

Big Data, Privacy, and Education Applications

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Big data applications pose some of the most profound new media challenges to human rights with particularly serious social, cultural, and political implications for privacy. Increasingly aggressive marketing of these applications in K-12 education now exposes young people to new forms of privacy intrusions and escalates the risk of discrimination in schools. Nonetheless, schools are adopting educational technology (“edtech”) globally, often in reliance on promises of yet-to-be-proven benefits. Meanwhile, it is unclear whether educators are well advised of edtech’s related privacy and equality implications. Articles in professional education magazines, in which edtech is frequently marketed, represent one potential source of such information. This article discusses the findings from our study of the developing discourse about edtech and big data in selected U.S. and Canadian professional education magazines from 2013 to 2017. Although these magazines reported on a wide range of risks and benefits of edtech, they incorporated disturbingly little coverage of its privacy implications.¹

Les applications de mégadonnées posent certains des défis les plus profonds des nouveaux médias en matière de droits de l’homme, avec des implications sociales, culturelles et politiques particulièrement graves pour la vie privée. Le marketing de plus en plus agressif de ces applications dans l’enseignement primaire et secondaire expose désormais les jeunes à de nouvelles formes d’intrusions dans la vie privée et accroît le risque de discrimination dans les écoles. Néanmoins, les écoles adoptent la technologie éducative («edtech») à l’échelle mondiale, souvent en s’appuyant sur des promesses d’avantages encore à prouver. En attendant, il est difficile de savoir si les éducateurs sont bien informés des implications liées à la vie privée et à l’égalité d’edtech. Les articles dans les magazines de formation professionnelle, dans lesquels edtech est fréquemment commercialisé, représentent une source potentielle de telles informations. Cet article présente les résultats de notre étude sur le développement du discours sur les technologies de l’information et les mégadonnées dans certains magazines de formation professionnelle aux États-Unis et au Canada de 2013 à 2017. Bien que ces magazines aient rendu compte d’un large éventail de risques et d’avantages des technologies de l’information, ils ont incorporé une couverture inquiétante et peu de ses implications sur la vie privée.

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Note: This article was written prior to the COVID-19 pandemic, which has markedly escalated the adoption of edtech by schools at all levels throughout the world. Because these developments post-dated our analysis, they are not specifically discussed herein. However, we believe that the rapid and widespread penetration of edtech post-COVID-19 makes the privacy and equality concerns highlighted in this article more pressing than ever.

1. INTRODUCTION

“Big data” refers to the “capacity to search, aggregate and cross-reference large data sets,”² a capacity that is featured in a growing number of applications in many different contexts, such as consumer marketing, health care, urban policing, and anti-terrorism.³ Such applications seriously threaten democratic commitments to privacy and equality by allowing for a seemingly ever-increasing capacity to profile and sort users of new media.⁴ As Jim Balsillie put it, “[d]ata is not the new oil—it’s the new plutonium. Amazingly powerful, dangerous when it spreads, difficult to clean up and with serious consequences when improperly used.”⁵

Education is one of the arenas in which big data applications are presently being aggressively marketed, not only at the college level but perhaps even more so at elementary and secondary levels. In this article, we use the term “edtech” to refer specifically to “technological processes and resources” to facilitate learning⁶ and not broadly to include all administrative tasks. Edtech includes both classroom use of technologies such as electronic whiteboards and videoconferencing, as well as platforms that measure and monitor student performance. Countries around the globe are directing attention and resources towards improving educational achievement—especially at the primary and secondary levels. With the concomitant increase in the costs of providing education and concerns about financial responsibility, heightened consideration of accountability and results, elevated awareness of the range of teacher skills, and student learning styles and needs, more focus is being placed on the promises offered by online software and edtech. Information technology companies

² Danah Boyd and Kate Crawford, “Critical Questions for Big Data: Provocations for a Cultural, Technological and Scholarly Phenomenon” (2012) 15:5 *Information, Communication and Society* at 662 at 663.

³ David Lyon, “Surveillance, Snowden, and Big Data: Capacities, Consequences, Critique” (2014) 1:2 *Big Data & Society* online: <<https://doi.org/10.1177%2F2053951714541861>> at 2.

⁴ Cathy O’Neil, *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy* (New York: Crown Publishing Group, 2016).

⁵ Jim Balsillie, “Jim Balsillie: ‘Data is not the new oil — it’s the new plutonium’”, *The Financial Post* (May 28, 2019), online: <<https://business.financialpost.com/technology/jim-balsillie-data-is-not-the-new-oil-its-the-new-plutonium>> .

⁶ Rita C. Richey, Kenneth H. Silber, and Donald P. Ely, “Reflections on the 2008 AECT Definitions of the Field” (2008) 52:1 *Tech. Trends* 24 at 24.

recognize the huge market offered by K-12 education and are aggressively developing and marketing their products accordingly.

Privacy has emerged as one of the key concerns about big data applications, although it is not clear whether educators are well advised about edtech's privacy implications.⁷ This article examines the developing discourse in the U.S. and Canadian education sectors about edtech and big data and gives particular attention to privacy concerns. In order to investigate this discourse systematically, we inspected articles about edtech applications in the leading U.S. and Canadian professional education magazines over the last six years (January 2012—December 2017). We are interested in identifying both similar and different trends in discussions about privacy and edtech, the causes of these similarities and differences, and how these trends have changed over the last six years. Moreover, we seek to analyze authorship of these articles to gain insight into the influence edtech companies and professional educators have on the discussion of privacy and edtech.

2. BACKGROUND

Canadian and U.S. elementary and secondary schools are increasingly engaging with edtech for a multiplicity of purposes including administration, evaluation, communication, and student learning.⁸ In particular, technologies based on big data analytics have been touted as offering unprecedented opportunities for innovation in education such as personalized learning, more effective delivery of educational materials, improved assessment, greater responsiveness to student needs,⁹ and increased opportunities for communication, collaboration, and non-formal learning, all of which are considered to be “21st century competencies.”¹⁰ As a result, there is growing

⁷ A widespread lack of transparency in privacy and security practices of edtech companies no doubt undermines educators' ability to gain familiarity with these issues. See Girard Kelly, Jeff Graham, and Bill Fitzgerald, “2018 State of Edtech Privacy Report” (2018), online (pdf): Common Sense Media <https://www.commonsensemedia.org/sites/default/files/uploads/research/cs_state_of_edtech_privacy_report-2018.pdf> ; Heather Leatham, “Digital Privacy in the Classroom: An Analysis of the Intent and Realization of Ontario Policy in Context” (Ph.D. Dissertation, U.O.I.T. 2017) [unpublished], online: Ontario Tech University <<http://hdl.handle.net/10155/816>> .

⁸ Joel Reidenberg et al., “Privacy and Cloud Computing in Public Schools” (December 13, 2013), online: *Center on Law and Information Policy* <<https://ir.lawnet.fordham.edu/cgi/viewcontent.cgi?article=1001&context=clip>> ; Bernie Froese-Germain and Richard Riel, “Connected to Learn: Teachers' Experiences with Networked Technologies in the Classroom” (March 18, 2016), online: *Perspectives* <<http://perspectives.ctf-fce.ca/en/article/3098/>> .

⁹ Priscilla Regan, Jolene Jesse, and Elsa Khwaja, *Student Data Privacy and EdTech: Evolving Policy Responses* (2017) [unpublished]; Marta Gómez Domingo and Antoni Badia, “Exploring the Use of Educational Technology in Primary Education: Teachers' Perception of Mobile Technology Learning Impacts and Applications' Use in the Classroom” (2016) 56 *Computers in Human Behavior* 21.

market and policy based pressure for educators to adopt technology in their schools and classrooms.¹¹ Those who fail to do so risk being characterized as anachronistic at best and professionally negligent at worst.

Concomitant with the international push toward student mastery of “21st century competencies” of critical thinking, communication, collaboration, and creativity, and innovation¹² has been an emphasis on development of technological literacy and skills, sometimes referred to as digital literacy. Whereas earlier iterations of digital literacy focused on technical and access skills, there is growing recognition that cognitive and social skills are also essential for navigating an increasingly commercialized technological landscape.¹³ This is perhaps nowhere more apposite than in the context of big data edtech, with controversies relating to student privacy, data security, and profiling gaining heightened public notoriety in 2013 and 2014.

A 2013 lawsuit initiated by parents to stop a contract between data aggregator and cloud service provider InBloom and the state of New York (which had already uploaded data from over 2 million students into InBloom’s system) was dismissed in 2014 and InBloom ultimately went bankrupt in 2015.¹⁴ The InBloom controversy sparked public awareness of big data surveillance in edtech. Parents and educators began to express concern about surveillance, seemingly non-consensual use of children’s data derived from activities they were legally required to participate in (i.e., attending school), and the absence of opportunities to opt out of these data collection practices.¹⁵ This controversy, in turn, led to the introduction of over 100 bills related to student privacy in the US in 2014, which included industry-based initiatives like the Student Privacy Pledge¹⁶ that appear likely to have been designed to stave off regulation, and

¹⁰ Service Ontario, “21st Century Competencies: Foundation document for discussion” (2015), online (pdf): EduGAINS < http://www.edugains.ca/resources21CL/About21st-Century/21CL_21stCenturyCompetencies.pdf > .

¹¹ P21 (Partnership for 21st Century Skills), “Learning Environments White Paper” (2009), online (pdf): P21 < www.p21.org/storage/documents/le_white_paper-1.pdf >; C21 Canada (Canadians for 21st Century Learning and Innovation), “Shifting Minds: A 21st Century Vision of Public Education for Canada” (2012), online (pdf): C21 *Canada* < <http://www.c21canada.org/wp-content/uploads/2012/05/C21-Canada-Shifting-Version-2.0.pdf> >; Service Ontario, above note 10.

¹² Service Ontario, above note 10.

¹³ Valerie Steeves and Priscilla Regan, “Teaching Digital Citizenship in the Networked Classroom” (2018) 5:4 *International Journal of Public Administration in the Digital Age* 33.

¹⁴ Regan, Jesse, and Khwaja, above note 9.

¹⁵ *Ibid.*

¹⁶ Jennifer Sabourin et al., “Student Privacy and Educational Data Mining: Perspectives from Industry” (Proceedings from the 8th International Conference on Educational Data Mining, Cary, NC, 2015) at 164-170 [unpublished], online (pdf): Educational Data Mining < <http://www.educationaldatamining.org/EDM2015/proceedings/full164-170.pdf> > .

Google’s April 2014 announcement that it had “permanently removed all ad scanning” in the email service it provided to schools (thereby suggesting that it *had* been ad scanning prior to that time).¹⁷ Privacy concerns relating to edtech, like those relating to big data more generally (e.g., the Cambridge Analytica and Facebook revelations of 2018), continue to proliferate along with related litigation.¹⁸

The regulatory picture affecting edtech and privacy is complicated in both the U.S. and Canada, but for slightly different reasons. In the U.S., federal regulation of education has made centralized guidance from the Department of Education possible, but scattered federal and state legislation, specifically addressing children’s privacy rights, creates complex legislative terrain.¹⁹ In Canada, provincial regulation of education undermines provision of centralized guidance relating to edtech, and omnibus federal, provincial, and territorial privacy legislation provides no specific guidance with respect to children.²⁰ As a result, educators in both countries are often placed in the particularly difficult situation of being expected to adopt edtech in schools, while at the same time protecting the privacy rights of students in the context of a very complex factual and policy-driven landscape in which apps are heavily marketed—and often free and easily accessible.²¹

Privacy and data commissioners from around the world are pushing for privacy education in schools,²² and some commissioners in Canada are directly involving themselves in assessing edtech²³ and in conducting privacy impact assessments of educational apps.²⁴ However, in many cases teachers themselves

¹⁷ Emma Brown, “UC-Berkeley students sue Google, alleging their emails were illegally scanned”, *The Washington Post* (February 1, 2016) at para. 4, online: <https://www.washingtonpost.com/news/grade-point/wp/2016/02/01/uc-berkeley-students-sue-google-alleging-their-emails-were-illegally-scanned/?noredirect=on&utm_term=.251ea803b49b> .

¹⁸ Christine Armario, “Ruling raises objections to release of personal student data” (February 24, 2016), online: PHYS ORG <<https://phys.org/news/2016-02-personal-student.html>> .

¹⁹ Regan, Jesse, and Khwaja, above note 9.

²⁰ Andrew Campbell, “Online privacy protection for kids lagging in Canada”, *The Star* (July 7, 2014), online: <https://www.thestar.com/life/parent/2014/07/07/online_privacy_protection_for_kids_lagging_in_canada.html> .

²¹ Leatham, above note 7; Leah Plunkett, Alicia Solow-Niederman, and Urs Gasser, “Framing the Law & Policy Picture: A Snapshot of K-12 Cloud-Based Edtech & Student Privacy in Early 2014” (2014) *Harvard University Report* 2014-10.

²² Office of the Privacy Commissioner of Canada, “Joint letter to the Council of Ministers of Education” (November 3, 2017), online: Office of the Privacy Commissioner of Canada <https://www.priv.gc.ca/en/opc-news/news-and-announcements/2017/let_171103/> .

²³ Office of the Privacy Commissioner of Canada, “Sweep of Educational Apps Finds Some Fall Short on Privacy” (October 24, 2017), online: Office of the Privacy Commissioner of Canada <https://www.priv.gc.ca/en/opc-news/news-and-announcements/2017/nr-c_171024/> .

have little-to-no formal or informal training in recognizing or assessing privacy risks arising from edtech.²⁵ Although magazines aimed at teachers can be sources of information relating to available edtech, Leatham's 2017 analysis in Ontario, Canada, found that publications such as the Ontario College of Teachers' *Professionally Speaking* magazine were more directed at marketing the "benefits" of advertised apps than critically analyzing their privacy related risks.²⁶ This article reports on our systematic analysis of the discourse around edtech applications and big data, especially relating to privacy, in leading U.S. and Canadian professional education magazines from 2013 to 2017.

3. METHODOLOGY

In selecting education magazines to use for our analysis, we chose to focus on general education magazines rather than those specifically focused on technology because we were interested in understanding what kind of material was generally being delivered to teachers as a whole, rather than to those who were specifically seeking out technology-focused information. Our original plan was to select one commercial publication and one professional publication in each country. As we surveyed possible magazines in the U.S. and Canada, we realized that there are more commercial publications in the U.S. than in Canada and that the U.S. magazines are published more frequently than the Canadian magazines. Therefore, we selected two Canadian commercial publications—*Teach*²⁷ and *Canadian Teacher*²⁸—and one U.S. commercial publication—*Education Week*²⁹—in order to have more comparable data for analysis. However, this still yielded more issues in the U.S. publications than the Canadian. With respect to professional publications, there are two main national magazines in each country, but the U.S. magazines are published more frequently than the Canadian; therefore, we selected two Canadian professional

²⁴ Regan, Jesse, and Khwaja, above note 9.

²⁵ Leatham, above note 7.

²⁶ *Ibid.* at 7.

²⁷ Founded in 1993, *TEACH* Magazine delivers pragmatic tools and resources to K-12 educators, supporting good teachers and teaching while promoting innovation in education. *TEACH* is not affiliated with any organization, federation, association, or government agency. See <<https://teachmag.com/about>> .

²⁸ *Canadian Teacher Magazine* is an independent national magazine. It aims to keep Canadian teachers abreast of current trends in their field by offering informative articles on instructional strategies and methodology, classroom management, professional and personal development, and national and international issues. See <<https://canadian-teacher-magazine.com/about-canadian-teacher-magazine/>> .

²⁹ *Education Week* identifies itself as "American education's newspaper of record" and is generally recognized as such within the field of K-12 education. Since it launched in 1981, it has been a leading U.S. commercial publication addressed to K-12 teachers. It is owned by a non-profit and describes itself as non-partisan, providing local, state and national news and analysis. See <https://www.edweek.org/media/edweek_info.pdf> .

publications—*Perspectives Magazine*³⁰ and *Education Canada*³¹ and one U.S. professional publication—*NEA Today*.³² We were able to access all these publications fully from 2013 to 2017 either through the magazines' websites or through the libraries at the University of Ottawa and George Mason University.

Once we selected the publications, we developed a content coding form in Excel that the three coders (one Ph.D. student, one J.D. student, and one professor) used in reviewing the magazines. Biweekly conferences were held with exchanges of spreadsheets and discussion of any issues in coding to ensure everyone was coding in the same fashion. In addition to full citation and abstract, we coded for the following categories:

- Number of articles in each issue;
- Number of articles relevant to edtech;
- Type of edtech mentioned in article;
- Capabilities of edtech discussed;
- Benefits of edtech discussed;
- Risks of edtech discussed; and
- Privacy issues discussed.

After completing the coding for each year, the coder compiled a list of themes for that year, which were discussed and compared during our phone conferences. Tables 1 to 4 provide an overview of our results.

**Table 1a - Education Week (U.S. Commercial) Data
2013-2017**

	2013	2014	2015	2016	2017
# of issues	38	35	42	38	37
# of articles	1,541	1,423	1,499	1,345	820
# of articles mentioning edtech	140	74	140	91	76
# of articles mentioning privacy	25	21	33	15	16

³⁰ *Perspectives Magazine* is published by the Canadian Teachers' Federation (CTF/FCE), a national alliance of provincial and territorial teacher organizations that represent over 273,000 elementary and secondary school teachers across Canada. See <<https://perspectives-ctf-fce.ca/>> .

³¹ *Education Canada* is published by the Canadian Education Association and is a trusted source for providing informed research and opinion on some of the biggest challenges facing educators today. See <<https://www.edcan.ca/about-us/>> .

³² *NEA* is the largest professional employees' organization in the United States and is committed to advancing the cause of public education.

**Table 1b - Canadian Commercial Data
2013-2017**

	2013 Can Tea- cher	2013 Tea- ch	2014 Can Tea- cher	2014 Tea- ch	2015 Can Tea- cher	2015 Tea- ch	2016 Can Tea- cher	2016 Tea- ch	2017 Can Tea- cher	2017 Tea- ch
# of arti- cles men- tioning edtech	1	2	4	4	3	3	1	4	4	3
# of arti- cles men- tioning privacy	0	0	0	1	2	0	0	0	0	0

**Table 2 - NEA Today — U.S. Professional
2013-2017**

	2013	2014	2015	2016	2017
# of issues	4	4	4	4	4
# of articles	71	76	77	47	47
# of articles mentioning edtech	11	8	10	7	6
# of articles mentioning privacy	1	0	0	1	2

**Table 3 - Canada — Perspectives Magazine (Professional)
2013-2017**

	2013	2014	2015	2016	2017
# of issues	3	2	2	2	3
# of articles	32	20	12	22	26
# of articles mentioning edtech	7	3	2	2	4
# of articles	0	1	1	1	0

	2013	2014	2015	2016	2017
mentioning privacy					

**Table 4 - Education Canada (Professional)
2013-2017**

	2013	2014	2015	2016	2017
# of issues	3	2	1	2	3
# of articles	60	38	23	36	59
# of articles mentioning edtech	6	3	1	3	3
# of articles mentioning privacy	1	0	0	0	1

4. FINDINGS AND DISCUSSION

Given the widely documented growth of edtech applications in both U.S. and Canadian classrooms, the increase in the amount of money being invested in edtech, and the policy interest in improving student achievement and teacher effectiveness, *we expected to see a steady increase in coverage of edtech in both commercial and professional publications addressed to K-12 teachers.* Surprisingly, we found that there was no increase and, in fact, there was no discernible pattern to edtech coverage (see Table 5 below). In the U.S. commercial publication, the percentage of coverage is roughly the same for 2013, 2015, and 2017, dipping somewhat in 2014 and 2016. For both U.S. and Canadian professional publications, the greatest coverage is in 2013, with coverage declining afterwards with a steeper decline in the Canadian publications in comparison to the U.S., where coverage decreases in 2014, increases slightly in 2015 and 2016, and then declines again in 2017.

**Table 5 - Percentage of Articles About Edtech
2013-2017**

	2013	2014	2015	2016	2017
U.S. Commercial (Ed-Week)	9.1%	5.2%	9.3%	6.8%	9.3%
Canadian	NA	NA	NA	NA	NA

	2013	2014	2015	2016	2017
Commercial (2)					
U.S. Professional (NEA)	15.5%	10.5%	13.0%	14.9%	12.8%
Canadian Professional (2)	14.1%	10.3%	8.6%	8.6%	8.2%

Given the traditional concern in both the U.S. and Canada with children's privacy and the longstanding practice that educators are to act as responsible stewards of student information, *we expected that articles about edtech would pay prominent attention to privacy issues and that such coverage would increase over the study period.* Keeping in mind that the total number of articles about edtech is relatively low, we do not find that to be the case and, once again, do not see any clear patterns in our data. The greatest interest in privacy in the U.S. commercial publication is in 2014, whereas in the Canadian commercial publications the greatest interest is in 2015. In the U.S. professional publication, we see some interest in 2013 (9.1%), dropping to no interest in 2014 and 2015, but then increasing over the next two years. The two Canadian professional publications combined contain one article about privacy in each year. Perhaps the most striking result is that the Canadian commercial publications gave no attention to privacy in 2013, 2016, and 2017. The U.S. professional publication devoted no attention to privacy in 2014 and 2015, whereas the Canadian professional publications consistently devoted little attention to privacy. The only publication that covered privacy across all years of the study period is the U.S. commercial publication. These results are summarized in Table 6 below.

**Table 6 - Percentage of Edtech Articles About Privacy
2013-2017**

	2013	2014	2015	2016	2017
US Commercial (Ed-Week)	17.9%	28.4%	23.6%	16.5%	21.1%
Canadian Commercial (2)	0%	12.5%	33.3%	0%	0%
US Professional (NEA)	9.1%	0%	0%	14.3%	33.3%
Canadian	7.7%	16.7%	33.3%	20%	14.3%

	2013	2014	2015	2016	2017
Professional (2)					

Despite the relatively small number of articles between 2013 and 2017, analysis of their content reveals several interesting substantive trends both in terms of edtech generally and in terms of privacy issues raised in the context of edtech.

In general, we discerned four prominent trends in both professional and commercial coverage of edtech in both countries and several trends that are more discernible in one country or for one time period.

The first trend is concern about what is commonly referred to as the *digital divide*. The largest number of articles (keeping in mind that there are more articles in this publication) was in *Education Week* with articles across all years, with the greatest number of mentions (13) in 2016 and the fewest in 2014 (4 mentions). There are two key issues associated with the digital divide. The first involves access to certain geographic locations, generally framed as a rural/urban split and/or a wealthy/less wealthy divide. Although this concern is inherently an equity issue, most of the articles covered it as a financial and budgeting issue related to affording edtech applications and software. There appears to be an underlying assumption that edtech applications are becoming an integral part of the educational experience and that a lack of adequate funding is a barrier that has yet to be overcome. Further, when “Bring Your Own Device” policies were developed as a response to overall funding inadequacy, the potentially exclusionary impact on students unable to afford their own devices was raised as a concern.³³

A somewhat related issue connected to the first concern about the digital divide involves the quality of the technological connection, with articles discussing glitches, disruptions to service, and dependability of connectivity. Crashes of online testing, such as those that occurred in Tennessee in 2016, were framed as cautionary tales both in terms of potential problems and the capability and reliability of vendors.³⁴ Similar issues with online testing occurred in 2015 and 2017. In the U.S., the Federal Communications Commission’s (“FCC”) eRate program (which helps schools and libraries get access to affordable broadband) is often referenced as a way of ameliorating technological disparities in broadband access. However, in 2017 one of FCC Chairman Pai’s first moves was to rescind an FCC staff report outlining the success of the eRate modernization order, which prompted an outcry from some K-12 and edtech groups, as well as Democratic lawmakers.³⁵

³³ Martha Beach, “Bring Your Own Device”(March/April 2014) 6-7, online: Issuu <http://issuu.com/teachmag/docs/teach_marapr2014?e=2372208/7356549> .

³⁴ Leo Doran, “Tennessee Online Test Crashes, Causing Return to Paper and Pencil” (2016) 35:21 *Education Week* 7.

The second trend is that articles overall provided a *fairly balanced picture of edtech benefits and risks*. Across all years of the study period, the general tone was one of support for edtech applications with assumptions that edtech is becoming, and will continue to become, an important component in classrooms in the U.S. and Canada—likely to improve students’ learning experiences. There was also recognition that the quality of all edtech applications varied widely and that selecting carefully from the vast array of edtech being marketed was a critical and difficult task. Some of the benefits from edtech identified in the articles included student collaboration; increased student engagement; encouragement of creativity through edtech applications such as digital gaming; enabling teachers to help students, especially struggling students; improvement of student performance; increased flexibility and mobility; easier exchange of ideas; and encouragement of experimentation.

However, articles also frequently acknowledged the potential edtech risks. For example, although recognizing that gaming can encourage creativity, there was concern that it should not replace real-life experiences and remove students from the mental orientation of being in the classroom. A 2014 article in *NEA Today* pointed out that some educators successfully weave games into their lesson plans whereas other articles said the practice of so-called “gamification” poses risks by emphasizing competition and outward motivators in order to increase student attention.³⁶ Similarly, a 2014 article in *Education Canada* noted research showing that in-class technology/internet connectivity could be detrimental to students’ ability to focus.³⁷ A few 2016 articles in *Education Week* expressed concerns that online gaming devices would distract students and that gaming’s motivation and incentives might lead to unhealthy cognitive development. These articles emphasized the importance edtech can have in fostering balanced development in students.

One of the key questions addressed in these articles is how technology can be best integrated into the classroom, as well as outside of it. Articles in both Canadian and U.S. professional and commercial publications provided specific examples of programs being used in classrooms, with a focus on exploring what worked well and what did not. From 2013 to 2017, *Education Week* profiled various schools and districts that were innovating in their uses of edtech and provided some analysis of their experiences. In the Canadian publications as well, teachers regularly reported on their uses of and experiences with edtech throughout the study period.

The third trend is that privacy concerns were framed almost exclusively in terms of protecting student information from inappropriate access or secondary uses. Generally, privacy was discussed in terms of compliance with standard *fair*

³⁵ Benjamin Herold, “Letters to Districts Prompt Worries About E-Rate’s Future” (2017) 36:33 *Education Week* 8.

³⁶ Tim Walker, “Gamification in the Classroom: The Right or Wrong Way to Motivate Students?” (2014) at para. 15, online: *NEA Today* <<http://neatoday.org/2014/06/23/>>.

³⁷ Claude Lessard, “Les TIC(French)” (2014) 54:4 *Education Canada* 34.

information practices and often turned into the discussion of security issues, especially data breaches and ransomware. A 2015 *Education Week* article reported on ways that school districts can prepare for possible personal data breaches by discussing how the Provo, Utah, school district was hacked and how data of former employees was compromised; how 47 states have data-breach legislation that affects school districts; and how the Consortium of School Networking organization developed a guide for schools and teachers about data security.³⁸ Articles also pointed to privacy invasions embedded in particular products. A 2016 article in *Education Week*, for example, reported on Google's collection and mining of personal information from student users who log in through its apps for education services and then venture to the company's search engine and other products.³⁹ In addition, a 2017 article examined the increase in "ransomware" cyber-attacks on U.S. school districts where viruses encrypt data and can only be unlocked by paying a ransom; it discussed how districts decide whether to pay ransoms, often in bitcoin, or to rebuild data systems from backups.⁴⁰

The U.S. commercial publication covered privacy more extensively than other publications. Aside from a few indirect references to privacy and safety, there was only one article—out of 42—discussing edtech in the U.S. professional publication, *NEA Today*, that briefly mentioned privacy issues. The article raised concerns about student data arising from Facebook's involvement in personalized learning platforms. With the exception of this brief mention, there was nothing else on privacy. Articles in *NEA Today* covered topics such as limited benefits of personalized instruction and virtual schools, and some risks, but nothing specific to privacy or breach of student data. In the Canadian professional publications, online safety was a focal point of risk discussion and privacy concerns.

There are, however, occasional references to other components of privacy. For example, in 2016, one *Education Week* article discussed digital writing and sharing and noted how these applications can raise issues about student privacy and online reputation. During the same year and in the same publication, there were a few articles on the Happify Online gaming platform as an example of social and emotional learning through edtech.⁴¹ One of the articles talked about parent advocacy groups' concerns about the privacy and data collection from the app, and then specifically stated Happify's privacy protocols and identified the school that is using Happify and its protocol for privacy.⁴²

³⁸ Michelle Davis, "Schools Learn Lessons from Security Breaches" (2015) 35:9 *Education Week* S6.

³⁹ Benjamin Herold, "Google Mines Student Data Outside Education Apps" (2016) 35:22 *Education Week* 12 [Herold, "Google Mines"].

⁴⁰ Leo Doran, "Ransomware Attacks Force School Districts To Shore Up—or Pay Up" (2017) 36:17 *Education Week* 1.

⁴¹ Herold, "Google Mines", above note 39; Benjamin Herold, "Unleashing Classroom Analytics" (2016) 35:17 *Education Week* 54 [Herold, "Unleashing"].

In contrast with the data breach/security focus of many of the U.S. publications, the Canadian publications more often focused on personal privacy issues arising from edtech. One 2013 *Education Canada* article noted, for example, that students gained greater privacy when using personal devices as opposed to whiteboards and computer screens.⁴³ Another 2013 *Education Canada* article emphasized the importance of teachers setting their privacy settings to “high” for purposes of sharing educational information through social media.⁴⁴ A 2016 *Canadian Teacher* article focused on the safety risks of students who fail to understand the significance of maintaining privacy online, pointing to the “realities” of pedophilia and cyberbullying.⁴⁵ In a 2014 *TEACH* article, a 2015 *Canadian Teacher* article and two *Perspectives* articles, the authors highlighted privacy risks, including impacts on reputation, as reasons in favour of digital citizenship education.⁴⁶

In 2016 and 2017, coverage of personalized learning increased in all publications, with some acknowledgment of the privacy issues that might occur. A 2016 *Education Week* article highlighted the surveillance involved in big data and personalized schools. It identified AltSchool, with its digital learning platform and mobile app, as a major player in the big data and analytics at the K-12 level, noting that AltSchool’s technology will help increase student data collection and project-based learning in schools by looking for patterns “in each student’s engagement level, moods, use of classroom resources, social habits, language and vocabulary use, attention span, academic performance, and more.” The article raised the likelihood that this “is almost certain to provoke a backlash from parents and privacy advocates who see in its plans the potential for an Orwellian surveillance nightmare, as well as potentially unethical experimentation on children.”⁴⁷ It also noted that big data and analytics occur throughout the edtech sector, including in Khan Academy and Pearson. A 2017 article discussed a report of the National Academy of Education which concluded that the wealth of student data generated today can help educators learn about student thinking and effective teaching in ways “that were unimagined just a decade ago” but can also create deep concerns about

⁴² Herold, “Unleashing”, above note 41.

⁴³ Ruth Scott and Donna Dortmans, “Word Play” (2013) 53:4 *Education Canada* 52.

⁴⁴ Kimberly Maich, “Giving and Getting” (2013) 53:4 *Education Canada* 10.

⁴⁵ Jay Donaldson, “Introducing Social Media into Elementary School Classrooms” (January/February 2015) at 26, online: *Canadian Teacher Magazine* <https://canadianteachermagazine.com/issues/2015/CTM_JanFeb15/>.

⁴⁶ Rick Riel, “CTF and MediaSmarts survey on networked technologies in the classroom” (June 29, 2015) at para. 11, online: *Perspectives* <<http://perspectives.ctf-fce.ca/en/article/3073/>>; Jeffrey Jordan and Simon Belanger, “21st Century Schools Need Digital Citizenship Education” (January/February 2015) at 28, online: *Canadian Teacher Magazine* <https://canadianteachermagazine.com/issues/2015/CTM_JanFeb15/>; Beach, above note 33; Froese-Germain and Riel, above note 8 at para 9.

⁴⁷ Herold, “Unleashing”, above note 41.

student privacy and the proper use of data.⁴⁸ Another 2017 article pointed out that New Classrooms, a non-profit active in the personalized learning space, does not have any built-in checks to ensure that its algorithms are free of bias.⁴⁹

A 2017 *Perspectives* article discussed “We the Educators,” an online resource for teachers developed by the Canadian Teachers’ Federation (“CTF”), the Alberta Teachers’ Association, and Education International “as part of a global response to the privatization and commercialization of education.”⁵⁰ In the article, the author focused on the need for conversations about “the impacts of educational technology and resulting personalization, standardization, privatization and datafication of teaching and learning.”⁵¹ She noted that the replacement of teachers with technology can result in the de-personalization of education.

The fourth general trend is that attention moves from the *latest edtech innovation to the next*. For example, the earlier articles tended to focus on one-to-one computing, then gaming, and finally to personalized learning powered by algorithms. Many of the articles homed in on educational innovation and the technologies that support those innovations: for example, project-based learning, videos for instruction, teacher professional development, Flipped Classrooms, Blended Learning models, and Personalized Instruction. Articles in all publications focused on specific technologies and their implementation, most frequently mentioning iPads and tablets generally, Google Classroom/Drive, and the suite of Google products. Articles also pointed to specific edtech applications and software including Classdojo, ClassPro, Fotopedia, Mathmateer, Remind101, Ted, Wordle, Dipity, Teacher Tube, EduTech for Teachers, Educentric, Kidblo, GoNoodle, and ReadingPlus, as well as apps used in, but not specific to, education such as Garageband and VideoStar.

Four concerns were consistently raised in the discussion of specific technologies. The first was whether the technology was working as expected; this concern was linked to the general concern about technology reliability and the occurrence of technological glitches. A second concern was whether, and how, the technology was engaging students for learning purposes. A third related to whether students could hide behind the technology and not develop socially. A fourth related concern, which grew over the period of the study, focused on teachers’ professional development and training with respect to using edtech generally and specific technological innovations in particular. Both commercial and professional publications covered this concern.

A 2013 *NEA* magazine article discussed a report, “Born in Another Time: Ensuring Educational Technology Meets the Needs of Students Today and

⁴⁸ Sarah Sparks, “Student Data” (2017) 36:34 *Education Week* 5.

⁴⁹ Benjamin Herold, “Learning Via ‘Playlists’” (2017) 36:26 *Education Week* 19.

⁵⁰ Cassandra Hallett, “How do you want your child’s education — personalized or standardized? How having the conversation changes the conversation” (November 2017) at para. 2, online: *Perspectives* <<http://perspectives.ctf-fce.ca/en/article/3145>> .

⁵¹ *Ibid.* at para. 4.

Tomorrow,” which emphasized the importance of providing educators with the necessary training and resources to teach in a twenty-first century learning environment.⁵² The author of a 2015 article in the same publication suggested that it is easy to get overwhelmed with the different choices available and advised educators to incorporate technologies and trends gradually and partially and to pilot the new technologies.⁵³ A 2014 article also suggested that Bring Your Own Device policies could raise further issues for teachers who may not be familiar with all of the devices and apps students normally use outside of the classroom.⁵⁴ Discussion of Flipped Classrooms⁵⁵ illustrates many of these concerns by drawing attention to the lack of a hands-on approach, the possibility of exacerbating the digital divide, the likelihood of technical difficulties, and potential distractions caused by technological devices.⁵⁶

There are also a number of trends or themes in the articles that are specific to one country, one type of publication, or one time period. These are discussed below.

(a) Specific to One Country

(i) Political Climate and Policy Events

The influence of the current political climate is more prominent in the U.S. than in Canada. In 2015 and early 2016, for example, *Education Week* published numerous articles on student privacy bills being introduced in several states. A 2015 article focused on U.S. federal regulations and state laws related to student data collection, security, and privacy protections. This article also covered a number of topics including a proposed federal law called the *Student Digital Privacy and Parental Rights Act*, which would, among other things, prohibit the sale of student data or the use of this data for targeted advertising to children and specify requirements for third-party vendors to provide for secure data and to notify schools, parents, and students in the event of data breaches.⁵⁷ In 2016, *Education Week* covered the U.S. State Department National Educational Technology Plan (“NETP”), which featured a major change that elevated a more nuanced approach to the use of technology in the classroom. The NETP was

⁵² Edward Graham and Tim Walker, “What ‘Flipped’ Classrooms Can (and Can’t) Do for Education” (2013), online: *NEA Today* < <http://neatoday.org/2013/03/29/what-flipped-classrooms-can-and-cant-do-for-education/> > .

⁵³ Scott Krivitsky, “Teaching and Learning: Laying Down a Steam Pipeline” (2015), online: *NEA Today* < <http://www.nea.org/home/64101.htm> > .

⁵⁴ Beach, above note 33.

⁵⁵ In flipped classrooms, students are introduced to ideas/concepts outside of the class (e.g., through podcast lectures that they can watch at home) and then use class time to work with the ideas/concepts.

⁵⁶ Graham and Walker, above note 52.

⁵⁷ Benjamin Herold and Lauren Camera, “Educators Hope Congress Provides Clarity, Support on Privacy Issues” (2015) 35:9 *Education Week* S5.

mentioned in several articles (especially at the beginning of the year), with some articles expressing the limitations and frustrations of the NETP standards/laws.

In 2016 and 2017 the *Every Student Succeeds Act* (“ESSA”) received increased attention, with articles emphasizing the positive effects of ESSA and the improved application of edtech through ESSA for increasing teacher and student engagement in the process of conducting needs assessments.⁵⁸ A 2016 *Education Week* article discussed the increasing popularity of open-education resources, which are released under a licence that allows their free use, remix, and sharing by others, and were seemingly encouraged by ESSA and the Obama administration. Some teachers regard them as low-cost materials that give teachers more power to choose content than they have with commercial products, but publishers say the materials often deliver simplified content without the support teachers and schools need.⁵⁹ During 2017 there were a number of articles discussing the need to develop policies with respect to open-education resources. One article emphasized the importance of carefully reading terms of service agreements to ensure that student privacy was protected and pointed out that “[i]f they [teachers] are not thinking about data privacy and they are being pushed to use a lot of free online resources, there is potential for a lot of student-data leaks.”⁶⁰

Many of the articles in 2017 focused on the new Trump administration and the implications for K-12 education generally. An *NEA Today* article expressed concern about the Trump-Devos privatization agenda and its negative impact on rural schools, which will be in danger of closing because of cuts to federal funding and teacher shortages. The article cautions that charter schools, especially online charters, are not the solution to lack of access because they have not provided the necessary quality of education.⁶¹ An *Education Week* article noted rising uncertainty about the future of efforts to boost broadband access, preserve an open internet, and protect online privacy—all issues affecting the K-12 sector.⁶² A related topic was the FCC’s roll back of support for the eRate program, which provided high-speed access to schools and libraries, and its alteration of the federal Lifeline program that offers subsidized broadband internet to low-income US citizens. Both of these policy changes were portrayed as negatively impacting access to the internet.

Beginning in 2015, both *Education Week* and *NEA Today* paid critical attention to online charter schools. A 2016 *NEA* article discussed in some detail California Virtual Academies—a network of 11 virtual charter schools owned by

⁵⁸ Pub L 114-95.

⁵⁹ Sean Cavanagh, “Open Ed. Resources Get Boost From ESSA” (2016) 35:18 *Education Week* at 1-11.

⁶⁰ Sarah Sparks, “Reading the Fine Print” (2017) 36:26 *Education Week* at 24.

⁶¹ Tim Walker, “Who’s Looking Out for Rural Schools?” (2017), online: *NEA Today* <<http://neatoday.org/2017/09/12/whos-looking-out-for-rural-schools/>>.

⁶² Benjamin Herold, “What’s in Store For Trump’s FCC?” (2017) 36:35 *Education Week* 25.

the largest for-profit charter management corporation (K12 Inc.)—which had many students falling through the cracks because of increased enrollment. The article argued that more transparency and accountability were needed for charter schools to safeguard and protect the interests of students, parents, and school communities rather than shareholders.⁶³ In 2017, the Ohio state board of Education voted to require the online charter school, Electronic Classroom of Tomorrow, to repay \$60 million in state aid funding.⁶⁴ Similarly, the Indiana state school board decided to defer the closing of the online virtual charter school, Hoosier Academy Virtual School (operated by K12 Inc.), despite its persistently low academic scores.⁶⁵

Throughout the study period, U.S. publications, particularly *Education Week*, reported on various advocacy groups and the influence they have in the edtech arena. For example, the Future of Privacy Forum, Common Sense Media, and Data Quality Campaign receive a fair amount of coverage, with their reports and analysis providing the substance for articles without the authors critically appraising the groups' expertise or neutrality. Other groups that received attention include the State Educational Technology Directors Association, International Society for Technology in Education, and the National Parent Teachers Association. In 2016, a parent advocacy group, Parents Across America, was mentioned as having expressed serious concerns about personalized instruction. This advocacy group questioned the excessive use of technology in classrooms, including misleading teaching practices, collection of student data, and the low-quality edtech products purchased.

(ii) *Influence of Large Foundations*

Another theme that receives more attention in the U.S. than in Canada is the influence of large foundations in funding edtech innovations and adoptions. *Education Week* provided fairly consistent attention to the large foundations (Gates, Zuckerberg, MacArthur, Carnegie) and the funding they provide. Indeed, some of the coverage of edtech, especially in 2014 and 2015, is funded by grants from these foundations. It is clear that these large foundations play a role in providing significant financial support to edtech companies, to schools for adoption of edtech applications, and to educational publications for coverage of edtech. Priscilla Regan and Valerie Steeves found that technology company foundations in particular “are active in framing issues about personalized learning, supporting advocacy organizations and research studies, and funding a range of edtech companies and initiatives in the area of personalized learning.

⁶³ Tim Walker, “Can Charter Schools Be Rescued from the Charter Industry?” (2015), online: *NEA Today* <<http://neatoday.org/2015/06/04/can-charter-schools-be-rescued-from-the-charter-industry/>> .

⁶⁴ Benjamin Herold, “Ohio Orders Cyber Charter to Return \$60 Million” (2017) 36:4 *Education Week* 4.

⁶⁵ Arianna Prothero, “Indiana Virtual Charter Again Escapes the Ax” (2017) 36:31 *Education Week* 5.

Their voices in the landscape of K-12 education are particularly loud, amplified by their grant dollars and their networks of influence.”⁶⁶

One *Education Week* 2016 article referenced concern for the “tangled web of interests” with the Facebook Chan Zuckerberg Foundation working with multiple investors and edtech companies to incorporate greater emphasis on personalized instruction. Another article noted that Chan/Zuckerberg announced they would eventually give 99 percent of their Facebook shares, worth an estimated \$45 billion, to a variety of causes, headlined by the development of software “that understands how you learn best and where you need to focus.”⁶⁷ Not only are these foundations investing in edtech companies, but they are also funding research. A 2017 *Education Week* article reported that two nonprofit organizations—Bill & Melinda Gates Foundation and Chan Zuckerberg Initiative (“CZI”)—are jointly funding a grant for New Profit, an organization for research on personalized learning. The article also pointed out that CZI is not a traditional nonprofit foundation but a limited liability company, which allows it to directly invest in for-profit companies and to engage in political lobbying and donations, and limits the extent to which the group is legally required to publicly report on its activities.⁶⁸

It is interesting to note that both U.S. publications had a group of authors covering edtech during the study period, whereas authors of edtech articles in the Canadian publications varied throughout the period.

(iii) *Digital Citizenship*

Digital citizenship is a theme that received more consistent attention in Canada than in the U.S. Articles discussing the importance of digital citizenship appeared in at least one Canadian magazine each year from 2013 to 2017. Coverage focused on a range of issues including using apps to teach digital citizenship, mitigation of privacy and security concerns through digital citizenship education, digital citizenship as a critical component of managing tech in the classroom, and learning digital citizenship skills through use of tech in the classroom. In one 2013 article, a teacher discussed how he and his students applied for and used a grant from the CTF to partner with a professional musician to rework the lyrics of the song “Inner Ninja” to create “Network Ninja,” which focused on digital citizenship. Recorded using a MacBook Pro and Garageband software, their song included lyrics about friending strangers on Instagram and “questionable content uploaded to Facebook.”⁶⁹ Later, they used

⁶⁶ Priscilla M. Regan and Valerie Steeves, “Education, privacy, and Big Data Algorithms: Taking the Persons out of Personalized Learning” (2019) 24:11 *First Monday*.

⁶⁷ Benjamin Herold and Maya Riser-Kositsky, “Facebook CEO Bets on Personalized Learning” (2016) 35:23 *Education Week* 9.

⁶⁸ Benjamin Herold, “Gates, Zuckerberg Teaming Up on Personalized Learning” (2017) 36:7 *Education Week*.

⁶⁹ Laun Shoemaker, “Network Ninja: Teaching Digital Citizenship” (November/December 2013) at 7, online: Issuu < http://issuu.com/teachmag/docs/teach_novdec2013 > .

Videostar to create their own accompanying video that was posted to the granting agency's website.⁷⁰ Not only did the exercise involve students in discussions about digital citizenship, it also engaged them in developing twenty-first century creative skills.

In contrast, digital citizenship received focused attention in *Education Week* in 2015 and 2016. In both years, the discussion of digital citizenship centred on related legislative initiatives but was more frequently covered in 2016. For example, the author of a 2015 article in *Education Week* noted existing U.S. state laws requiring comprehensive digital citizenship education, internet safety, and social-media instruction.

(iv) *Cyberbullying and Fake News*

Although non-privacy related negative outcomes of digital connectivity were addressed in both Canada and the U.S., the focus of analysis tended to be different. Cyberbullying and fake news received greater attention in Canada than in the U.S. and discussions of these topics were often tied to the need for improved education strategies for digital literacy and critical thinking. In one 2017 *TEACH* magazine article, the author discussed the risks associated with spreading fake news and the difficulties individuals, including students, face in discerning valid from invalid information. She suggested that the development of critical evaluation skills is necessary, arguing “[t]eachers should challenge students to consider why they agree or disagree with information—fake news or otherwise.”⁷¹ In a 2016 *Canadian Teacher* magazine article, the author focused on the risks of cyberbullying associated with the use of social media and quoted a study indicating that “over 70% of parents are negligent in taking responsibility in educating their children in the correct, safe and ethical use of social media or in sharing with them the devastating effects it can have on children and families.”⁷² Ultimately, the author advocated for introducing social media into the classroom to assist students in building necessary skills related to social media use, but he favoured using platforms with a “teacher’s dashboard where all activity can be monitored.”⁷³

(v) *Lack of Evidence to Substantiate Claimed Benefits of Edtech*

By comparison, U.S. coverage of non-privacy-related negative outcomes tended to focus more on the lack of compelling evidence to substantiate edtech industry claims of improved student outcomes and learning. A 2014 *Education Week* article noted the push toward replacing teachers with technology in order to promote individualized learning, but argued that this effort could undermine

⁷⁰ *Ibid.* at 9.

⁷¹ Meagan Gillmore, “Fake News: Distinguishing Fact from Fiction” (March/April 2014) at 9, online: Issuu <https://issuu.com/teachmag/docs/teach_marapr2017> .

⁷² Donaldson, above note 45.

⁷³ *Ibid.*

students' ability to work independently and was giving rise to large classrooms in which some students were being neglected.⁷⁴ In two 2015 *Education Week* articles, the same author raised concerns over technical glitches plaguing a curriculum model that was supposed to provide each student with an iPad tablet⁷⁵ and pointed out that, notwithstanding the hype, solid evidence of how edtech supports student learning remains scarce.⁷⁶ In a 2016 *Education Week* article, another author criticized edtech-related claims, noting that although a variety of speed reading apps promise results, not many students improve their speed using them and that, in any event, few people can double their reading rate without losing comprehension.⁷⁷

(b) Specific to One Type of Publication

(i) Critical Perspectives on Edtech

Unexpectedly, the U.S. commercial publication, *Education Week*, offered the most consistently critical perspective on edtech, especially in relation to privacy and data security issues. However, it also presented the most content focused on the lack of substantiation for the claimed benefits of edtech. One might have expected a commercial publication to be more laudatory with respect to edtech and the big business of technology in the classroom; however, *Education Week* (especially its author Benjamin Herold) defied that expectation.

(ii) Attention to the Firsthand Perspectives of Students and Teachers

One of the Canadian professional publications—*Perspectives*—was most consistent in discussing the perspectives of teachers and young people, often by reporting on the outcomes of data-collection exercises, such as those from MediaSmarts through its Young Canadians in a Wired World project. This outcome is perhaps less surprising than the outcome relating to *Education Week* because one would expect a professional magazine to be more attentive to students' and teachers' expressions of their experiences than would a commercial publication.

⁷⁴ Benjamin Herold, "New Model Underscores Rocketship's Growing Pains" (2014) 33:19 *Education Week* S29.

⁷⁵ Benjamin Herold, "L.A. Shifts Gears Over Computers-for-All-Students Policy" (2015) 34:23 *Education Week* 4.

⁷⁶ Benjamin Herold, "Doing Ed-Tech Right in the Early Years" (2015) 34:16 *Education Week* 28.

⁷⁷ Sarah Sparks, "Reading: So Much to Read, So Little Time: How Do We Read, and Can Speed Reading Help?" (2016) 35:17 *Education Week* 5.

(c) Specific to One Time Period*(i) 2013-2015 Emphasis on Funding*

Funding issues figured more prominently in the 2013 to 2015 time period. This could reflect the fact that significant upfront investments in infrastructure and hardware had to be made in this period and/or that the move toward more flexible, personal devices had somewhat reduced the financial strain of adopting and maintaining edtech.

(ii) 2016-2017 Emphasis on Personalized Learning

As noted above, personalized learning became a significant focus of attention in all publications, particularly in the U.S. This focus may reflect curricular developments over time and/or the growing emphasis on and awareness of algorithmic profiling as a mechanism for personalization.

5. CONCLUSION

Big industry players and policymakers are pushing schools to incorporate edtech, partly as a reflection of the promised (though not proven) benefits of big data apps for personalized learning and improved assessment, evaluation, communication, and collaboration. However, the shape and dimensions of the privacy and equality implications associated with algorithmic profiling are only beginning to be understood. Despite longstanding academic predictions about the potentially devastating impacts of these practices, public consciousness has just awakened. This situation leaves educators facing a dilemma: adopt edtech despite its unknown risks or be accused of failing to adequately prepare future generations for the twenty-first century.

The U.S. and Canadian teaching magazines in our study might well have offered informational support to educators facing that dilemma by providing relatively balanced coverage of both the risks and benefits of edtech. However, the coverage of edtech-related privacy issues during this period was relatively scan, and privacy was almost exclusively understood in terms of protecting student information from inappropriate access or secondary use. As a result, where initiatives for addressing privacy concerns were offered, they focused more on in-house data security measures and teaching students to guard their data than on recognizing and addressing the big data practices that jeopardize young people in the first place.

As the next stages of the twenty-first century in a post-Cambridge Analytica era begin to unfold, we hope that these practices and their potentially discriminatory privacy impacts will come to the fore not just in teaching magazines but in larger public discourse around justice in education. These concerns are of particular moment in Canada as all levels of government engage with related issues. The federal government, for example, in its Digital Charter, has signaled a commitment to continue to emphasize computers in schools, and

technological training to build the future skills of Canadians, while at the same time recognizing the importance of strengthening privacy for the digital age and the role that federal privacy legislation might play in that process.⁷⁸ Similarly, the Office of the Privacy Commissioner of Canada’s consultations with Canadians relating to artificial intelligence reflect concern around the appropriate limits on corporate access to and use of Canadians’ data.⁷⁹ And, as provincial governments, such as Ontario’s, push forward e-learning agendas premised on cutting costs and increasing efficiency, and as “solutions” for dealing with the COVID-19 pandemic, important questions remain about whether—and if so, how—the impacts of such strategies on privacy and equality will be addressed.⁸⁰ Perhaps most pressing of all, however, is ensuring that as federal initiatives and provincial ministries of education urge school boards toward ever-increasing engagements with edtech, school board administrators and teachers are provided with the information, resources, and guidance they need to understand the privacy implications of the platforms and applications being used in and outside of classrooms every day.

A number of practical steps can and should be taken. First, policymakers should focus on creating regulatory initiatives that prohibit (or at least severely limit) the corporate use of data arising from the learning process. Second, all school boards should have full-time privacy staff who are familiar with existing and future regulatory constraints and whose responsibilities include monitoring and making recommendations about which edtech should be adopted in schools and which should not. Without these supports, teachers are too often left to their own devices, with little guidance about or understanding of the potentially privacy-invasive effects of the edtech they deploy in their classrooms. Third, administration of edtech licencing for use in schools should be centralized. Although it may be difficult for individual school boards or schools to meaningfully negotiate privacy-protective agreements with the large corporate suppliers in the edtech market, larger collectives of schools and school boards⁸¹

⁷⁸ Innovation, Science and Economic Development Canada, “Strengthening Privacy for the Digital Age” (May 21, 2019), online: Government of Canada <https://www.ic.gc.ca/eic/site/062.nsf/eng/h_00107.html> .

⁷⁹ Office of the Privacy Commissioner of Canada, “Consultation on the OPC’s Proposals for Ensuring Appropriate Regulation of Artificial Intelligence” (January 28, 2020), online: Office of the Privacy Commissioner of Canada <https://www.priv.gc.ca/en/about-the-opc/what-we-do/consultations/consultation-ai/pos_ai_202001/> .

⁸⁰ Fatima Syed, “Ontario may be creating student inequality with mandatory online learning: report”, *Canada’s National Observer* (April 9, 2019), online: <<https://www.nationalobserver.com/2019/04/09/news/ontario-may-create-student-inequality-mandatory-online-learning-report>> .

⁸¹ In Ontario, Canada, for example, the Ontario School Boards’ Insurance Exchange (OSBIE), a large collective of 78 schoolboards, was formed to deal with the protection of students’ personal safety and other liability issues faced by individual boards. So, the idea of creating another non-profit collective of boards to deal with the matter of edtech and student privacy should not be considered unreasonable.

would be better positioned to negotiate terms that protect students from discriminatory use of their data. When privacy and equality-respecting limitations cannot be negotiated, edtech should not be deployed in learning processes. Fourth, awareness of the privacy and equality implications of edtech should become a mandatory component of teacher education programs, at both pre-service and graduate levels.

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