 41(3), 326–344. <https://doi.org/10.1080/01587919.2020.1763782>
- Tondeur, J., van Braak, J., Guoyuan, S., Voogt, J., Fisser, P., & Ottenbreit-Leftwich, A. (2012). Preparing pre-service teachers to integrate technology in education: A synthesis of qualitative evidence. *Computers & Education*, 59, 134–144. <https://doi.org/10.1016/j.compedu.2011.10.009>
- U.S. Department of Education (2010). *Transforming American education: Learning powered by technology. National Education Technology Plan 2010*. U.S. Department of Education.
- U.S. Department of Education. (2017). *Reimagining the role of technology in education: 2017 National Education Technology Plan Update*. Education Publications Center.
- Varenne, H. (2014). Comments on Tobin's contribution to comparative research in anthropology and in education. *Comparative Education*, 16(2), 43–47.
- Wajcman, J. (2015). *Pressed for Time*. The University of Chicago Press.

- Wallace, M., Walker, J. D., Braseby, A. M., & Sweet, M. S. (2014). 'Now, what happens during class?' using team-based learning to optimize the role of expertise within the flipped classroom. *Journal on Excellence in College Teaching*, 25(3–4), 253–273.
- Waters, A. (Oct. 22, 2015). The algorithmic future of education. *Hack Education*. Retrieved on March 29, 2020 from: <http://hackeducation.com/2015/10/22/robot-tutors>
- Williamson, B. (2013). *The future of the curriculum. School knowledge in the digital age*. MIT Press.
- Wilson, T. S., & Santoro, D. A. (2015). Philosophy pursued through empirical research: Introduction to the special issue. *Studies in Philosophy and Education*, 34(2), 115–124. <https://doi.org/10.1007/s11217-015-9460-9>

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.