Ethical Use of Technology in Digital Learning Environments: Graduate Student Perspectives, Volume 2

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This book was produced with Pressbooks (https://pressbooks.com) and rendered with Prince.

Contents

Acknowledgements

This book was co-created with graduate students in the Master's of Education, Leading and Learning in a Digital Age Program (2020-21). We were delighted to work with the same project team as our first volume. Dr. Verena Roberts taught the third course in the program and helped students conceptualize and draft their chapters; she offered ongoing feedback to the students and connected students with outside experts. Dr. Roberts also reflected on her experiences and included this as a final chapter in this volume. Nicole Neutzling is graduate of the program and worked with Dr. Roberts during the third course and provided editing and support for the students as they drafted their chapters. Dr. Barbara Brown, an associate professor and academic coordinator for the program, taught the fourth course in the program and offered feedback to the students when they were preparing early drafts. She also worked with Dr. Michele Jacobsen, professor in the Learning Sciences, to edit subsequent versions of the chapters after students completed the program. Christie Hurrell, Director Lab Next, Libraries and Cultural Resources, helped set-up and finalize the Pressbook with tags for all the images and media. Mia Travers-Hayward helped edit and organize the chapters, and finalize the layout of the book.

We would like to thank you the Taylor Institute for Teaching and Learning at the University of Calgary for supporting open education projects. Thank you to the two OTESSA peer-reviewers for their suggestions and help with strengthening our conference proceedings that was later remixed as the introductory chapter for this book. We would like to thank the professional copyeditor who reviewed all of the student chapters prior to publication. Thank you to Robert Brown, an undergraduate student at the University of Calgary, for creating the original book cover and providing us with a revised version for Volume 2. The Cover Photo: Colourbox.com was selected for the first volume of the book to illustrate the balance

that is needed when navigating multiple ethical perspectives and technological advancements. We decided to keep the same image for the second volume with a slight colour change to highlight the new volume number. We also recognize this volume was created during the COVID-19 global pandemic and demonstrates many of the technological and ethical challenges that were relevant for graduate students in their professional practice during this time period.

Thank you to all students in the Master's of Education, Leading and Learning in a Digital Age cohort (2020-21) for contributing chapters and for their involvement in this project beyond the duration of their enrolment in the program. Volume 2 would not have been possible without the dedication of our graduate students and all the external content experts who provided the students with guidance and feedback for their chapters.

We also acknowledge the support of Libraries and Cultural Resources, University of Calgary and the University of Alberta Library in the production of this book.

Introduction: Creating an OER Using an Open Learning Design Framework

DR. BARBARA BROWN; DR. VERENA ROBERTS; DR. MICHELE JACOBSEN; CHRISTIE HURRELL; NICOLE NEUTZLING; AND MIA TRAVERS-HAYWARD

This chapter is an adapted version of a paper submitted to the OTESSA 2021 Conference Proceedings. The copyright notice[1] for the proceedings includes information about the Creative Commons Attribution 4.0 International (CC BY 4.0) license that allows us to remix and adapt the article for this ebook. We thought it would be helpful for readers to know more about the process that we used to develop the book and how we worked with students over a one-year period to prepare the manuscripts. There were seven student-authors who contributed their chapters to this book. All of the chapters were written during the COVID-19 pandemic and demonstrate many of the educational technology and ethics topics selected by graduate students that were particularly concerning during this period of time. This includes creating national healthcare applications with personal information; excessive video gaming for children; the need for data literacy skills for teachers and students; access to broadband in rural

communities; online cheating and use of e-proctoring; video intrusion during synchronous online classes; and the risks in using artificial intelligence, machine learning and big data in educational contexts.

The chapters are divided into two parts, each of which converges on a theme related to the ethics of technology in learning environments. In *Part I: Emerging Ethical Questions on User Well-being in Technology-Enabled Learning Environments*, authors grapple with how users (i.e., students, children, etc.) interact with technology that, when treated as ubiquitous or efficient, may introduce personal risks that are overlooked. These chapters explore questions about how students and young people experience digital environments in different forms, and the complex ways in which interactions with technology can enhance or diminish their well-being.

- Steeves discusses video intrusion and the ethical considerations of requiring web camera use in online learning environments. This chapter suggests the application of Universal Design for Learning (UDL) principles can help provide an open and safe learning environment for students.
- Luinstra discusses the ethical considerations of adopting e-proctoring software in post-secondary education, and considers how students experience this form of surveillance. This chapter offers long-term strategies such as adopting approaches for authentic assessment and suggestions for ways to use e-proctoring solutions

with the least invasive features.

- Hendrickson explores the opportunities and challenges associated with video game use for school-aged children, and discusses Farrow's (2016) framework for the ethics of open education as a tool to help parents and caregivers make decisions about when video game play should be encouraged or discouraged to avoid or minimize risks.
- Maciach examines the ethics of online learning by focusing on the challenges that rural, remote, and Indigenous communities face to access reliable broadband internet. As the pandemic drove K-12 classrooms online, students without a stable internet connection were unable to participate fully in their new digital learning environment. The chapter questions the government's ethical responsibility to guarantee home broadband access to all learners, and the implications of such a commitment on student privacy and autonomy.

In *Part II: Critical Considerations of the Ethics of Technological Advances and their Effects on Autonomy and Privacy*, authors contemplate the ethical balance between embracing digital innovation and prioritizing ownership over one's own data. The chapters in Part II discuss the many social benefits of advancements in learning technology, while centring the implications of this rapid development on the personal autonomy and privacy of users.

- Humphreys discusses the benefits and ethical implications of implementing a 1:1 program where each student in the classroom has access to at least one device at all times. Data literacy is recommended to help teachers, students and their families keep safe by learning more about data security.
- Templeman discusses a safe and socially responsible manner for examining technological advances in education, such as artificial intelligence, machine learning and big data, to help avoid harm and minimize risk. The chapter concludes with key questions to contemplate when considering the use of new technologies in educational settings.
- Dunham discusses the benefits and challenges that can result from implementing a clinical information sharing system to improve the continuity of care for all Canadians. A digital healthcare platform can be helpful for accessing accurate records but can also present issues of cybersecurity and privacy.

In 2020, we created a similar book Ethical Use of Technology in Digital Learning Environments: Student Perspectives [New Tab] with nine chapters with topics such as artificial intelligence, social networking services (SNS), 3D printing, academic resource sharing, adaptive learning systems, STEM, assistive technologies, and consideration for post-secondary admissions and institutional communications.

In this introductory chapter, we describe how an instructor, students, program coordinator, and members of a research team were involved in the co-design of an open educational resource in a graduate program in education. A four-part open learning design framework was used to guide the course design: (a) co-design process; (b) building and sharing knowledge, and making thinking visible; (c) building relationships; and (d) sustaining learning beyond the course. The framework, along with the collaborative team effort that was part of a larger research project, enabled the development of an openly licensed and accessible digital book. The project brought together a collaborative team that was passionate about learning more about open education, and a small grant supported the additional expense of professional copyediting to refine the book.

Co-design and Participatory Pedagogy

In design research there has been a notable shift from a user-centred approach to a more participatory and co-designed approach (Barbera et al., 2017; Sanders & Stappers, 2008). In a user-centred approach, the user might be invited partway through a project, for example, to conduct usability testing, whereas when using a co-designed approach, the user is a partner and involved in all phases of development (Sanders & Stappers, 2008). Co-design relocates the user from consumer to producer; in educational

contexts this situates students as knowledge creators in learning activities instead of as recipients of knowledge (DeRosa & Robison, 2017; Jahnke et al., 2020). Students who are part of the co-design process within an interactive learning environment have a personal investment in the learning task, which can be described as a participatory pedagogy approach (DiPietro, 2013; Sanders & Stappers, 2008). In other words, co-design can be a methodology implemented by instructors along with their students (Barbera et al., 2017). It can also be considered a highly facilitated instructional process that can lead to the development of educational innovations (Roschelle et al., 2006). Further, consistent with Gee's (2005) principle of learning in video gameplay, co-design can be simply described as a way to empower learners as active agents in a highly student-centred learning experience (DeRosa & Robison, 2017; Wiley & Hilton, 2018).

User participation and interaction in design processes is an important aspect of co-design (Sarmiento-Pelayo, 2015). For example, in an edited volume, graduate student authors, with assistance from undergraduate student editors, described a range of student-centred learning and teaching practices and called their book "both a product of student-centered learning and part of that process" (Ashton, 2017, p. 13). Students can be empowered learners through participatory pedagogy and by co-designing open educational content, connecting with scholarly communities, and working in public spaces (DeRosa & Robison, 2017). Co-design can provide an opportunity for students to take learning beyond the expectations of the instructor or intentions behind the course design, thereby extending the value of their work beyond the course (Jahnke et al., 2020; Paskevicius & Irvine, 2019).

Research on co-design in digital and open learning environments highlights the importance of describing a situated context when examining learning processes and the roles of instructors and students in the learning process (Barbera et al., 2017; Clinton-Lisell, 2021). Rich descriptions of pedagogical designs in open education contexts can contribute to a deepened understanding of openness

in teaching and learning (Paskevicius & Irvine, 2019). This book emerged from a graduate program in educational technology at the University of Calgary. Students worked with their instructor, peers, and members of a research team to co-design the chapters for release through Pressbooks, a content management system that allows books to be published in an openly licensed digital format that can be easily accessed, reused, revised, and remixed. The research team comprised experts in educational technology, including the course instructor, program coordinator, and another faculty member, as well as a librarian, a master's-level graduate research assistant, and an undergraduate research assistant. The team received modest financial support from a grant focused on scholarship of teaching and learning, which funded the two research assistants as well as a professional copyeditor. Additionally, the team took advantage of an institutionally supported Pressbooks platform to host and distribute the final open educational resource (OER).

Open Learning Design Framework

The student authors prepared their draft chapters in a course called Ethics and Technology. It is part of an online master's certificate program entitled Leading and Learning in a Digital Age [New Tab], which is offered by the Werklund School of Education. The two preceding courses in the program, Interdisciplinary Learning and Technology and another called Technological Literacy, provided a foundation for students to write the chapter. The final course in the program, Leading Citizenry in a Digital Age, helped students consider knowledge mobilization. Collaboration with members of the research team and work with a professional copyeditor also supported students to complete their final chapters for publication, which occurred after they had finished the program courses.

The open learning design framework that guided the course

design for Ethics and Technology had four interconnected parts: (a) clarifying the co-design process and negotiating each learner's personal learning pathway; (b) building and sharing knowledge through learners choosing how to communicate their learning and make thinking visible; (c) building learning relationships, and (d) sustaining the learning throughout the writing process and beyond the course by developing and expanding upon personal learning networks (Roberts, 2019). In our project, we expanded on this framework by extending learning relationships to include members of the research team.

Clarifying the Co-Design Process

The activities leading towards the development of the chapters were designed as a layered and supportive pathway to provide students with multiple opportunities to share their ideas and to receive ongoing and continual feedback. Topic selection was bounded using Farrow's (2016) framework of ethics for open education, and students chose a topic related to the safe and ethical use of technology in digital learning environments based on their earlier course work, the readings provided during the program, and their personal interests in technological and ethical issues. Students conducted further literature searches to support their topic of inquiry and prepared an outline and 1-minute pitch as part of their course work. The course outline described co-design as follows:

> Learning is a shared responsibility. As such, in this course, the students will explore the ways in which students and instructors can share the process of co-

designing learning within one graduate course. The students and instructor will co-design and develop an open educational resource (OER), in this case a pressbook, as a framework for co-designing participatory pedagogy and conditions for learning. Pressbooks are a sustainable and openly shared digital publishing tool to create an openly licensed digital textbook that current and future students can reuse, revise and remix with others. The pressbook is being created and hosted in conjunction with the Taylor Family Digital Library as a pilot for other University of Calgary courses.

Building and Sharing Knowledge and Making Thinking Visible

The students were expected to work alongside and with their peers to regularly offer feedback when others shared their outlines and pitched their ideas. When searching for literature, the students would often find relevant literature for their peers. Students were encouraged as co-designers and active participants to share resources with peers and help peers throughout the learning process. Students were organized into self-selected social pods to connect, interact, and give feedback to each other throughout the course (DeWaard & Roberts, 2021). The social pods were intended to provide an opportunity for the students to clarify course expectations and develop trusting relationships with peers throughout the course.

Chapter development involved several stages. First, students developed an initial draft and engaged in iterative cycles of

formative feedback with peers and their instructor. Then, students engaged with experts external to the course to receive additional feedback on their draft chapters (students were assisted with identifying external experts if necessary). Students used a variety of tools and techniques to engage with each other and to give and receive feedback, either synchronously during class time (e.g., Zoom chats) or asynchronously using collaborative authoring tools (e.g., Google Docs), discussion threads, or informal social media conversations with the class hashtag #EdTechEthics.

Specific feedback activities were designed within the course (e.g., 1-min pitch); however, other feedback activities developed more serendipitously as the students discovered how and with whom they needed to connect and interact. The choice and variety of feedback activities highlights the need to consider students' *open readiness* (Cronin, 2017). The following information was included in the course outline to help prepare students for this formative feedback:

> The role of the instructor is to facilitate the work and to support students as they engage in the learning tasks. The course is designed to ensure the students connect and interact with multiple feedback loops throughout the course. The feedback loops include group feedback, outside of the class feedback and instructor feedback. The instructor will also provide students with ongoing, timely, and constructive feedback to further their learning and growth in interdisciplinary learning and technology.

Students were asked to reflect upon their open learning experiences in a final assignment as a way to help make their thinking and learning visible to themselves, their instructor, and others. They reflected on the learning process and the sequence of

the layered learning tasks and formative feedback. Students were open to active learning and collaboration with peers and others. According to the students, formative assessment and reflection were key parts of the co-design process and layered assignments that supported their engagement in learning.

At the end of the course, each student submitted their draft chapter and personal reflection to fulfill the course requirements. All students in the program were offered the opportunity to contribute their chapters to the OER pressbook.

Building Learning Relationships

Throughout the Ethics in Technology course, students were building relationships with peers, with instructors, and with content experts. Peer groups were often mentioned by students as an important support as they navigated a challenging assignment. Following the course, students also started to develop relationships with members of the research team when they refined and finalized their chapters. During this period, students were also invited to complete a survey, participate in a semistructured interview, and share artifacts from their learning experiences in the program. As reported by Jacobsen et al. (2021), developing human interactions and building relationships through a co-design model that integrates digital tools can enable the development of OER and provide an authentic scholarly activity that engages students in collaborative knowledge building.

The open learning design framework (Roberts, 2019) used in Ethics and Technology helped students actively engage in the co-design process as a participatory pedagogy while developing an OER (Jacobsen et al., 2021). This learning design facilitated the extension of relationships and interactions beyond the course, building the students' personal learning networks and supporting the

development of a learning community. Students' relationships with outside content experts and members of the research team, including the program coordinator, librarian, and research assistants, contributed to the co-design and completion of the chapters for the pressbook, and extended beyond the duration of the course and the program.

Sustaining Learning Beyond the Course

Students approached outside experts during the course for different types of feedback and assistance as they developed their chapters (e.g., conceptualization of ideas, recommendations for literature, draft review). Although it was uncomfortable for some students to ask for assistance from family members, let alone reach out to experts outside of the classroom, they reported that they appreciated how this collaboration helped them develop their personal learning networks and forge connections that could be carried beyond the graduate program. Experts from outside the class (e.g., university librarians, many of the authors of the assigned course readings, and the program coordinator) were intentionally integrated into the course design though webinars and added as suggested expert support in weekly instructor emails and in communications using the course hashtag.

The program coordinator role for the master's certificate is a voluntary service role, and after the course was completed, the coordinator helped facilitate further feedback and refinement of the chapters. The draft chapters were reviewed by two members of the research team for content, and two other members of the team for format, including APA citations and references. Following these reviews, the chapters were returned to students to consider and implement changes. After the students completed their final edits and changes, the librarian on the research team prepared the pressbook and worked with the team to help upload the final

versions of the chapters. A professional copy editor, who was funded through the research grant, reviewed the chapters and suggested final changes. Students were provided with one more opportunity to finalize their chapters prior to publication.

The total process for completing the OER, including the 12-week Ethics and Technology course, and the back-and-forth communications with the chapter authors and edits, was 1 year. Project momentum was sustained through a combination of grant funding, enthusiasm and commitment from the students and the team, including the course instructor and program coordinator, and the diverse range of expertise that the research team brought to this project.

Conclusion

A four-part open learning design framework guided the co-design of this project: (a) clarifying the co-design process and negotiating each learner's personal learning pathway; (b) building and sharing knowledge through learners choosing how to communicate their learning and make thinking visible; (c) building learning relationships, and (d) sustaining the learning throughout the writing process and beyond the course by developing and expanding upon personal learning networks (Roberts, 2019), including relationships with members of the research team. Infrastructure support, such as institutional access to the Pressbooks content management system and research grant funding, helped make the development of the chapters into an OER possible. The project also required a collaborative team effort. Team members shared different forms of expertise to contribute to this project, such as expertise in educational technology, participatory pedagogy, open education, digital authoring, editing, copyright and licensing, to name a few. The team's diverse expertise and commitment to open pedagogy has allowed it to continue to develop OER in subsequent iterations

of the program, even absent of grant funding. As the development of OER in higher education continues to evolve with the aim of strengthening learner engagement, further study is needed to examine co-design as a participatory pedagogy.

Authors' Contributions

Conceptualization: VR, BB, MJ, CH; Data curation: MT, NN, BB, VR; Formal analysis: MT, NN, BB, MJ, VR; Funding acquisition: BB, VR, MJ; Investigation: BB, VR, MJ; Methodology: MJ, CH, BB, VR; Project administration: BB; Resources: CH, NN, MT; Software: CH, NN, MT; Draft writing, review, and editing: BB, CH, MJ, VR, NN, MT.

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Funding

Grant identification number: Scholarship of Teaching and Learning Grant, Taylor Institute for Teaching and Learning, University of Calgary

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PART I

PART I: EMERGING ETHICAL QUESTIONS ON USER WELL-BEING IN TECHNOLOGY-ENABLED LEARNING ENVIRONMENTS

1. Chapter 1: I Can't See You? Ethical Considerations of Web Camera Use in Online Environments

MARCIA STEEVES

In the spring of 2020, COVID-19 initiated what will likely become referenced in the future as the great pivot to online learning. Globally, students of all ages saw their physical schools closed and all educational services moved online. Due to this rapid transition, many educators had limited time for reflection. They were unable to move beyond mere substitution, as referenced in Puentedura's (2015) substitution, augmentation, modification, and redefinition, or SAMR, model, in their attempt to quickly replicate what their students had been experiencing in their face-to-face classrooms in the online environment.

This chapter delves into one aspect of technology integration that has arisen as a concern during this critical shift in educational delivery: the use of web cameras in the online environment. With the integration of technology in our lives, it behooves us to stop and take stock of the ethical considerations of that integration and understand the risks and benefits of that use. A consequentialist perspective (Farrow, 2016) requires us to contemplate a balance of ethical considerations and to come to an understanding that the consequences of a stand for or against camera use must be considered to achieve the most favourable results.

Full Disclosure

Since the spring of 2020, many educators have shared images and personal reflections from their virtual classroom camera experiences in social media posts, and the topic of camera use has gained broader public attention through news coverage. The range of experiences have varied, from Zoom bombings to feelings of loneliness as educators found themselves lecturing to empty screens (Reed, 2020). The resulting comments and feedback, though sometimes comedic, have also resulted in two diametrically opposed positions on whether students' cameras should be on or off, centred mainly on concerns for student engagement, equitable access, and concern for student privacy.

This is not a new issue. Student engagement has been a topic of pedagogical discussion in online learning for several years. Online instruction was primarily text and audio based (Barnes, 2016; DeWaard, 2016a; Weller, 2020b; Young, 2020) until video began to be used, both synchronously and asynchronously, as one approach to increasing teaching and social presence, as described by the community of inquiry framework [New Tab] (Garrison, 2017). Physical classrooms, and to a greater extent the buildings, labs, libraries, and halls of academic institutions, naturally present a number of opportunities for communication and wayfinding, such as room and directional signage, for students and educators. Online classes require more deliberate attention and planning to build communication and engagement (Weller, 2020a, 2020b). With the pandemic pivot to online teaching in 2020, many educators struggled as they moved their face-to-face pedagogical practices to online environments.

Many of today's courses are built upon constructivist learning theory, relying heavily upon student interaction with faculty and peers as learners construct knowledge through scaffolded student-centred learning (Brown, 2005; Weller, 2020a). On top of this, student engagement is used as a feedback indicator for both the

learning being achieved and the facilitation of that learning by educators in face-to-face classrooms. Educators in online classrooms have found themselves searching for the same feedback indicators they had in the face-to-face classroom, like body language and facial expression. Many teachers and institutions simply opted for requiring students to turn on their cameras during synchronous video sessions in an attempt to reinstate the familiar feedback loops. This has been implemented in a variety of ways, from school board directives to parents, mandated expectations from the classroom teacher, incentivization through participation marks, to simple requests (Finders & Muñoz, 2021). Physiologically, however, it is nearly impossible to cognitively interpret body language and facial expression from a screen full of video images while at the same time delivering content and attempting to interact with students.

Some experts would suggest that allowing students to choose to have their camera on or off comes "at the cost of student engagement and teacher effectiveness, sacrificing the ability of all involved to live and respond in the moment" (Bui, 2021, para. 8). However, this directive implies that a blind educator or student could never fully engage or be effective in a physical classroom or an online environment (J. Bond, personal communication, January 27, 2021). Others report that the intrusiveness of cameras into the private lives of students' and educators' homes (or lack thereof) puts participants at risk and furthers the digital divide between the haves and the have-nots (Goodis, 2021; Raicu, 2020). Thus, a requirement that students have their cameras on may come at a cost.

Privacy, Data Security, and Informed Consent

In a discussion with Dr. Jeremy Bond (personal communication,

January 27, 2021), director of instructional development at Central Michigan University, he noted that many educators are struggling to connect with their students via cameras and not recognizing the potential risk of camera use to themselves and their students. Contemplate for a moment what an educator might see: a student smoking a cigarette, changing a shirt, or sitting in a car in a parking lot somewhere to access the internet. And consider what students see through the teacher's camera. It is these potential risks that need to be evaluated and given more thorough contemplation.

Some students and educators may be able to modify their camera view, by constructing a "clean" space or attempting to use built-in digital backgrounds (which tend to require additional bandwidth and are known to disappear) to create at least a small sense of protection by not sharing their entire private space. Many others simply do not have this luxury of choice, either due to living arrangements or bandwidth issues. Reed (2020) called this "visual overshooting" (para. 5) where the viewer (or viewers) sees more than just the participant.

This video intrusion can present a significant breach of privacy and risks exposing a participant's life through a view into their private space and individual behaviours. It can reveal private aspects of a student's life, from needing to log in from a public Wi-Fi access point to sharing a room with a number of other family members (Miller, 2020). Cyberbullying has made students all too aware of the ability of other classmates to record or take unwanted pictures that can be used inappropriately on social media (Miller, 2020). Neurodiverse students might struggle to sit still (Duncan, 2021; Miller, 2020) and may not want classmates to be aware they are pacing to help them listen. Exposing a participant's socioeconomic situation, behavioural characteristics, or disabilities has the potential to create divides that affect the social dynamics of a course and increase levels of anxiety among students. Finders and Muñoz (2021) also pointed out that enforcing the use of cameras may even be deemed racist, as it is a position that does not take into consideration cultural sensitivities, where students may have

cultural reasons for not exposing their private spaces to those outside of their immediate family.

The topic of consent, for the most part, has been limited to the recording of synchronous video conferencing lectures, and policies across the country are being developed or further honed to ensure institutions are in compliance with protection of privacy regulations around the storage and collection of recordings (Goodis, 2021).

In the spring of 2020, there was little or no choice for the vast majority of teachers and students when it came to the shift to remote teaching and learning. Now, in many cases, students are learning in a hybrid environment, and may not have the choice to learn in a physical classroom given current health regulations and limitations on class sizes. A review of acceptable use policies and student codes of conduct from K-12 boards and postsecondary institutions indicates there are few that provide explicit guidance specific to the use of cameras or expected behaviours in online classrooms (Durham District School Board, 2019; Fleming College, 2013; Hanover School Division, 2017; University of British Columbia, n.d.; University of Calgary, 2019). Moving forward, there is time and opportunity to ensure that students, and parents when necessary, are made aware of the expectations and requirements for camera use and to ensure that consent is obtained where needed. Student consent should not be a blanket check-off; instead, consent should be specific to classes where there are clear learning outcomes that require the use of cameras—for instance, public speaking, drama, art, music, or physical education lessons. Institutions should provide policy development specific to video use in the remote classroom in advance, through course pages or outlines. Doing so will allow students to make informed decisions in selecting online or hybrid courses, as will reviewing accurate information about technology requirements and expectations, and the engagement options available to them should they have concerns with camera use.

Educational Integrity: Avoiding Harm and Minimizing Risk

> To teach in a manner that respects and cares for the souls of our students is essential if we are to provide the necessary conditions where learning can most deeply and intimately begin. (hooks, 1994, p. 13)

Further application of a consequentialist perspective, from Farrow's (2016) ethical framework, requires the acknowledgement that even if there may not be an intent to harm, risk still may exist. Today's students live in a world of surveillance. To those aware of the collection and use of their personal data through websites, services, and other electronic systems, this knowledge can create a heightened sense of being watched, leading to fear and anxiety (see Luinstra, this volume). "The constant fear of being watched can create mental health problems and impair normal academic performance in students" (Romano, 2021, para. 14). Research on the effects of surveillance, whether hidden or open, has found it causes anxiety within the brain, changing behaviour and processing, sometimes without the full knowledge of the individual (Rogers, 2018; Romano, 2021). This finding is supported by numerous social media posts observed from January to March 2021, where students and educators described feeling hypervigilant, uneasy, and self-conscious when their cameras are on.

Prior to the onset of COVID-19, an estimated two-thirds of students had a history of trauma, and the effects on learning have been well documented (Costa, 2020). Trauma impacts "focus, concentration, decision-making, time management, self-regulation, and various higher-order thinking skills" (Costa, 2020, para. 4). This is cause for concern given the steep rise in mental health problems

that have proliferated during the pandemic. Videoconferencing technology, with cameras on, has been shown to cause an increased load on cognitive function or overload, as individuals try to interpret the myriad of visual cues presented, resulting for many in what has been termed Zoom fatigue (Forani, 2021). Trauma and videoconferencing fatigue can compound, negatively affecting student learning.

Cameras act as a mirror for those already suffering from trauma, mental illness, or socioeconomic disparity (Costa, 2020; Duncan, 2021; Forani, 2021), magnifying inequities and forcing individuals to continuously observe themselves in a way that may cause additional trauma and distress. In a physical classroom, students for the most part are seated facing the front of the room or lecture hall to direct their attention to the teacher. When a student speaks aloud in a class, they can typically see who is watching them, and are seldom faced with being at the front of the classroom on their own (Duncan, 2021; Reed, 2020). In a videoconferencing session, an individual is not aware of who is looking at them, and for those developing their self-identities or those who are self-conscious, the idea that someone might be watching can be overtaxing on their senses and produce anxiety (Finders & Muñoz, 2021; Reed, 2020).

Providing students with the autonomy to choose how and when they want to engage with the course material can alleviate unnecessary stressors for those dealing with trauma and mental health issues and help them attain learning outcomes more effectively (Metzler, 2021). During pandemic times, it is more important than ever for educators to understand students' basic physiological needs and focus on their personal safety to ensure they feel secure and safe enough in the online classroom to become engaged and meet their full potential. Maslow's Hierarchy of Human Needs (Figure 1.1) depicts this necessity for the fulfillment of both one's basic and psychological needs in order to reach one's full potential.

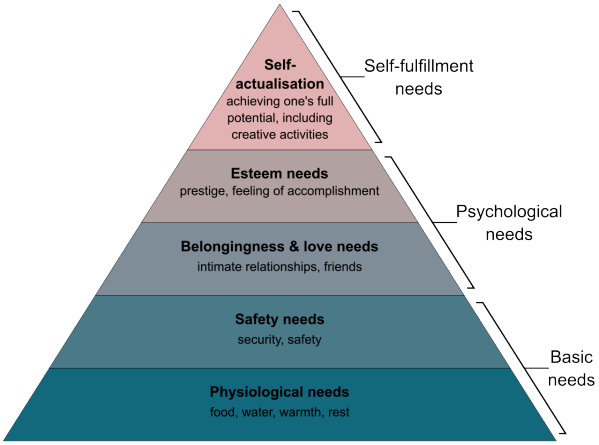

Figure 1.1 Maslow's Hierarchy of Human Need [Clip art], by Androidmarsexpress, 2020, Wikimedia Commons. Licensed under CC BY-SA 4.0.

Friend and Spelic (2020) and Rorabaugh (2012) called for educators to consider the current context that students are learning in and to acknowledge that the online learning experience cannot be identical to one in the classroom. Online learning is a different environment with different resources, and access and ability to thrive online is often dependent on a student's past experiences, abilities, and socioeconomic context. Schools must consider these variables in planning for online learning in order to provide an inclusive and equitable education that minimizes risk to students.

Having cameras on or off can affect how teachers engage in the online classroom. Some educators have indicated that cameras are a distraction from their role in the online classroom. Educators such as Alexis Buschert (2021) have noted that having cameras off can assist in increasing teacher self-confidence: "I can be myself without feeling self-conscious about the eye rolls, the sighs, the yawns or the phones squirrelled away under the desk" (para. 11).

Some educators assert their preference for cameras to be on

during classes, and provide an option for students who are experiencing technical or bandwidth issues, or those who have formal accommodations, to remain off camera. However, as Duncan (2021) pointed out, this practice is an assertion of power, implying that permission needs to be granted, putting the students off camera at risk of being identified as "others" as opposed to active participants in the class. To mitigate risk, educators can apply Universal Design for Learning (UDL) principles by providing a variety of options for all learners. This approach requires educators to trust that students will choose an option that suits their needs. UDL applications allow all participants to have multiple options for engagement and participation so that no one student needs to be openly accommodated. Armed with the knowledge of what is expected and needed to succeed, students can engage in a variety of ways, because they feel trusted to do so. Providing choice and multiple options for engagement allows students to maintain their autonomy while mitigating potential risks.

All students deserve a safe space to learn, but the online environment is ever-changing, and participants simply cannot unsee something broadcast through video to the class. Disruptions can occur, such as Zoom bombing, classroom pranks, and unwanted sexualized remarks that are shared openly by participants. Student codes of conduct may only partially assist in dealing with these behaviours after an incident has already occurred. Attempts at maintaining safety are being made through the use of class-specific logins and passwords, but the lack of authentication can prove a stumbling block if the information is shared outside of the designated participant group. Digital backgrounds are available in some platforms but, as mentioned earlier, these can pose bandwidth issues and call to question the equitability of the technology itself.

Stanford (2020) has challenged educators to assess their use of tools in online environments based on bandwidth and immediacy. In his framework [New Tab], synchronous videoconferencing is identified as a tool "that require[s] both high bandwidth and high immediacy" (para. 13), which can be taxing on the technological

resources of students, putting their course success at risk and potentially causing a "sense of shame and anxiety" (para. 2) as it may reveal their lack of access to high-speed internet to all participants. Although low tech does not seem as sexy in 21st-century learning, it can help address equity and access issues. Providing simple solutions for student engagement that do not require high bandwidth or immediacy allows students with other needs and access problems the opportunity to participate how and when they can (Young, 2020).

While educators must continue to take the primary role in ensuring equity in the classroom, institutions can play a role in reducing risk through the vetting of platforms and the creation of policy or frameworks on how technology is used to support learning (Goodis, 2021). Technology system developers may be able to reimagine what was once developed for business to adapt or create better platforms for school environments (Bui, 2021).

Emerging Practice, Theory, Authentic Contexts and Learners' Personal Connection

Many educators are grieving the loss of their known and familiar educational environments, both personally and professionally. With this grieving may come a sense of loss of control, which can cause educators to seek ways to control as much as possible. Working from a lecture hall or physical classroom, educators felt they had full control of their domain, knowing for the most part the room would be fully equipped to meet their needs. To enhance learning, educators need to divest from full control (Bali, 2014) and focus instead on empowering learners to assert themselves in ways that suit their needs so that they can feel secure and in control themselves (Brown, 2005; Rorabaugh, 2012).

Punitive approaches to the use of cameras—participatory grade reductions, removal from online lecture if cameras are not on—are a part of an antiquated control dynamic in which students are believed to lack the autonomy to be fully participatory in their own learning (Finders & Muñoz, 2021). Online learning can be developed to provide students the necessary agency to determine how and when they learn, along with responsibility for their own time management, participation, and quality of education, which they frame through their own experiences and choices (Weller, 2020b). In an online classroom, an educator needs to re-evaluate expectations based on the necessary learning outcomes and then determine the appropriate levels and ways in which students can engage to meet those expectations.

Many educators can agree that both teacher and student need to be present and engaged for quality education to happen. However, in the context of an online classroom, teaching presence and how it lends itself to creating a safe space for students to test their own limits needs further exploration. Educators might ask, is the camera the only way students can engage with this material? Is my need to see faces reflective of a desire for control rather than an effort to support students' diverse learning needs?

Lindsay Masland (n.d.) of Appalachian State University developed a resource [New Tab] for educators on camera use in the classroom. It provides educators with a number of ways to ensure student engagement while building a sense of community in the classroom—central components of the community of inquiry framework (Garrison, 2017). Feedback is required in the community of inquiry framework to inform adaptations and modifications in each sphere of presence: social, cognitive, and teaching (DeWaard, 2016a, 2016b). Numerous resources outline a variety of optional ways to engage with students online (e.g., Barnes, 2016; DeWaard, 2016b; Loya, 2020; Young, 2020), but what appears to be lacking in this critical moment is an investment in the development of educators, so they have the tools and support to modify and redefine how they engage with their students online.

Finders and Muñoz (2021) noted that "the work of teaching requires the development of mutually respectful, trusting and supportive relationships. Respect and trust must extend to understanding students' needs for privacy and the safety from surveillance of their private lives" (para. 13). The trust and relationship between educators and students is put at risk when rigid, standardized structures are applied that do not support the desired learning outcomes.

By intentionally setting and sharing clear expectations mapped to required learning outcomes (Barnes, 2016; Quality Matters, 2020; Sloan & Catania, 2021; Weller, 2020b) and providing alternate modes of engagement, educators can strengthen their teaching presence in the online environment. That is not to say that cameras or video do not have a role. DeWaard (2016a) suggested that through strategic application using UDL principles, educators can use video and audio to humanize teacher presence and "enhance feelings of immediacy and closeness between instructors and students" (para. 4) while modelling engagement behaviour for students. Trusting that students will make choices for their own academic success serves to motivate student participation. To increase participation in a safe and trusting learning environments, teachers need to gather feedback that they can use to meet students where they are at and to adapt to the needs of each student in the class to support them in achieving the expected learning outcomes.

Conclusion

Media 1.1 This video was created by a student to depict

their experience in remote learning during the pandemic in 2020. The video shows a grade nine student performing tasks relating to remote learning during the Covid-19 pandemic. The video shows a time lapse of the student sitting in the same spot in her bedroom over the course of many days, getting increasingly distraught. It does not feature spoken words, but contains elements of background audio and music. (Liv McNeil, 2020)

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://openeducationalberta.ca/educationaltechnologyethics2/?p=115#oembed-1

The COVID-19 pivot has brought to light numerous ethical issues in the implementation of a variety of technology for learning. While many of these issues existed before, much has been accentuated with the rapid move to remote teaching and learning without proper pause and reflection on practice. This sudden change in delivery has in some cases given rise to potential harm to students and educators by forcing them to see or be seen on video in a variety of ways.

Although educators and students are both affected by the pandemic, it must be accepted that no one is living in the same circumstances, nor coming to the table with the same history or experience. Online education can benefit many teachers and learners; however, it will not equally benefit all without appropriate

time and energy given to UDL principles, trauma-informed practice, and the development of all aspects of a community of inquiry to support student learning equitably. Putting students at the centre of their learning (Bali, 2014; Friend & Spelic, 2020) and focusing on building trust and safety will increase opportunities for authentic engagement in the online classroom.

As Weller (2020b) pointed out, when online teaching is not working it becomes viewed as a deficit as opposed to an opportunity, but to increase the opportunity, investment is needed. Moving forward, institutions need to focus time and energy on supporting educators in exploring pedagogies and learning designs specific to online learning and providing professional learning to reimagine their programs, as undoubtedly online learning will continue to increase for the foreseeable future.

Future research may focus on the development of low-bandwidth enhancements that protect participants' privacy in videoconferencing environments, on the development of privacy policy covering the collection and storage of classroom recordings, on acceptable use and student conduct policy enhancements for the online classroom, and on the ethical implications of educators gaining an intimate view into the home lives of students through online environments.

For now, permitting students to keep their cameras off may simply mean that educators must support students and trust that this support will create an open and safe environment for them to engage in ways that best meet their learning needs and allow them to develop as learners within a community of learners.

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2. Chapter 2: The Use of Eproctoring Software at Post-secondary Institutions: A Balanced Approach

DAVID LUINSTRA

Introduction

The onset of the COVID-19 pandemic brought expanded use of digital platforms designed to support remote testing and uphold academic integrity standards using automated features powered by artificial intelligence (AI). Eproctoring services existed before the pandemic (Dimeo, 2017), but COVID-19 has been a catalyst for the rapid increase in the use of these services and has inspired institutions to seek novel ways to take advantage of the increasingly sophisticated methods available to detect and deter cheaters in the online environment (Flaherty, 2020; Lawson, 2020). It is difficult to find aggregated data on eproctoring as an industry, but considering that a single company oversaw over a million exams in one month and is adding 100s of new clients in a single year (Harwell, 2020), it is safe to say that this segment of education technology is a burgeoning one. During the pandemic, over half of institutions who responded to an EDUCAUSE poll reported using eproctoring and another 23% indicated that they are planning to adopt this practice (Grajek, 2020). Companies already in operation have expanded their range of services and increased their level of technological sophistication, and new companies have emerged to take advantage of the sudden increase in demand (Flaherty, 2020).

Multiple choice question-based exams have increased over the past several decades, due to a trend towards increased class sizes, limited resources, and the availability of new technologies (Nichols, 2017). The rapid transition in 2019-2020 towards remote learning (dubbed by some as "pandemic pedagogy") (Barbour et al., 2020) saw many colleges and universities translate traditional activities into a digital mode (including standard assessment methods), without adequate time and resources to fully understand and respond to this new teaching environment and the pedagogical challenges it presented. The phenomenon of transplanting pedagogical conventions into an online dimension has been dubbed "emergency remote teaching", and Hodges et al. (2020) argued that it should be considered as a separate category to true online learning. Anticipating that students may be more likely to cheat in an unproctored environment (Dyer, 2020), institutions and faculty increasingly chose to rely on eproctoring as a logical solution to a clearly defined problem. While defensible in a time of crisis, many ethical issues and serious concerns related to the adoption of eproctoring tools should now prompt post-secondary institutions to rethink their use of tools that rely on invasive surveillance. As a second-order consequence, it also prompts reconsideration of the use of timed, high-stakes, memory-based testing in the post-secondary education (PSE) environment.

These ethical concerns with eproctoring tools are related to *privacy and security*; *mental health*, *diversity and discrimination*; and *autonomy and independence*. As a contrast to many of the articles published in the popular media on this topic, this paper will not argue that institutions should immediately divest themselves of all eproctoring tools. Instead, this paper argues that institutions should limit the risk presented by eproctoring software solutions while simultaneously engaging in a process that would see a shift towards authentic assessments that simulate what students might expect to encounter in their career, require critical thinking, and allow for multiple attempts and access to resource material (Center for Teaching and Learning, 2019).

Overview of Ethical Concerns

Educational institutions have a long history of using private educational technology companies that rely on large data sets as partners in academic content and service delivery (Regan & Jesse, 2019). As such, there was a ready supply of companies able to meet the perceived needs of institutions to operate in a digital mode in a way that was analogous to face-to-face delivery. However, there is a price to be paid for the convenience and efficiencies these platforms purport to offer, and students may have been burdened with much of this cost. As will be described below, the costs for students disqualifies these tools as a long-term solution to the question of how to ensure knowledge transmission and meet the institution's need to provide instructional continuity.

Privacy and Security

For eproctoring service providers to deliver on their value proposition, it is necessary for them to adopt a variety of computer-mediated, automated features that impinge on the privacy of its users. This includes facial detection/recognition, recording of the user's screen and immediate physical environment, browser lock-down, monitoring and analysis of system usage, keystroke/mouse movement capturing, audio monitoring, and other features, depending on the selected vendor and level of service. If a student behaves in a way that either the remote proctor or the algorithm deems to be suspicious, the system triggers a notification either for review by the faculty member upon completion of the exam or in some cases the student may be notified in real-time of the potential infraction (Dimeo, 2018; Flaherty, 2020).

The result is a large amount of identifiable data located on the servers of a private company, including unique facial, voice, and

behavioral data (Stewart, 2020). The data gleaned from these practices is a valuable commodity to the company and, given the propensity of the vendors to guard their source code, some institutions feel that they are in the position of having to trust that the companies are behaving in a responsible way (Hippensteel, 2021). There are safeguards in place, in the form of privacy and security terms offered by vendors; contracts that specify acceptable use of this data; and privacy legislation, but the misuse of data can be difficult to detect and police (Swauger, 2020a). The risk of a data breach may be relatively low but is still a genuine concern, given that an eproctoring-related breach already occurred in Australia, and privacy breaches in general are quite common for digital service providers (Johnston, 2020). Given the amount of private information stored in these recordings, the consequences may be higher than with other educational technology applications that store data on private servers. It has been suggested that a feeling of being watched may be anxiety-provoking (Reed, 2020), and this feeling would be accentuated when the viewer is provided with heightened access to intimate details of the students' home environment, including their living spaces, physical attributes, and even bathroom habits.

Mental Health, Diversity, and Discrimination

While concern for privacy has been identified as a major issue for students and faculty alike, many recent articles focus primarily on the psychological impacts of being watched while undertaking an already stressful activity (Swauger, 2020b). Users object to the "creepiness" factor related to eproctoring: the disturbing feeling of being watched, the additional stress related to a sense of someone tracking your movements, fear of being penalized for bathroom

breaks, and the surreal sensation of exposing environments such as one's bedroom to a stranger (Chin, 2020b). Journalists have shared stories of extreme anxiety caused by the fear that the AI imbedded in an eproctoring service might flag a long gaze, unusual typing patterns, scrolling too quickly, completing the exam too early, or the potential that another person in their house might accidentally enter the frame (Harwell, 2020).

Students and their advocates have argued that the adoption of eproctoring tools unnecessarily increases students' stress associated with test taking to excessive degrees, especially impacting students with mental health conditions (Chin, 2020a). Students with cognitive disabilities report being flagged for reading questions aloud and students with involuntary vocal or physical tics or a need for self-stimulation have claimed that they were flagged by the algorithm for suspicious sounds and motion (Harris, 2020; Flaherty, 2020). Students of colour have reported that the facial recognition technology is not effective at identifying them and creates the conditions for potential consequences relating to their academic standing and progression (Harris, 2020). Their concerns are well founded, as it has been demonstrated that facial recognition and detection is much less effective for women and students of colour due to a variety of factors. These factors may include implicit bias built into the programming of the hardware and software as well as the lack of black and brown faces in the databanks that these programs use to execute this function (Buolamwini & Gebru, 2018).

It could be argued that test-taking is an inherently stressful experience and while it has not been conclusively determined that eproctored tests are more stressful than exam-taking in general, and there is some evidence that some students feel *less* anxious in remote testing environments (Japp et al., 2021). It is also true that there is no guarantee that human proctors in a face-to-face setting do not harbour implicit or explicit biases. However, there is enough anecdotal evidence to suggest that the trauma caused by surveillance-based software—coupled with evidence that students

are still able to use services like CHEGG to cheat, despite every effort being made to ensure that students complete the assessment without unsanctioned assistance (Adams, 2021)—is enough to motivate educational institutions to investigate and consider implementing alternative approaches to eproctoring services.

Autonomy and Independence

A common theme that pervades this topic is one of agency, power, and control. This concerns both students who feel subject to the whims of their institution and their chosen corporate partners, and faculty who may feel similarly constrained by choices made by their administration. Ceding too much control to third parties is not only detrimental to the student but could weaken the foundation of the educational institution and may hamper the academic freedom of the faculty member. However, a strict prohibition on eproctoring solutions also places limits on academic freedom by denying the faculty member the right to choose their preferred mode of assessment for their circumstances. Institutions and the administrators who are responsible for business decisions that impact the overall success of the college or university also have the right to keep at their disposal tools that may, in a limited and prescribed manner, enable them to remain innovative in a highly competitive environment.

All the above considerations represent a complex interplay of competing rights. The students' rights relating to mental health, disability accommodations, privacy, or objections of conscience should be respected. Honouring student rights must also be viewed in tandem with the faculty member's academic freedom and right to assess students in a manner they deem to be the most appropriate for their field, industry, or to meet certification requirements. This speaks to the need to find a balanced approach that emphasizes the careful application of policy as well as reason, compassion, and

respect for the autonomy of both staff and students. In addition, the rights of the institution and its mission to provide quality and reputable programs must also be considered.

Institutions can mitigate concerns about rights by yielding power back to those affected by these choices. Giving students and faculty clear explanations of their options for remote assessment and the rationale for the decision behind the use of the software better facilitates informed decision-making and builds trust between the affected parties. Institutions should balance their interest in maintaining high academic integrity standards with an equally robust concern for empathy and agency. Also, institutions should recognize their power and influence by limiting their business relationships to only companies that comport to their institutional values. There are examples of companies posting consumer-support chat logs into a Reddit thread to shame a student who complained about the service (Zhou, 2020) and excessively litigious companies who have resorted to taking legal action against a professor who posted training videos on Twitter (Chin, 2020a). Given the preponderance of eproctoring options in the private sector, institutions should only consider companies that demonstrate and commit to the highest ethical standards.

Recommendations

The COVID-19 pandemic is a tragedy, but also presented an unprecedented opportunity to affect new ways of teaching and learning in online environments. The pandemic and shift to online teaching and learning has exposed weaknesses in the operations of post-secondary institutions. In particular, a digital-default or hybrid content delivery mode, with large class sizes and limited faculty development time, poses an inherent challenge to PSE's core mission. However, an impulsive decision to immediately sever eproctoring contracts may be as problematic as the reactive

decision to implement eproctoring modules at the onset of the pandemic.

Post-secondary institutions are heterogenous, complex, and often conservative entities that are made up of faculty who enjoy considerable autonomy and academic freedom. Instead of a prohibitive approach, educational institutions should embark on a long-term strategy that encourages faculty to adopt more creative, authentic assessments and foster a spirit of collaboration and community (Anderson, 2017). Faculty with an interest in simulating exam conditions (e.g., in regulated professions that require a standardized test administered by a governing body) could consider frequent low-stakes testing (or "retrieval practice") as an alternative to "make-or-break" exams that create the type of stressful conditions that may motivate some students to cheat (Paul, 2015). Online assessments may offer great value as a pedagogical tool and have many practical applications that go beyond a mere determiner of grades. Means et al. (2014) cite several other roles for online assessments, from determining if a student is ready for new content, providing faculty with information about learning states, and identifying struggling students.

The nature of authentic assessments can discourage or make cheating an impossibility, as these types of assessments are based on providing unique responses to specific circumstances instead of choosing the "right" answers from a predetermined list (Sotiriadou et al., 2020). By adopting authentic assessment strategies, we can further shift the conversation towards questions about whether students are learning instead of how to deter cheating (Bertram Gallant, 2008). Institutions should initiate one-time or ongoing investment in faculty development and increase support for curriculum designers and online learning specialists to facilitate this culture shift. These costs could be recouped or defrayed in the long term by avoiding the licensing fees related to the software solutions currently in place. In the short-term, a process could be developed that requires faculty to justify the use of eproctoring and demonstrate that alternative assessments have been considered

and ruled out—not related to personal preference or convenience, but guided by theoretical frameworks or exigencies such as student-instructor ratio (Hodges et al, 2020).

If one accepts the argument that eproctoring may be necessary to offer as an option while longer-term strategies for authentic assessments are pursued, there are several practices institutions can employ to reduce the impact on student privacy and mental health and regain their ethical footing:

- **Use eproctoring solutions with the least invasive features.** In line with recommendations of the Dutch Data Protection Agency (2020), avoid platforms that use synchronous monitoring of student workspaces while the exam is in progress. Limit access to the recordings to the smallest number of trained adjudicators with the faculty member as the determiner if the flag is a false-positive or genuine concern (Dawson, 2020).
- **Require that potential and current vendors complete a process like the HECVAT questionnaire** (EDUCAUSE, 2020), a report that provides the institution with an exhaustive overview of their policies and practices related to data security and privacy including information on staff training protocols and procedures.
- **Conduct a Privacy Impact Assessment** using a process similar to what is recommended by the Privacy Commissioner of Ontario (2015). New and existing contracts should be assessed to determine compliance with privacy legislation. Information used via this process can be used to affect changes in practice with vendors currently not meeting the standards or expectations of the institution (e.g., reducing retention schedule to statutory minimums).
- **Enter a separately negotiated contract and privacy terms with vendors** that exist outside of their standard service level agreement and override any posted terms on the vendor's website. Publicly post institution-specific contracts on

dedicated website. Queen's University is an exemplar institution vis-a-vis clear communication with respect to transparency and clarity (Queen's University, n.d.)

- **Set clear expectations for vendors** regarding professional conduct and demonstrate a willingness to terminate contracts with companies that do not align with institutional values, policies, and legislation.
- **Conspicuously post information about all aspects of the eproctoring experience**, including details about technical requirements, expectations for the in-exam experience, how to prepare your workspace, what the faculty role is with respect to following up on potential AI flags, and a coherent rationale for why eproctoring may be chosen by faculty as the best or only option available to meet the learning objectives of the course (Dawson, 2020)
- **Broadly communicate the options available to students** with disability accommodations and clearly outline pathways for these students to access alternative assessments that ensure the learning outcomes are met. Examples include testing in a physical space, or non-algorithmic online, remote testing in which a human invigilator monitors the students' screens and uses their discretion to manually flag suspicious behavior.

Conclusion

Eproctoring raises concerns related to privacy, mental health and safety, and student autonomy and independence. The widespread adoption of eproctoring software represents a textbook case of products being acquired as a response to external conditions, where administrations make long-term sacrifices (of student privacy and potentially their online safety) for the sake of the short-term maintenance of the status quo (with respect to assessment practices). This should not preclude institutions from reconsidering

their choices and honestly evaluating their decisions now that their impact is more easily measured. In the short term, institutions can recognize their power and agency and compel vendors to improve their terms and practices to lower the risk of harm for all students, with the option to patronize other vendors if their chosen corporate partner does not share their values.

While these short-term solutions may limit harm, the long-term solution should be to improve student outcomes by transitioning away from multiple-choice assessments and ending harmful practices that rely on surveillance and breed a sense of distrust among students and faculty. In the long term, institutions should support faculty and students in moving towards authentic assessments of meaningful student work. Achieving this type of attitudinal, cultural, and operational shift requires time, resources, and buy-in, and hence a short-term continuation of eproctoring in a conditional and limited manner will allow institutions to reprioritize budget allocations and revise academic planning processes to support this effort and give faculty the space they require to make the necessary adjustments, all the while respecting their academic freedom.

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3. Chapter 3: Exploring the Ethical Considerations Regarding Video Games for School-Aged Children

ROB HENDRICKSON

The Rise of Video Games in a Digitalized World

Video games are a relatively new form of media that can dramatically influence the people who play them. The 1970s was the era of stand-up, coin-operated arcade games. With the introduction of the Atari 2600 in 1977 (Lacina, 2020), video games moved from purpose-built retail establishments into home living rooms. The popularity of video games for home use caused an explosion of home video consoles and eventually oversaturation (Lacina, 2020). In 1985 the Nintendo Entertainment System revived home gaming (Kohler, 2010) and forever changed the video game world.

Arcade games, early home console games, and early personal computer games were restricted to a single player or small group of players in the same area. According to Chikhani (2015), video games began to change with the introduction of multiplayer games, allowing people in different geographical locations to play together. In the 1970s and early 1980s, online multiplayer games like *Empire*—an eight-player turn-based game using the Programmed Logic for Automatic Teaching Operation, or PLATO—were possible only using powerful computers, usually confined to universities.

The introduction of powerful home computers in the mid-1980s extended the reach of multiplayer games, but it was not until the development of the local area network in the 1990s that these games began to take off. Multiplayer gameplay further expanded with the introduction of the internet, allowing truly diverse groups of people to play together in a virtual environment. However, the internet was not robust enough to support the aspirations of the gaming industry. The failure of the Sega Dreamcast, the first genuinely network-enabled console, demonstrated the infrastructure's weaknesses.

In 2001, *Runescape* was released, marking the beginnings of a new era of gaming the massively multiplayer online role-playing game (MMORPG). As a free-to-play, multiplayer, sandbox-style game, *Runescape* began the evolution of video games to their current form (Grubb, 2017). Games had moved out of the home and entered the mobile stage. The first mobile game had been introduced in 1993, when IBM released the first smartphone, the Simon Personal Communicator, which was preloaded with a game called *Scramble*. Despite this, gaming on mobile devices was not a central selling point, and this innovation was not pursued (Paiva, 2020a). The 1999 launch of Wireless Application Protocol meant cell phones could receive data from a wireless network, allowing communication between devices. Game manufacturers began to exploit this feature to tap into a new market (Paiva, 2020b). As cell phones increased in popularity and cellular networks became more robust, game developers began investing in mobile gaming. The 2007 introduction of Apple's iPhone, with its high-resolution screen, dramatically increased the playability and market reach of mobile gaming. The emergence of competitors, such as phones running the Google Android system, forced developers to incorporate more features, such as games, to draw in consumers. Games generally followed the free-to-play model introduced by *Runescape* and could reach many users in short periods. In 2016 the popular game *Pokémon Go* was downloaded 500 million times in the first three months of its release (Paiva, 2020c).

The evolution of games from dedicated retail arcades to home consoles, personal computers, and finally smartphones suggest that barriers to access and play games have decreased. The free-to-play business model, along with relatively inexpensive and powerful internet connections, indicate that upfront costs for games are also low. Despite the continuing existence of digital inequalities (Beaunoyer et al., 2020), video games can be accessed and played nearly anywhere by anyone with a cell phone. While the prevalence of video games has undoubtedly extended to all aspects of society, school-aged children have always been a target. Given the accessibility of video games, the question becomes one about ethical concerns, particularly for school-aged children. *Do video games help children feel good about themselves?*

Ethically, the relevance of video games is an issue of virtue. Holmes et al. (2018) explored virtue through a modern lens, and it is worth exploring if video games could also fall within the idea of a person living a good life. Virtue, they argued, is more personalized and should not be as defined as deontology or consequentialism, for instance. This is further reinforced by Aristotle's ideas that formal rules do not lead to a good life; appreciation for aspects of life such as friendship and pleasure are more important (Kraut, 2018). From parents' and caregivers' perspectives, is it possible to view video gaming as a virtuous action, or is it merely a vice that should be discouraged or limited? Farrow's (2016) framework for the ethics of open education is a valuable tool for evaluating the ethical considerations of parents and caregivers and deciding whether online video game play should be encouraged. Video games are a relatively new media and addressing these concerns is an important topic of discussion.

Ethical Considerations of the Positive Benefits of Video Games

The video game industry is massively profitable. In 2020 it overtook movies and sports combined in terms of profits, bringing in total revenue of US$179.7 billion. Of course, one must consider the influence of the COVID-19 pandemic on movie, sports, and video game revenues. However, the video game industry's total revenue in 2019 was already a hefty US$150.2 billion (Witkowski, 2021). These mind-boggling numbers emphasize the fact that the video game industry is a for-profit business. It is in the companies' best interest to produce video games that encourage consumers, including children, to keep playing, which reinforces the potential ethical concerns of video gaming as a vice.

Interestingly, individual skill level does not significantly factor into a child's enjoyment and continued participation in video games. For instance, a design feature of MMORPGs is that they are practically never-ending; it is generally not possible to complete the game. However, players will continue to participate and achieve a sense of social community within the game even though they may never actually finish it; this applies to both expert and novice players (Badrinarayanan et al., 2015).

It is worth exploring the relationship between a child's experience in a game and any social connections the child develops. Regardless of the player's skill level or the fact the game will never finish, players develop a sense of identity and community while playing in the immersive worlds of video games. Kowert et al. (2014) studied this relationship by examining how children with high emotional sensitivity (ES), who would be considered shy, used video games socially, in contrast to children with low ES, who would be seen as more socially active. Notably, children considered to have high ES did not engage in online video games measurably more than did children with low ES. Kowert et al.'s work did identify that children with high ES would be more likely to transfer offline relationships to

online environments. An essential issue is how children, particularly ones with high ES, may have trouble developing relationships offline and how online video games may better support their engagement in relationship building. Kowert et al. stated that children with high ES use online video games differently than do children with low ES. Children with high ES use video games' social interaction features to develop and broaden their social circle by strengthening offline relationships.

Kowert et al.'s (2014) study occurred before the COVID-19 pandemic. However, their research points to the benefits of parents and caregivers permitting, and even encouraging, children to participate in online video games, particularly children with high ES who have difficulty developing and strengthening friendships in face-to-face social contexts. This conclusion then supports the idea that video games offer an ethical component of virtue, in particular the aspect of virtue related to development of friendships; online video games can help children, particularly those with high ES, feel good about themselves by allowing them to develop and strengthen relationships (Kraut, 2018). The view of video games as a vice, for this type of learner in this circumstance, can be disregarded.

Video games also offer benefits for family social interaction. A child's social interactions should not only be with peers and should include parents, caregivers, and siblings as well. According to Bassiouni et al. (2019), parents and caregivers should act as gatekeepers when it comes to children's consumption of video games, and they should play the games with the children as well. In their research, Bassiouni et al. found that family social interaction is a by-product of the convenience and ease of use of video games. However, positive social outcomes occur when parents and caregivers involve themselves with their children's video gaming. Whether video games are better than other forms of interfamily activity was not addressed in this study. However, video games are one opportunity to strengthen social interaction within the family unit. By playing with their children, particularly in online

games with people they do not know, adults can also help develop children's digital literacies associated with gameplay.

Primack et al. (2012) explored the benefits of video games from a medical perspective. Their study focused on the potential therapeutic benefit of video gaming and included physical activity games for rehabilitation. They also investigated the use of video games for patients with long-term illness and the potential benefit of games as a pain management strategy. Despite limitations and lack of current research in the area, Primack et al. concluded that there are potential benefits of playing video games as a medical strategy. The therapeutic outcomes of playing video games extend beyond children and are not gender specific.

Avoiding Harm and Minimizing the Risks of Video Games

If the use of online video games should be permitted and, in fact, encouraged for children, what potential hazards exist? In particular, what are the hazards regarding informed consent (Farrow, 2016)? One concern is the issue of data collection and privacy. What information about their children are parents and guardians surrendering to the for-profit video game industry? The simple answer to that question is a great deal of data. Online video games use data collection for various purposes, and they make much of this data mandatory in order for users to be able to play the game. Video games can be a very personalized form of entertainment; therefore, the more data that video game producers have, the more tailored the games can become. The privacy issues raised by this should be a concern. Newman and Jerome (2014) outlined a variety of reasons that developers collect data from players and categorized types of data as follows:

- "*Real-world*" *data* includes information about how the player uses a controller for console game systems, for instance, but also includes more advanced information such as head movements in virtual reality systems.
- *Social data* includes information about a player's interactions with other players through the gaming system.

Player behaviour includes information on how the player interacts within the gaming environment. The recording of every single interaction that a player makes within a game is possible, according to Newman and Jerome (2014). This information is used to predict player personality types by analyzing what they focus on in the game. Further, this category of data can include financial information—for instance, whether players will pay real-world money to more easily achieve a game goal.

How this data is collected and then used should be a concern for all parents and caregivers. They need to explore the user agreements and privacy policies of video game companies. Using the popular online game *Roblox* as an example, its privacy policy states explicitly in Section 7, Information Sharing, that *Roblox* "doesn't sell your information to other companies for them to use as they want" (Roblox, 2021). The fact that information is not sold is potentially reassuring because the data collected by the game is extensive and includes the ability to track the "real-time or precise geolocation" of the user (Roblox, 2021). It is possible to disable this feature through device settings, which respects players' autonomy related to their data and enables privacy and data security (Farrow, 2016).

Of concern for parents and caregivers is the other people that children will be interacting with while playing the game. An online game has the potential to include anyone, so how can children be protected from questionable content or cyberbullying? Several examples highlight strategies for protecting users. *Roblox*, for instance, contains features that can filter inappropriate content and personal identifiers. For players under the age of 12, this content

is filtered automatically, and older children can adjust the content filters. Users can report abuse to moderators and block other players who are problematic (Roblox, n.d.). Parents and caregivers should discuss with children how to identify questionable content and what they should do when they witness it.

Other concerns for parents and caregivers is the potentially adverse effects of children's use of electronic devices and the amount of screen time. Such concerns fall within the realm of avoiding harm and minimizing risk (Farrow, 2016). Nagata et al. (2020) discussed how excessive screen time is associated with health risks for obesity, high blood pressure, the development of a sedentary lifestyle, and more. In the context of online schools or during times of crisis when there are social distancing measures, the use of screens cannot be eliminated; however, it can be managed (Nagata et al., 2020). The mitigation of the risks associated with screen time through specific daily allowances of time for screens has largely been discarded for school-aged children. The American Academy of Child and Adolescent Psychiatry's (2020) still recommends as little screen time as possible for children under 18 months and the use of screens only for video chatting with an adult, not playing video games. Video games are also not recommended for children from 18 to 24 months, with screens used only to watch educational videos with adult supervision. Children from 2 to 5 should limit noneducational screen time, including video games, to a maximum of 1 hour per weekday and 3 hours on weekends.

For school-aged children who are completing schoolwork from home (online school, home school, etc.), screen-time management for educational or recreational uses becomes a critical parental or caregiver responsibility. Nagata et al. (2020) discussed how although screen time for children has increased, minimizing the adverse effects of screen time through proper management is possible. The American Academy of Child and Adolescent Psychiatry (2020) recommends a screen-time plan for families, encouraging positive screen-time use. Parents and caregivers should:

- be aware of children's online activities,
- model good behaviour and responsible use of screen time,
- discuss online advertising,
- support activities that do not include screens, and
- be aware of parental controls and discuss online privacy and safety.

Parents and caregivers should not ignore the potential social benefits of screen time. The development of strategies associated with screens will allow the realization of the potential benefits of allowing children to socialize online, for instance, through video game play.

Internet gaming disorder is also a concern when allowing children to play online video games. In their early work on game addiction, Lemmens et al. (2009) listed seven criteria, based on similar criteria for gambling addiction, to address the frequency of this disorder. Their study of Dutch children found as low as 2% to as high as 9% demonstrated problematic use of video games. More recent studies by Liu et al. (2020) have validated this measure. The probability of internet gaming disorder among children varies widely, ranging from 1.6% in the Netherlands to 15.6% for high-school-aged students in Hong Kong. As such, parental supervision and monitoring of children's activities online should occur. Like all activities, video game play should occur with awareness and some moderation, and if problematic behaviour occurs, intervention is required.

A criticism of online games is the potential for predatory revenue-generation schemes. King and Delfabbro (2018) studied the use of "loot boxes" as a strategy to monetize free-to-play online games. These games are potentially predatory because players do not know the game's actual cost until they are deeply committed to the game. Also, they tend to favour the use of real-world money to achieve goals within the game instead of skill or strategy. Loot boxes are a randomized collection of virtual items purchased with real-world money, which can be considered a form of online gambling, as the

player will have to purchase the boxes repeatedly to acquire the desired virtual reward. The potential profit cannot be understated. According to King and Delfabbro, Activision Blizzard recorded US$4 billion in 2017 from in-game purchases. The current lack of regulation in many countries means that parents and caregivers must educate children about this profit scheme. The pattern of behaviour regarding in-game purchases can become similar to that of gambling addictions, with financial and mental repercussions (King & Delfabbro, 2018).

Of concern for parents and caregivers is questionable content, including violence, associated with many video games. Is playing violent video games, for instance, linked to increased aggression in children? Greitemeyer and Mügge (2014) explored this issue and also asked whether prosocial video games positively influence players. Violent video games primarily focus on harming characters, whereas prosocial games focus on assisting characters. They concluded that video games, both violent and prosocial, can have a positive social influence, which suggests that parents' and caregivers' guidance is necessary regarding what type of video games children play to emphasis the social benefits. A more recent study by Przybylski and Weinstein (2019) reinforced this study by suggesting the influence of violent video games on youth has been overstated.

In North America, the rating of video games is conducted by the Entertainment Software Rating Board (ESRB), which, it is worth noting, is not a government organization and demonstrates how the video game industry self-regulates. The ESRB rating system standardizes game ratings and clarifies age appropriateness (see Table 1). The ratings also contain notes about elements of the game, such as whether there are in-game purchases and whether these include randomized items (loot boxes), and whether the game shares the user's location.

Table 3.1 ESRB Ratings, Adapted from Ratings guide, by ESRB, 2021b (https://www.esrb.org/ratings-guide).

Rating	Description
Everyone	Content is generally suitable for all ages. May contain minimal cartoon, fantasy or mild violence and/or infrequent use of mild language.
Everyone 10+	Content is generally suitable for ages 10 and up. May contain more cartoon, fantasy or mild violence and/or minimal suggestive themes.
Teen	Content is generally suitable for ages 13 and up. May contain violence, suggestive themes, crude humour, minimal blood, simulated gambling, and/or infrequent use of strong language.
Mature 17+	Content is generally suitable for ages 17 and up. May contain intense violence, blood and gore, sexual content and/or strong language.
Adults Only 18+	Content suitable only for adults ages 18 and up. May include prolonged scenes of intense violence, graphic sexual content, and/or gambling with real currency.
Rating Pending	Not yet assigned a final ESRB rating.

Parents and caregivers therefore have the responsibility of ensuring the appropriateness of video games for their children. In addition to checking the ESRB rating, they can also view widely available advertising trailers for the games. It is worth noting that the advertising trailer's rating and the game's ESRB rating may be different.

A Holistic Approach to Encouraging Video

Games

For people who do not regularly play video games, including many adults, the attraction can be hard to understand—and from an ethical perspective, the inexperienced or casual observer may view video games as a vice, a guilty pleasure, and a distraction from the real world. However, video games can have an impactful influence on a person's identity. According to Murphy (2004), video game design is similar to that of movies, because it draws the viewer into an alternative reality. Video games take this process and further extend the connection to the user in the real world. The ability to interact with the character and the environment, and the use of real-world feedback controls, such as with PlayStation's DualShock controllers, allow the player to physically feel the game's influence in their reality.

For Murphy (2004), this connection to the game world and the characters who inhabit it becomes an essential part of the player's identity. Does the player lose the ability to distinguish between reality and the fantasy of the game? If video game consumption is to be encouraged, this distinction must be addressed as a form of media literacy. This is especially so given recent developments in video games' immersive characteristics, such as virtual reality headsets. Considering the development of media literacies related to video games should be an essential factor when allowing children to play video games. In a more recent study, Rivera et al. (2016) concluded that children's attitudes toward negative aspects of video games can be changed, with lifestyle being a significant factor in their development of media literacy. Children with pre-existing poor-quality relationships, what Rivera et al. described as fractured relationships, tended to reject media literacy regarding, for instance, violence in video games. Children with pre-existing positive relationships, defined as communicative, tended to accept media literacy intervention and moderated their habits regarding violent video game consumption. Factors other than video game

consumption habits play a role in determining the appropriateness of video games, particularly violent ones for children. Rivera et al. encouraged further research in the usefulness of media literacies for children who play video games. They concluded with the recommendation that media literacy intervention should be part of a holistic approach to educating children on video games. A holistic approach reinforces more recent guidelines to have a family plan that incorporates video games into a daily schedule (e.g., American Academy of Child and Adolescent Psychiatry, 2020).

What is the balance between the social identity children may associate with online games and their offline relationships? Travaglino et al. (2020) analyzed the relationships that high school and university students have through online interactions, particularly among people who label themselves as "gamers" or "frequent internet users." Their study addressed the types of social support children receive through video games, and they attempted to determine whether video games represent a social cure (i.e., vitreous activity to be encouraged) or a social ill (i.e., a vice to be discouraged). They found that a child's identification as a gamer strongly contributes to social support from like-minded peers in the gaming community and that this support can mitigate problems associated with video games, such as video game addiction. Children's social isolation can be reduced through the social connections they make in online gaming. However, Travaglino et al. also drew attention to situations where gaming identity can lead to harmful activities. A child may identify as a gamer, but this should be balanced with other aspects of their identity, which is encouraged by the American Academy of Child and Adolescent Psychiatry (2020). Likewise, video games can be one component of a child's daily activities but should not be the primary focus.

Do Video Games Allow Children to Feel Good About Themselves?

The introduction of video games into the fabric of society has dramatically changed how children are influenced by media. As such, there are additional challenges for parents and caregivers in guiding children to appropriately use them. However, the benefits of video games are apparent if parents and caregivers work to avoid harm and minimize the risks (Farrow, 2016) associated with the use of video games, particularly ones that are online. From an ethical standpoint, video gaming can be viewed as a virtuous action that allows children to feel good about themselves and lead a good life by developing friendships and finding pleasure in their activities. Aristotle viewed a person's path towards a good life as uniquely their own (Kraut, 2018) and certainly, in the modern era, video games can be a component of this journey for a good life. The use of video games should be encouraged if parents and caregivers work to minimize the potential risks.

Suggested recommendations for parent and caregivers:

- Children under 24 months are not encouraged to play video games (American Academy of Child and Adolescent Psychiatry, 2020).
- Children 2 to 5 years should limit noneducation screen time (including video games) to 1 hour a day on weekdays and 3 hours per day on weekends (American Academy of Child and Adolescent Psychiatry, 2020).
- For children over the age of 5, video games should be part of a holistic family plan (Nagata, 2020).
- Adults are encouraged to play video games with their children (Bassiouni et al., 2019).
- Check the parental controls, particularly for geospatial information and in-game purchases (Newman & Jerome, 2014).
- Be aware of randomized purchases in games—for instance, loot

boxes (King & Delfabbro, 2018).

- Encourage prosocial elements in games, particularly in games that feature violence (Greitemeyer & Mügge, 2014).
- Become familiar with ESRB ratings and decide the appropriateness for children (ESRB, 2021a).

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4. Chapter 4: Broadband Connectivity in Rural and Remote Communities: A Persistent Challenge Heightened by COVID-19 and the Move to Remote Learning for K–12 Students

MICHAEL MACIACH

Over the last few decades, the internet has become increasingly crucial to the everyday lives of a large portion of the world's population. People rely on the internet for essential news and information, banking, communication, healthcare, employment, education, and access to government services. For many individuals, the internet has become a necessity for active participation in society and also a lifeline for access to the world outside of their homes (OpenMedia, 2020). The internet has made the world a smaller place and provides people all over the world with exposure to other individuals, locations, ideas, and opportunities they might never have encountered otherwise. This increased global access has come with both advantages and challenges. Some people, especially those with reliable internet service at home, have a greater number and scope of choices. But for those without access to a reliable internet connection, or without any internet access at all, opportunities for participating in society may be limited (Standing Committee on Industry, Science, and Technology, 2018).

COVID-19 has increased reliance on the internet, as people struggle to stay connected and meet their personal needs (OpenMedia, 2020). In dealing with the challenges brought on by the pandemic, the internet has become the main tool for social and economic interactions (Beaunoyer et al., 2020). Despite advances in technology and the development of infrastructure necessary to take broadband internet service almost anywhere in the world, a large portion of the global population in remote or rural areas still continues to have limited or no internet access. Additionally, even in areas where there is internet access, it may be unaffordable or there may be insufficient bandwidth to complete the most basic of internet activities.

This chapter describes broadband connectivity challenges in remote, rural, and Indigenous communities in Canada while exploring how COVID-19 has impacted the situation. I focus on how lack of broadband internet services has affected K–12 students and their access to education during the move to remote learning. Looking at this ethical issue from multiple perspectives, I examine whether governments should be responsible for providing broadband home internet access for all K–12 learners.

Full Disclosure and Historical Context

How Has the Situation Evolved Over Time?

Internet access across the world grew significantly in the early part of the 21st century with worldwide internet availability and usage increasing from just 18% of the global population in 2006 to 35% in 2011 (Li & Ranieri, 2013). Research conducted in 2015 indicated that teenagers in the United States went online regularly for a variety of purposes, including gaming, and that a significant majority owned

smartphones (Lenhart, 2015). Inequitable broadband access across the world might negatively affect both education and social progress (Li & Ranieri, 2013). For K–12 students, access to online education involves more than just having a computer and an internet connection; it requires a reliable connection with sufficient bandwidth (Dolan, 2015). The ongoing and current challenge people in many rural and remote communities face is gaining access to broadband infrastructure that delivers the robust internet capabilities they need to engage in activities necessary for educational, economic, and communication purposes. For these communities, lack of necessary broadband infrastructure makes using the internet for many tasks a challenge.

In 2018, the Canadian Radio-television and Telecommunications Commission (CRTC) identified broadband internet as critical, using speeds of 50 Mbps for downloading and 10 Mbps for uploading as the basic measure of adequate home internet capacity across Canada (Standing Committee on Industry, Science, and Technology, 2018). In 2020, 87.4% of Canadian households had access to an internet connection with that minimum speed; in rural Alberta, that number decreased to only 37% (Cybera, n.d.). Moreover, in Alberta, the percentage of households in First Nations communities that had access to a 50/10 Mbps internet connection speed was only 19.6% (CRTC, 2020). Although broadband internet services have expanded greatly in urban centres, rural, remote, and Indigenous communities have struggled to keep up. Broadband infrastructure challenges in remote and rural communities persist today despite the fact that over 3 years ago, a House of Commons publication indicated that high-speed internet is vital for the economic and social development of communities (Standing Committee on Industry, Science, and Technology, 2018).

The Government of Alberta (n.d.) considers the rural internet market in Alberta to be competitive, with service provided by a variety of internet service providers. However, although Canada has over 500 internet service providers, the broadband market is controlled by three large telecommunication companies, creating

very little competition and limited incentive to invest in infrastructure that is not considered profitable (McNally, 2021). In Alberta, the SuperNet, a broadband fiber optic cable, provides high-speed internet services to 429 communities, including remote and rural locations, First Nations communities, and Métis settlements. Despite running near many private homes, the SuperNet cable extends only to schools, health centres, libraries, and government offices, unless an internet service provider has extended its reach (Loewen, 2021). In many cases, internet service providers have not been motivated to extend the SuperNet to homes in rural and remote communities for numerous reasons, including financial and infrastructure challenges.

In Canada, there have been numerous internet funding initiatives such as the Universal Broadband Fund, CRTC Broadband Fund, Investing in Canada Infrastructure Program, and the Connect to Innovate fund, to name a few. These initiatives, despite representing billions of dollars in capital, have achieved very little in terms of delivering robust broadband internet to homes in remote and rural communities (McNally, 2021). Indeed, the internet reaches almost every single area of the world, while in Canada and many other countries, a divide still exists based on physical geography and lack of available infrastructure with the absence of a viable plan for moving forward to solve the persistent broadband connectivity challenge within a reasonable amount of time (Lembani et al., 2019).

What Is the Current Situation for K–12 Students?

In 2020, the pandemic drew awareness to the continued lack of internet access in many parts of the world. Particular attention was paid to the lack of internet access in northern rural and remote areas of Canada. The absence of high-speed internet services has left many vulnerable individuals even more vulnerable, particularly students learning online (OpenMedia, 2020). This lack of access

currently impacts Indigenous communities more significantly than others because they are more likely to be in remote and rural areas with low population bases. In Indigenous communities that do have quality internet services, home broadband internet is unaffordable or inaccessible to many. As a result of the pandemic, many more individuals in remote Indigenous communities are relying on the internet for access to basic services, to stay in touch with family and friends, and to continue to receive an education. When referring to broadband internet services in Indigenous communities, Ula Shirt, communication specialist for the Piikani Youth and Education Foundation, stated, "It's almost a basic human right like water because it underlies everything" (McMahon et al., 2021).

When schools and community libraries were open, those who did not have high-speed internet access at home could access it in those public spaces. Pandemic safety measures meant individuals could no longer use public broadband connections (OpenMedia, 2020). Many K–12 schools in remote, rural, and Indigenous communities closed and moved to distance learning, making the internet their main education delivery tool. In communities where students returned to in-person schooling, some students continued to learn from home for a variety of reasons, such as being immunocompromised or living in a multigenerational family home with an older member vulnerable to COVID-19. For students who did return to in-person learning, regular COVID-19 cases and outbreaks routinely necessitated a return to online learning for extended periods of time. In rural and Indigenous communities where broadband internet is not accessible for all residents, students who are required to receive their education online are unable to participate meaningfully because they do not have the broadband capabilities for synchronous online learning classes or because they cannot access internet-based learning at all. Consequently, many students in homes without reliable internet access instead received their schooling through worksheet packages delivered to homes or picked up at the school. This educational format offers little interactivity between the student

and teacher and does not provide the same opportunity for an engaging and quality educational experience that may be accessed by those who do have a broadband connection. A purely paper-based educational experience removes the social aspect of learning, leaving students to learn in isolation with few opportunities to communicate and collaborate with their peers. Consequently, many students can become disconnected from their schooling, falling further behind and in many cases dropping out of the educational system all together.

Many students begin online learning with the intention of being actively involved in the learning experience, and many teachers attempt to make the learning experience as engaging and effective as possible for the students and themselves. Frustration can quickly develop as students without high-speed internet realize that they are unable to access parts of the learning experience and teachers realize that their efforts to create quality online learning experiences are futile. When discussing his granddaughter's attempts to access online learning with a weak internet connection, a grandparent from the Enoch Cree First Nation stated, "Kids are falling behind and can't stay caught up with their schooling, which will have an impact on community later on" (McMahon et al., 2021). The equity gap between those who have access to broadband internet and those who do not becomes abundantly clear when physical schools must close and learning moves online.

Ethical Perspectives

According to the Convention on the Rights of the Child (UN General Assembly, 1989), "parties recognize the right of the child to education and with a view to achieving this right progressively and on the basis of equal opportunity" (Article 28). Since thousands of Canadian students must now receive access to their education at home via the internet, and equal opportunity for all to receive

a quality education is recognized globally as a fundamental right, it seems logical that all students learning at home should have quality internet access. In addition, since both the government of Canada and the CRTC have identified broadband internet access as an essential service, this raises the question: Should the government be required to provide quality and affordable broadband home internet access for all K–12 students?

Looking Through a Consequentialist Lens

From a consequentialist perspective, the soundest ethical decisions are based on what is best for the largest number of individuals with the fewest number of negative consequences or harmful outcomes for the majority. As Farrow (2016) suggested, a consequentialist ethical perspective considers that what is beneficial to oneself or individuals is not as important as how decisions may impact the collective. Expanding broadband infrastructure to all households so that all individuals have reliable and affordable access, including K–12 students, could be considered the best ethical decision because it brings positive consequences for the majority of people. A recent study indicated that investments in high-speed internet for rural and Indigenous communities in Alberta would have a significant positive economic impact along with numerous other community benefits (Valleau, 2019). The positive consequences would have the greatest benefit for all in terms of both quality of life and economic prosperity, with limited negative consequences for any one individual. According to Mignone and Henry (2009), "ICT [information and communications technology] investments in remote communities dramatically increase their bridging and linking opportunities, with potentially major returns in business opportunities, education, and health" (p. 136). Broadband internet access can ensure that individuals in Indigenous communities have opportunities to participate and connect more fully with others

in online communities, allow for better access to services and opportunities outside of the community, and open up career training and work opportunities for community members. “From a broader perspective of community return, the potential of ICT with high capabilities can directly enhance the development of communities’ business opportunities, as well as of their educational and health systems among others,” noted Mignone and Henry (2009, p. 136).

When students are learning from home during the pandemic and beyond, broadband access for educational delivery purposes ensures they have the opportunity to access an education that can allow them to complete their K–12 schooling. This can also support them to continue to postsecondary studies or workforce training and contribute back to the economy and overall economic prosperity of their community, province, and country. Not providing broadband internet to those who require it could lead to students leaving the education system before graduating, not being able to pursue further education, or lacking diverse options in joining the workforce. Not having access to broadband internet limits an individual’s access to information and a variety of services, often resulting in what could be considered digital exclusion, leading to reduced educational opportunities and possibly negative health outcomes (Beaunoyer et al., 2020).

Looking Through a Deontological Lens

From a deontological view, the ethically correct course of action is always that which is driven by a sense of moral obligation, responsibility, duty, and what is considered acceptable according to principles and values (Farrow, 2016). The government is responsible for the well-being of its citizens and is morally obligated and duty bound to provide a quality and equitable education for all students. Therefore, from a deontological ethical perspective, the

government should provide broadband internet access to all homes, especially when receiving a quality education hinges upon having a robust and reliable internet connection.

Despite multiple challenges that might make it difficult for all individuals to access an equitable education, education is a foundational human right necessary for both dignity and inclusion in society (Cronin, 2019). In the case of Indigenous individuals, who have historically been and are currently being marginalized, a deontological perspective acknowledges their right as students to a quality education that is equal to the education received by others in non-Indigenous communities. Additionally, a deontological lens identifies the government's moral obligation and duty to provide equal educational opportunities for all. Where lack of broadband internet access acts as a barrier to educational opportunities for Indigenous students in remote and rural communities, the government should provide access for all K–12 students because it has both an obligation and a moral responsibility to do so.

Risks and Challenges

There are numerous risks and challenges for users that accompany access to the internet or increased usage of the internet for a wider variety of purposes. It is important to reiterate that in the case of limited broadband internet access in remote and rural communities, it is not always the case that there is no internet access in these communities. The issue may be that the current access is not of sufficient speed or quality for many purposes and not affordable for all. With improved access to quality broadband internet services, one concern is that more individuals will be using the internet and for an increased number and variety of purposes, potentially increasing overall exposure to the risks and challenges that accompany internet usage. For example, in many communities with limited broadband access, K–12 students are currently able to use

the internet via cell phones with limited data plans and other devices that offer varying degrees of usage. As broadband access becomes more prevalent, K–12 students will be able to better use the internet for educational purposes as well as a variety of other activities that require increased bandwidth and higher internet speeds, making them more exposed and vulnerable to the following risks and challenges.

Privacy, Data Security, and Informed Consent

Access to an internet connection always comes with the risk that others might gain access to a user's private information and use it for illegal purposes or share it with others. In some instances, the very applications and learning management systems that school divisions approve for use or that teachers sometimes use without specific permission from the division often track and surveil students through their everyday educational activities. Survey data indicates that very few educators actually understand the impact that their technology tool choices have on their students' privacy (Stewart, 2020). The pandemic has increased the use of data-driven technology by academic institutions, which has placed students in the vulnerable position of having their user data compromised and shared without their explicit consent. Often, a user agreement is difficult for a layperson to understand, let alone a student who is very unlikely to have ever read or understood one (Stewart, 2020).

Frequently, user data is used by large educational technology companies for marketing purposes and to direct students towards specific advertising and products under the guise of leveraging it to improve software and services (Regan & Jesse, 2018). Increased usage of technology tools and social media platforms that have become so engrained in everyday lives can lead to extensive use of these tools without ever questioning how they might be monopolizing and monetizing users' private data. These same tools

that teachers and students use for engagement, communication, and connection rely on tracking locations, using personal data, and sharing information to generate a profit and thus continue to exist (Cronin, 2019). With increased use of the internet for socialization and communication, online anonymity becomes a challenge, as information thought to be incognito can easily be traced back to a specific individual and used without their knowledge (Regan & Jesse, 2018). With more students using the internet for schooling at home, there is a greater potential for privacy breaches and use of user data without parents' or children's knowledge or consent.

Educational Integrity by Avoiding Harm and Risk

Risk in the form of specific harm to individuals and educational integrity can be another challenge with increased access and use of the internet. Just as access to the internet opens up a world of opportunities, choices, and information, it also increases potential exposure to illegal activity, inappropriate content, and addictive behaviours, such as excessive gaming. As access increases, students who are not appropriately monitored or individuals who may not have the skills to make wise choices could be left vulnerable. Increased access to social media may leave individuals more susceptible to harmful behaviours such as cyberbullying and could also expose them to inaccurate information or "fake news" for which they may lack the ability to discern between fact and fiction. Inaccurate information promoted on various internet platforms can have negative consequences, especially during a pandemic and in situations where individuals are already vulnerable and marginalized and lack digital literacy skills (Beaunoyer et al., 2020).

Academic integrity may also be compromised as increased internet access also increases access to information and ideas that individuals may choose to use in place of their own original ideas

and thoughts. These actions can compromise a student's learning and education while also leading to countermeasures that are equally as harmful, such as proctoring tools that further violate student privacy (see Luinstra's chapter). Additionally, information gathered for assessment purposes might be used to customize or stream student learning, which can be harmful if it is done without student knowledge or consent and if it limits a student's potential (Regan & Jesse, 2018) or access to opportunities. Kearns and Whitney (2019) suggested that "existing evidence on the negative effects of internet use can be considered in three broad categories: lower social connections; negative mental health effects; and lower levels of physical activity" (p. 2). Increased access to the internet can be harmful in a number of ways if the risks are not mitigated and if individuals do not have the knowledge they need to make wise decisions and choices online.

Respect for Participant Autonomy and Independence

Just as remaining anonymity online is next to impossible, increased access and usage of the internet can also impact personal autonomy. Although an individual might think they are making choices for themselves while choosing how to use the internet, which sites to browse, and which applications to use, the truth is that various algorithms may be making these choices without the individual ever knowing. User data is often used for targeted advertising, to make predictions about user behaviour, and for directing an individual's online choices in a certain way. Users are likely unaware that this is happening because they only see the choices that are offered to them and can remain in the dark as to how their choices are being limited or manipulated (Regan & Jesse, 2018). There are times when artificial intelligence tools are used to stream users towards this content based on their browsing

history or other forms of user information that people might think is private. This information could potentially be used in discriminatory ways that further perpetuate inequality.

Another concern is that once an individual's data is in the hands of another party, it becomes very difficult to exert control over what the data is and is not used for and very challenging to claim ownership over it (Regan & Jesse, 2018). Increased access to the internet may give an individual expanded opportunities or choices but at that same time might limit the online choices they are exposed to and reduce the amount of control they are able to exert over their own data, giving them a false sense of autonomy.

Mitigating the Risks and Challenges

Much can be done to reduce the risks related to privacy and data security and to decrease the vulnerability of adult and student users. For example, a strong digital literacy curriculum in schools and community support for learning digital skills can give individuals the skills they need to better understand the risks, protect their information and data, and make wise choices online (Beaunoyer et al., 2020). In addition, institutions can adjust their policies, choose education technology tools more wisely, educate staff on privacy and data security, and use a number of strategies to limit the risks for students. Stewart (2020) mentioned that "it's time to educate our campus communities about the data implications of tools that — in an extraordinary short window of time — have come to effectively constitute a huge proportion of teaching environments" (p. 4).

When it comes to educational integrity, harm, and risk, a strong digital citizenship focus in K–12 education and educational campaigns against fraudulent and illegal online activity for students and adults would give individuals a better understanding of acceptable and unacceptable online behaviour (Beaunoyer et al.,

2020). Additionally, helping students develop the ability to discern between fact and fiction online combined with a strong foundation for identifying and preventing the negative health impacts of maladaptive online behaviour would reduce the negative health and psychological impacts that internet use can induce. There is a positive correlation between internet access and good health as access to the internet can strengthen social connections and support (Kearns & Whitney, 2019). Further, academic institutions can make academic integrity a priority topic beginning in elementary school and re-evaluate their assessment practices and procedures to ensure that they take a balanced approach to student evaluation and prevent students from participating in potentially harmful assessment practices.

Finally, student online autonomy will increase if students more fully understand how they can be manipulated online and if they are taught the skills they need to reclaim their online power. More clarity around who owns student and user data, better identification of the parties responsible for protecting student data, and effective government policies and strategies related to privacy, transparency, and data use will increase student autonomy and independence (Regan & Jesse, 2018). Further, assistive tools built into the internet and technology can give students and users with a variety of learning challenges a new level of autonomy and independence that might not have existed had the internet and the corresponding technology not been available to them.

Where Do We Go From Here?

In light of the information and data presented in this chapter, it has become clear that delivering broadband internet access to all rural, remote, and Indigenous communities is a very complex matter. Clearly it is not just a matter of funding and determination, as billions of dollars have been made available for this effort and

numerous individuals, groups, and organizations have worked tirelessly to shrink the digital divide in internet access. In some locations the divide has become smaller but in other areas it has grown. Some communities have been able to find solutions on their own through various partnerships and creative thinking while other communities have fallen further behind. A one-size-fits-all solution will not expand broadband internet to every community. Even if government is responsible, there will need to be a mix of public and private support, involvement from all stakeholders, and creative solutions to address infrastructure, sustainability, and funding challenges. This leads to several important questions:

- How can a greater sense of urgency be created for all stakeholders in relation to broadband internet challenges in rural, remote, and indigenous communities?
- How can more collaborative approaches be fostered that involve all levels of government, industry, educational institutions, large telecommunication companies, and communities?
- How can stakeholders and communities be encouraged to develop creative and innovative solutions to the challenge while building their own technological capacity?
- How can large telecommunication companies and internet service providers be encouraged to see the value in investing in broadband internet expansion without expectation of large profits?

Conclusion

Access to broadband internet is fundamental for everyday communication purposes and full participation in economic and educational aspects of society. During the COVID-19 pandemic, the need for both reliable and affordable internet services in all homes

has become even more evident. Many communities and homes throughout the world continue to have limited or in some cases no access to broadband internet. Lack of internet access is particularly evident in rural, remote, and Indigenous communities throughout Canada. In Alberta, the number of homes receiving high-speed internet in urban areas has increased while many homes outside of large urban areas continue to struggle with limited high-speed internet access. Despite numerous large-scale funding efforts, the gap between those who have quality home internet service and those who do not still exists. Indigenous communities are more impacted by a lack of broadband services because they are more likely to be located in remote and less populated areas of the country. COVID-19 closed many schools across the country and forced thousands of students to continue their learning online. Students who do not have high-speed internet access are at a disadvantage for access and participation in online learning. Consequently, many of these students access education in less engaging and less interactive formats. Students in rural and remote communities are more at risk of leaving the education system and appear to be disengaging from their schooling at alarming rates (McMahon et al., 2021).

Since education is a right and quality education during COVID-19 requires high-speed internet access, the ethical question to address is whether the government should be responsible for providing home broadband access for all K–12 students, which is particularly relevant not only in the current context but also in regards to future school closures. From both the consequentialist and deontological ethical perspectives, the government should be responsible for providing broadband internet access for all K–12 students. Increased internet access does come with many risks and challenges related to privacy, data security, informed consent, educational integrity, harm, autonomy, and independence. However, these risks and challenges can be mitigated through education, awareness, policy changes, and strategic planning. Further, the risks inherent in not expanding broadband internet to all communities are immense.

Communities without broadband access will continue to fall behind, which will heavily impact educational outcomes for students and could have economic, communication, and health impacts for everyone else. Although providing high-speed infrastructure and access for K–12 learners may be a government responsibility, all stakeholders will need to be fully engaged in collaboratively working together to find creative solutions to this persistent challenge in order to provide the broadband infrastructure and services needed to benefit all.

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PART II

PART II: CRITICAL CONSIDERATIONS OF THE ETHICS OF TECHNOLOGICAL ADVANCES AND THEIR EFFECTS ON AUTONOMY AND PRIVACY

5. Chapter 5: A Laptop for Every Learner: The Not So Simple Solution

LINDSAY HUMPHREYS

1:1 Defined

The development of 21st-century skills [New Tab] (Rich, 2020) is a mandate that has been increasingly and broadly adopted in education. This directive includes mastering skills that enable learners to collaborate, learn actively, inquire, and involve themselves in the design process through technology. Institutions are assisting students to develop 21st-century skills in part by implementing one-to-one (1:1) programs, which are believed to foster said skills (Islam & Grönlund, 2016). These programs mean that every student within an institution has access to a personal laptop (or tablet) at all times to complete their school work (Islam & Grönlund, 2016). Researchers have posited that 1:1 is a method by which student growth and preparedness can be ensured (Powers et al., 2020). To properly prepare students for the world outside of the school building, those who argue in support of developing 21st-century skills (e.g., Alvarado, 2018) contend that pedagogy is enacted to bring about the best consequences, which has shifted over the years to meet the needs of the individual, and society [New Tab] (Bates, 2019) resulting in an increasingly authentic, technology-charged classroom.

This chapter takes a utilitarian perspective while discussing the ethical implications of a 1:1 program. Utilitarianism, a consequentialist approach to ethics, maintains that the morally

superior action is the one that results in the greater good (Driver, 2014). When everyone has equal access to education, society is better off. As the classroom changes because of technology, diligence must be maintained to ensure that education is for the greater good, and that society takes meaningful steps to ensure that it is inclusive. This chapter discusses the benefits of a 1:1 program, and also the ethical challenges such programs face. This consideration of benefits and challenges includes the effects on learners, educators, and other stakeholders; data, privacy, and consent; inclusivity and the digital divide; and autonomy and independence.

Laptops in the Classrooms

A Device for Everyone!

In an effort to have students achieve growth in 21st-century skills, institutions arm each of their learners with a device (Islam & Grönlund, 2016). This approach has been bolstered by a technology industry that has produced better and cheaper devices for the classroom (Blikstad-Balas & Davies, 2017; Boninger et al., 2019). And it may be true that the computer is one of the most important tools of this lifetime [New Tab] (Gray, 2015); however, research into effective, replicable use of 1:1 initiatives is scarce (Parrish & Sadera, 2020). As such, researchers have yet to fully understand if a personal laptop does improve learning outcomes and prepare students for their future, or if they simply put students and teachers in an ethically ambiguous situation.

Don't Forget the Teachers

A device may help enhance learning for students; however, educators are profoundly affected by the speed with which systemic changes are implemented. Often, there is little time or support for teachers to adequately prepare for enhanced use of technology. The invention of the iPad in 2010, and subsequent surge in cheaper and better personal devices, spurred the widespread adoption of a device for every student (Blikstad-Balas & Davies, 2017). DelSanto (2017) pointed out that many studies overlook the substantial amount of resources that institutions need to carry out a 1:1 program to support educators. Though competition and innovation lead to refined products, these advances also require educators to become proficient with slightly different tools. This scenario requires a considerable investment of time and focus, both of which can be hard to come by.

Engaged or Distracted?

Implementing 1:1 can be both an enhancement and a disruption to learning. Studies report that learners are more engaged and motivated, and persist more often when using technology (Zheng et al., 2016). Students have more control over their learning (Holen et al., 2017) and participate in inquiry, sharing, gathering, and research (Sung et al., 2017), as well as communication and collaboration (Blikstad-Balas & Davies, 2017). However, disruption in this educational process can ensue due to a lack of support for teachers (Bebell & O'Dwyer, 2010; Holen et al., 2017). Without leadership and infrastructure (Islam & Grönlund, 2016), teachers are left in the lurch. Furthermore, technology itself can be distracting and encourage superficial versus deeper learning (Holen et al., 2017, p. 38). Teachers report falling behind on curriculum goals (Peterson &

Scharber, 2017) due to the distractibility of the device. Additionally, if teachers are not appropriately supported, devices may not be used as intended (Bebell & O'Dwyer, 2010; Penuel, 2006). The device should be used to engage learners in learning, not distract from a task.

Moving Forward

Further research into 1:1 programs would assist all invested parties in learning more about the most effective approach for this relatively new pedagogy. Without proper implementation or research (Islam & Grönlund, 2016), ethical dilemmas are bound to surface. The belief that each student having a laptop is enough to positively affect their learning outcomes is at the root of this problem and must be addressed.

Data Literacy

Behind the Screens

As part of 1:1 implementation, students are potentially exposed to ethical issues regarding privacy, data security, and informed consent. The 1:1 classroom is a complex interaction of students, teachers, individual and group knowledge, and access to the web. Because of insufficient teacher and student preparation, concerns can arise with the use of various software. As students' presence on the web grows larger, educational and noneducational applications routinely collect their personal data. Although this is unsurprising in today's data-driven society, students are minors and targeting

them in a school setting is inappropriate. Privacy and data concerns for digital learning include being tracked, losing autonomy, lacking anonymity, and losing ownership of intellectual property (Regan & Jesse, 2019). Given that 1:1 programs require the use of various digital tools, each of these risks must be fully assessed by institutions and stakeholders.

According to Kelly et al. (2019), privacy settings are often difficult to control, and some apps may intentionally or unintentionally engage in collecting student data and selling or sharing the data with third parties. Applications or websites that are deemed educational may not respect child privacy laws or obtain parental consent (Kelly et al., 2019). Yet the prevalence of a device in the hands of every student only grows. Kelly et al.'s (2019) findings "indicate a widespread lack of transparency and inconsistent privacy and security practices for products intended for children and students" (p. 5). This lack of transparency, alongside teachers and schools that may not be well prepared or equipped to protect their students (Fleming, 2021), calls into question the potential ethical implications of a 1:1 program.

More than a Number

Educational apps may appear to be designed with innocent intent as their advertised goals are to engage students in learning. However, Lupton and Williamson (2017) warned of algorithms that are not objective, and "consist of a range of embedded forms of knowledge and expertise, norms and values that originate with their designers and are encoded in the data the tools provide" (p. 799). These design factors can put students at risk of being tracked, their data analyzed, predictions made, or student learning goals dictated according to certain norms. Consequentialist theorists "understand morality as a matter of bringing about the right consequences" (Farrow, 2016, p. 101). Through the collection of data from students, their learning,

future learning progress, and pathways may be influenced or predicted without inclusion of their actual lived experience (Rennie et al., 2019). The data does not incorporate the students' voices, thoughts, or opinions concerning their experiences and decision-making process, but may dictate life opportunities [New Tab] (Barassi, 2019) without their informed consent. Regan and Jesse (2019) pointed out that big data in education may create "more refined, intersectional categories that might discriminate among students in harder to read ways" (p. 172). As 1:1 programs increase, institutions ought to use a variety of assessments as evidence of learning, not just analytics.

Education and Data

Analytics can benefit education since many applications collect data to improve learning. Furthermore, many companies have signed a Privacy Pledge [New Tab] (Student privacy pledge, 2020) promising to only collect educationally relevant data and protect student privacy. Whether part of the privacy pledge or not, data collection is often done with limited consent from a vulnerable population (namely students). Islam and Grönlund (2016) noted that educators often lack the necessary support to navigate these complex privacy issues. Educators use and implement a variety of educational and noneducational technology tools for learning without full consideration of the terms and agreements (Duball, 2020). Furthermore, due to limited budgets, teachers often choose free apps, which often require users to pay with the learners' attention and behavioural data (Rennie et al., 2019). Teachers unwittingly mandate that their students comply with potentially misunderstood terms and agreements. The ethical responsibility ultimately lies with the teacher (Rennie et al., 2019). Therefore, prioritizing teacher education, children's rights, and parental oversight in 1:1 projects, and consistent adoption of policies to protect these rights is

needed. The ramifications of a 1:1 program can put students at risk for habit-forming [New Tab] (NPR, 2012) and the growth of an online digital identity, stemming from data collection, that affects their lives without their knowledge (Pangrazio & Selwyn, 2020). Consequently, students, their families, teachers, and institutions are all at risk of privacy breach, and their intellectual property or other data being used without their informed knowledge and consent.

Taking Responsibility

To facilitate learning in a 1:1 program and to do so transparently, institutions should make data literacy an integral part of the program. This would allow for an investigation of a company's terms of agreement. Teaching students to think critically about data to build data literacy can give educators and students agency over the tool (Markham, 2018). All parties learn to weigh the consequences and the benefits. A critical data literacy pedagogy should be incorporated in tandem with other disciplines to ensure teachers are supported in choosing the best tools for students and in understanding how to read the terms and conditions and adjust privacy settings.

Interestingly, an issue with data literacy is the propensity of humans to be unwilling to change "even when cognisant of the issues and options" (Pangrazio & Selwyn, 2020, p. 13). Many educators are unwilling to give up the convenience of digital tools in the classroom even when they are aware of potential issues. At this time, it is primarily up to corporations to take data more seriously and treat students' data more respectfully. In their study on data literacy implementation, Pangrazio and Selwyn (2018) noted that trust in corporations is what makes datafication so widespread. If teachers and students in 1:1 classroom settings are obliged to use applications, data security ought to be taken more seriously by both technology companies and educational institutions.

Avoiding Harm and Minimizing Risk

The Digital Divide

Technological inequities lead to a digital divide. Though there are some schools that are equipped with the latest laptops, smartboards in every classroom, 3D printers, and designs that allow for collaboration and movement, there are other schools in which teachers and students have little to no access to technology. For instance, in 2019–2020 in Ontario, only 66% of schools had access to Wi-Fi, and 77% of elementary schools with high average family incomes offered robotics, technology, or STEM clubs, compared to 57% of schools with low average family incomes (Watkins, 2020). Technology companies are supporting 1:1 programs by making devices more accessible. For example, Chromebooks, which are low-cost laptops with free tools built in to bridge the digital divide, are used in many schools (Alvarado, 2018, p. 9). One intention of 1:1 programs is to address the digital divide, but if they are not implemented carefully, this goal may not be met.

The Good

A 1:1 program is an opportunity for educators and students to benefit from access to an individual device. Access to technology can bolster project-based learning, which can increase learners' decision-making skills in other areas of their lives (Kral & Schwab, 2012). Schools with 1:1 programs can challenge inequitable access to information since every student has a laptop, sometimes 24/7, and online access to knowledge (Kral & Schwab, 2012). Furthermore, in a 1:1 program, there are opportunities to become digitally literate (Zheng et al., 2016), which is another growing knowledge gap in the

21st century. A laptop can also create a personal space for those that may not get much privacy (Kral & Schwab, 2012). As literacy changes and expands, students may have increased opportunities to express themselves in multiple ways rather than only through traditional assessments that may not serve certain groups (Kral & Schwab, 2012). Supplying every student with a device appears ethical from a consequentialist perspective, but this is just the start. Other supports, like professional development for teachers, or equal access to Wi-Fi, need to be enacted.

Support for Educators

Support for educators as they shift their practice in a 1:1 program is imperative to address the digital divide. Not all teachers receive the support they need due to a lack of systems, time, or budget (Alvarado, 2018; Rauf, 2020). As a result, the technology may not get used intentionally, or at all, resulting in missed opportunities. "Educators who struggle to learn how to use computers are quickly left behind when new technologies are invented and utilized in the classroom" (Alvarado, 2018, p. 4). If a school does not support its teachers in implementing technology, then 1:1 programs can create a divide between teachers, and students' learning can be impacted. Before integration, institutions need to have enough resources to implement a 1:1 plan, including network infrastructure updates, finances, and appropriate teacher training (Alvarado, 2018; Rauf, 2020). Furthermore, with a 1:1 program, teachers may be asked to do many new or additional tasks, which can result in stress and work dissatisfaction. Bridging the digital divide with a 1:1 program requires comprehensive professional learning and long-term support for educators.

A More Inclusive Web

A more diverse world within educational technology should also be considered if the intention is for all individuals to be engaged online and in a 1:1 classroom. Many educational technology tools are created based on the educational experience of the country they come from, which is generally Western, developed nations (Gallagher & Knox, 2019). Furthermore, Islam and Grönlund's (2016) international literature review of 1:1 computing in schools pointed out that most of the research comes from the developed world and "impact or effectiveness evaluation is still scarce" (p. 213). Adding diversity to the technology education world, and considering the application of technology outside of their country of origin, can lead to a more inclusive web experience for students and educators. This would include a representative group of creators of the educational technology population.

Accessible Wi-Fi

The advantage of a 1:1 program is every student is provided with a device. In an institution with a 1:1 program, students should be provided with equal access to technology and Wi-Fi in the school. In Cole and Sauers's (2018) research, equity as a key motivator for superintendents who implemented 1:1 programs. Superintendents perceived 1:1 as closing the gap and creating a more even playing field for all students. However, these superintendents worked with local residents and companies like Google to provide free Wi-Fi access in the community. Unfortunately, Wi-Fi can be very expensive and unaffordable for some families. To bridge these economic and digital inequities, initiatives that involve the entire community are more likely to succeed, "particularly in disadvantaged neighborhoods" (Beaunoyer et al., 2020, p. 5).

Additionally, teachers must consider the projects and homework they give students to ensure that all have equal opportunities to complete any work that is required to be done from home. Holen et al.'s (2017) study on a 1:1 program also showed other disparities; not all students had equal access to an adult to help with the technology at home. Strategies to narrow the digital divide include having volunteer educators, holding tutorials, and updating school curriculum (Beaunoyer et al., 2020). It can't be assumed that access to a device equals bridging the digital divide. The digital divide is more than access to a device—it also includes access to Wi-Fi and digital literacy.

Participant Autonomy and Independence

Technology and Authenticity

The 21st century is commonly known as the era of knowledge due to the proliferation of technology, which has improved and modernized many education systems and pedagogies (Selwyn, 2011). In a knowledge-based society, students need to learn how to manage and apply knowledge [New Tab] (TeachOnline.CA, 2020) rather than simply memorize information. In response, a constructivist approach to learning has developed [New Tab] (TeachOnline.CA, 2020), strengthened by technology, to engage students in a social process of knowledge collection and construction known as a model of inquiry. Technology is imperative to this process, as it is key to the individual's relationship to information and knowledge (Selwyn, 2011). Schools with 1:1 programs can encourage a constructivist approach perpetuating an authentic context (Selwyn, 2011). Authentic lesson plans and learning environments are often more relevant and meaningful for

students, and are more likely to engage students in generating deeper connections, developing an enduring understanding, and applying 21st-century skills [New Tab] (Stanley, 2019). These programs can provide an authentic experience for the learner; after all, most people out in the world use technology in many facets of their lives. However, when scrutinized further, autonomy and independence are not assured.

Encourages Autonomy

It has been reported that student engagement increases when students have access to a computer, and, according to Schellenberg (2018), choices regarding how, when, and where one does one's work increases learner autonomy. A 1:1 program can allow students to demonstrate their learning, collaborate, communicate, and research in a variety of ways. It can also lead to better work management for students, which also demonstrates increased autonomy (Schellenberg, 2018). For students with distinct needs, abilities, and learning styles, laptops have many accessibility features to make the classroom more inclusive (Apple, n.d.; Google, n.d.). Furthermore, ownership over a laptop builds independence and autonomy since the student usually signs and complies with an acceptable use policy. Laptops can give the student freedom to search and become involved in what they are interested in, and educators have commented that 1:1 programs are useful at reinforcing student-centred learning (Alvarado, 2018). However, autonomous learning can be frustrating for students who are used to being passive in teacher-centred classrooms (Jahnke et al., 2020). Active learning strategies can support students in developing their autonomy and feel pride in their work. Tools that can support active learning in a 1:1 classroom include Nearpod (https://nearpod.com [New Tab]; Jahnke et al., 2020), Classkick (https://classkick.com [New Tab]), or Google Workspace (https://workspace.google.com [New Tab]),

to name a few. Though 1:1 programs can encourage independence, it must be noted that not all learners have experience with autonomous learning, and they may need support to develop autonomous learner strategies.

Discourages Autonomy

Without appropriate support and digital literacy education, a loss of autonomy may arise with a 1:1 program since internet use is inevitable. At any point throughout the day students can go online to a web that monitors and extracts their data, which only benefits certain individuals (Gilliard, 2017, para. 2). Acceptable use policies, which are usually intended to protect young people from inappropriate information [New Tab] (Kostadinov, 2021), also impede a certain amount of autonomy. However, students have reported using their phone as a hotspot or a proxy server to get to blocked pages (Peterson & Scharber, 2017), perhaps perceiving this as reclaiming freedom. There are applications that give the teacher full control of students' devices, like Hapara, which works with Google to give "teachers a real-time view of student activity as well as the ability to see a report of websites students have either visited or been blocked from accessing" (Madhusudan, 2014, para. 1). In reality, people have to combat the distractions of the internet daily, making applications like Hapara inauthentic, but if educators can't exercise some control over their students' online actions, students may lose valuable educational time. Furthermore, "the predictive analytics that are incorporated in many personalized learning programs may restrict the options available to students and thus limit the autonomy of students and of teachers who often do not understand or cannot easily explain" (Regan & Jesse, 2019, p. 176). Finally, regarding autonomy in a 1:1 program, there is no opportunity to opt out. A student would need to change schools in order to avoid the program. Even though device ownership can

bring independence and autonomy to one's learning, it can also interfere with one's self-determination by distracting, collecting data, or controlling the user's actions.

Conclusion

The outcomes of a school 1:1 program can be beneficial, but there remain challenges that need to be considered and addressed. For example, teachers need ready access to continual professional learning and support as the technology landscape changes often. Integrating IT coaches [New Tab] (Saltmarsh, 2020) with educational backgrounds into various departments is one solution. For superior outcomes and a better effect on learning, all stakeholders should be involved with the decision-making processes to meet the goals of a 1:1 program. Including digital literacies in the curriculum can mitigate challenges with privacy and consent, but public advocacy for technology companies to take responsibility is also necessary. This should be done at a governmental level to ensure compliance and protection of minors' data. Further, ensuring that a 1:1 program is inclusive means recognizing that social inequities persist even when every student has a device. Working with stakeholders to ensure proper resources and infrastructure are available so that all students and educators benefit from the program is imperative.

Schools with 1:1 programs have been increasing around the globe exponentially and will continue to do so as connectivity and applications increase (Islam & Grönlund, 2016). Nevertheless, there is still much to learn about the outcomes of this ever-expanding approach to education. Boasting a 1:1 program only indicates the number of devices a school provides. It does not necessarily mean there is a pedagogical model, professional development, teacher training, or infrastructure (Bebell & O'Dwyer, 2010). More rigorous and diverse research needs to be completed in order to understand

characteristics of effective learning models and help educators select approaches that will benefit students and teachers during implementation.

Questions to Consider

- Is datafication inevitable?
- How do we measure successful learning with a device?
- How are 1:1 models being implemented around the world?
- What have longitudinal studies of the impact of 1:1 programs on learning demonstrated?
- How should lessons be scaffolded to encourage active learning within a 1:1 program?
- How should support be structured to support student autonomy in a 1:1 program?
- How can the digital divide be narrowed for educators?

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6. Chapter 6: The Razor's Edge: How to Balance Risk in Artificial Intelligence, Machine Learning, and Big Data

JOEL TEMPLEMAN

> The path to Salvation is as narrow and as difficult to walk as a razor's edge.
>
> **— W. Somerset Maugham**

This chapter is guided by the question, how can an educational system take advantage of rapid technological advances in a safe and socially responsible manner while still achieving its mandate of fostering and supporting learner success? Artificial intelligence (AI), machine learning (ML) [New Tab], and big data [New Tab] are examples of highly risky technologies that also hold vast potential for innovation (Floridi et al., 2018). In examining technological advances from an ethical perspective, one of the aims is to avoid harm and minimize risk. This is referred to as a consequentialist perspective (Farrow, 2016). The complexity of finding and maintaining a proper balance in advancing technological innovation and avoiding harm and minimizing risk cannot be understated. This

quest for an educational "sweet spot" is mired by a lack of understanding, inconsistent leadership, and simple human greed.

Educators are inundated with information and change on a daily basis, and this accelerated greatly in 2020 as a result of the COVID-19 pandemic and related health restrictions. Technologies such as AI, ML, and big data may be outside an educator's expertise or interest; however, they have the potential to impact teaching practice and students' lives in significant ways. Teachers are often required to rely on experts and popular media to guide their learning about emerging technologies or to inform decision-making. At times, even when teachers have an informed opinion, they lack the organizational authority to make certain decisions regarding changes needed in the learning environment. One such area in which teachers may feel limited in their choices is the rapidly evolving infiltration of educational technology (EdTech) in the classroom, and specifically the automation within EdTech that exploits the capabilities of technologies (e.g., AI, ML, and big data) that augment functions historically in the domain of the teacher. This chapter is about how humans' *carbon intelligence* (biological) will begin to coexist with computers' *silicon intelligence* (machine; Shah, 2016) in learning, without the formal educational system acting as a gatekeeper of personal privacy, from a consequentialist perspective (Farrow, 2016).

Discussion about the appropriate use of advanced technologies is not limited to the classroom, as this integration impacts all aspects of living in a digital age. For everyone with access to technology, their experience will be shaped by systems and their interactions with those systems. In an educational context, learners are subjected to information technology (IT) platforms at all levels, and these interactions require the system to "know" things about the users. For these systems to be accepted and to benefit the users and the education system, without abuse or discrimination, certain ethical norms must be established and maintained. In the past, this trust relationship was between teacher and student, but now the role of teacher is being increasingly augmented by computer

networks. Many educators are not comfortable turning over any of their traditional tasks to systems that they neither fully control nor fully understand. To further burden the relationship between teachers and IT systems is the proliferation of abuses (e.g., monitoring student behaviour to target them with advertising) and misuses of personal information (e.g., applying tools to areas in which they are not proficient or appropriate, such as use of algorithms trained to identify successful applicants to higher education programs based on existing patterns) by companies and bad actors who develop and maintain these systems. Although these problems are a subset of all the applications, the impact on individuals is nonetheless a clear and present danger.

This chapter is not about the efficacy of using automation to create autonomous learning machines or computer-assisted instruction. Justin Reich (2020) detailed in his book *Failure to Disrupt: Why Technology Alone Can't Transform Education* why attempts to utilize machines to replace teachers continue to fail at scale. Instead, the focus of this chapter is on IT systems used for the simple management of content and as facilitator of communication and collaboration between educators and learners at all levels (McRae, 2013). The analysis in this chapter requires imagining what could be and not necessarily a description of what is. I argue that change is essential for institutions to remain relevant and that individuals within the organization need to find ways to adapt to new paradigms while remaining protected from harms.

Section 1: Full Disclosure: Why Do Haters Hate?

Artificial intelligence (AI) is generally understood to involve computers performing tasks that are normally carried out by humans (e.g., speech recognition, facial recognition, language

translation). There is a valid argument to be made for positive AI applications in the world. In the podcast "From Sea to Sky [New Tab]" from the Canadian Broadcasting Corporation (Noorani, 2019), Andrew Blum, author of *The Weather Machine: A Journey Inside the Forecast* [New Tab], highlighted that great advances in weather forecasting are possible because of the utilization of and advances in AI. Prediction quality is gaining roughly "a day a decade," so that a 5-day forecast is now about as good as a 4-day forecast was a decade ago, and a 2-day forecast was 30 years ago. AI uses computing power and huge collections of data to help answer challenging questions about trends and patterns in weather systems (Fremont, 2018). This example shows tech utilization for the common good.

When computers learn and adapt using algorithms and statistical models, this is generally referred to as machine learning (ML), and when the data sets become extremely large they are referred to as big data. The accumulation of massive databases of information is a prerequisite for the implementation of AI and ML. All of this data and metadata [New Tab] are used to make sense of what the user is doing (as part of a quest to accurately predict what the user is thinking and ultimately foresee future user behavior). The number of collected data points are multiplying. The number of connected devices—what's also called the Internet of Things (IoT) [New Tab]—with the ability to collect and share information is also growing exponentially. "The quality and scope of the data across the Internet of Things generates an opportunity for much more contextualised and responsive interactions with devices to create a potential for change," said Caroline Gorski, the head of IoT at Digital Catapult, in a *Wired* article (Burgess, 2018). Although data collection is on the rise, the majority of existing data remains unusable and is referred to as dark data [New Tab] (e.g., data archives, repositories, computer system logs) to indicate the inability to use it for anything meaningful at this time (Reiley, 2019).

One significant factor leading to distrust of technological systems is the lack of consequences for inappropriate or unlawful acts

(Regan & Jesse, 2019). In cases where there is manipulation and misuse of the rules, there must be accountability and justice. Where innovation disrupts processes and protections, adjustments need to be made to realign systems. For example, simply meeting the minimum legal requirements (based on user agreements) is not sufficient to protect minors from harm and risk (Floridi et al., 2018). Increasing regulatory minimums does not serve to achieve the desired results either.

There are legitimate reasons to be concerned when it comes to use of advanced technology such as AI, ML, and big data in education. Computational power coupled with massive amounts of available data is a high-risk combination. There is a potential for abuse and misuse. From an ethical point of view, the question often asked is, just because we can, should we? How can these technologies be managed to avoid harm and minimize risk?

Section 2: Privacy/Informed Consent

Privacy is the idea that some things must be held as secret. A secret [New Tab], by definition is something not known or seen or not meant to be known or seen by others. "Secrecy is the practice of hiding information from certain individuals or groups who do not have the "'need to know'" ("Secrecy," 2021, para. 1), while still sharing it with other individuals who are deemed by the secret's owner to be permitted to know. That which is kept hidden is known as the secret.

In the context of this chapter and EdTech in general, the collection of the information and even the insight brought about by artificial intelligence (AI) and machine learning (ML) is not seen as the problem if the information is in the "right hands" (as determined by the secret's owner) and for legitimate purposes (as agreed to by the owner and the authorized recipient). Those who see and reuse these secrets for their own benefit while returning little or nothing

to the individual user are considered the problem. So the issue isn't the information, or the secret, but who holds the secret and to what end that information is employed.

> Count not him among your friends who will retail your privacies to the world.
>
> — **Publilius Syrus [New Tab]**

The general term "privacy" is better clarified by identifying six specific ethical areas of concern: information privacy, anonymity, surveillance, autonomy, discrimination, and copyright (Regan & Jesse, 2019). The discussion about privacy, with all of its nuances, is made more complex in that everyone has a personal definition of and relationship with privacy, which is informed by their personal experience and place in history.

David Vincent, author of *Privacy: A Short History* [New Tab], discussed on a Canadian Broadcasting Corporation podcast (Noorani, 2021) how the Eurocentric concept of privacy has changed over time and how relatively recent the idea of individualism is. This new concept of all individuals owning and managing secrets or intellectual property [New Tab] requires a culture to develop around it and laws and social morays to support it. However, while individuals are desiring ever-increasing levels of anonymity, corporations are putting into place systems designed to achieve the exact opposite. Individual sovereignty doesn't exist in technology. The use of one-time user agreement forms, sometimes called "click-wrap" or "browse-wrap," where a company is indemnified when a user clicks "OK," or even just through the user's presence on the webpage (Zuboff & Schwandt, 2019), is an act of an individual relenting, not consenting. The user, even if they have read and fully understood the agreement, gives carte blanche approval for

any and all data uses, including future unknown uses of the data exposed through repurposing, reselling, or unintended breach. This is a concern in education when the institution adopts a management system that the participants, teachers, and students are required to utilize, but data ownership falls to the corporation or is otherwise negotiated between the educational institution and the company. Too often though, this relationship is unknown or unclear to the institutions and the users. The commodification of student data by allowing the direct and unrestricted access of private corporations into the education environment requires greater community involvement (Reich, 2020).

Some promising innovations, such as edge computing [New Tab], may allow for closed institutions to take advantage of the computing power found in the cloud while retaining ownership and control over sensitive internal data. However, without a new funding model, the costs involved in developing and maintaining a not-for-profit infrastructure for education to rival the might of multi-billion-dollar corporations make this option unrealistic. Global giants can be less constrained by social responsibility and operate without regulations given their focus on profit from their commercial innovations.

End users are not workers, not products, and not customers. End users are the source of raw material in the form of data. Every kind of online transaction results in by-products, referred to as data exhaust [New Tab] (Zuboff & Schwandt, 2019). Analysis of this dark data, when aggregated on a massive scale, reveals patterns of human behaviour. Patterns are the gateway to predictability and the collection of this information can be used in ways that are not yet understood (Regan & Jesse, 2019) with fears of abuse and misuse (Floridi et al., 2018). The keepers of power in the past were giants of manufacturing; now, the richest and most powerful are those that control technology, including Google, Facebook, Amazon, Tesla, Alibaba, Baidu, and more.

The antidote to current worries regarding AI in education, and AI in general, is to evoke democratic and legal processes available to the people and hold actors accountable for actions counter to the

common good. This will require users to become informed and take appropriate actions (Cadwalladr, 2020).

Section 3: Avoiding Harm and Minimizing Risk

Risk is a quotient of the unknown events to come. Risk is not, in and of itself, negative, because it represents an assessment of both the danger and opportunity of possible future events. Risk assessments are already heavily employed by IT system managers to address physical and IT security risks such as fires, floods, and hackers in the protection of equipment and data, but these rarely get used by those who manage the software and users who utilize the software to complete their work. Educators, supported by IT specialists, can identify every piece of software they use and provide a risk assessment from the user point of view. Issues to consider are secure data collection, transmission, processing, and storage; use of tracking tokens (cookies); the credibility and reliability software vendors and subcontractors; location of servers (jurisdiction); value of user data; value of user identity; user autonomy; and more. The list is as long and detailed as is appropriate for the organization to determine where and what safeguards are required to reduce risks to an acceptable level.

Ethical use of technology, avoidance of doing harm to others, and minimization of risk are key components of a strategy to embrace innovation in learning. There are significant risks to employing powerful and rapidly developing technologies, but work is already underway to establish new norms and protections, rewrite laws, and develop new ways of thinking. Since these risks are widespread and interrelated, it is important to first develop maps and frameworks so that work can occur simultaneously in all areas without delay, while benefiting as much as possible from coordination and collaboration

with other actors. Legal and moral frameworks can help manage misuse and unintentional mishaps, but dedication and discipline are required to resist corruption of these systems. For inspiration from other areas where risky innovation is embraced and successfully integrated, we can look to healthcare, for example (see Dunham, this volume).

The move toward technological transformation in institutions has made devices and connectivity ubiquitous. Although this change has concurrently isolated and further disadvantaged those who live in remote, rural, and low-income communities, the path for the haves is decisively digital. This arch of utilization and adoption has no foreseeable endpoint, so there are calls for proactive adaptation at the pace of risk tolerance for a given organization. It should be noted that this work to assess and mitigate risk must succeed in parallel to efforts to mitigate inequity driven by its many factors.

Section 4: Participant Autonomy and Independence

Despite the risks inherent in artificial intelligence (AI), machine learning (ML), and big data, each educator can find ways to contribute to the ethical use of technology and in particular identify cases where misuse or abuse occurs. Leadership remains responsible for ensuring that appropriate safeguards are established and maintained while fostering a culture of informed participation (Floridi et al, 2019). In cases where policies and best practices do not exist or have not been adopted, creating interim solutions based on best efforts should be established and continually improved upon. Fortunately, much work has already been done and is available to inspire adaptations appropriate to a given situation.

For instance, work by groups such as the Alan Turing Institute,

with frameworks like FAST (fairness, accountability, sustainability, and transparency), encourages design teams to consider ethical perspectives in all areas of development (Leslie, 2019). Decision-makers that are employed in educational environments can seek partnerships with companies that declare and follow principles that align with the goals of the institution and act in the best interests of end users to avoid harm and minimize risk. Design teams can follow these basic principles:

> Issues of fairness, accountability, sustainability, and transparency operate at every juncture and at every level of the AI project delivery workflow and demand the cooperative attention and deliberative involvement of those with technical expertise, domain knowledge, project/product management skill, and policy competence. Ethical AI innovation is a team effort from start to finish. (Leslie, 2019, p. 12)

Figure 6.1 The Alan Turing Institute's FAST framework for ethical AI innovation (Leslie, D., 2019 – Alan Turing Institute)

In places where a lack of political will or understanding is inhibiting progress, advocacy and coordination of like-minded individuals and groups is critical. Cultural change through strong leadership is required. Change to culture and social norms in any organization is not easy, and each educator will need to determine if they are willing to adapt with the changing environment and, if so, in what ways. All institutions must prepare people for lifelong learning and integration of technology as an enabler of digital literacy. In this day and age, technology lives inside and outside of the classroom and permeates all areas of social and professional realms such that this learning must also occur across all environments.

Adaptation is an ongoing requirement to keep the education system relevant and effective. Floridi et al. (2018) identified four fundamental areas to focus on when thinking about the opportunities and risks of AI with the end goal of human dignity and flourishing (otherwise thought of as the alleviation of suffering; Harari [New Tab], 2014, 2017). The four areas are as follows:

> *Who can we become* (autonomous self-realization, without devaluing human abilities); *what can we do* (enhancing human agency, without removing human responsibility); *what can we achieve* (increasing individual and societal capabilities, without reducing human control); and *how can we interact with each other and the world* (cultivating societal cohesion, without eroding human self-determination). (Floridi et al., 2018, p. 690)

Working together cohesively is an important condition for adaptive change in education.

In aerospace, humans have defied gravity as an international activity since the earliest days of flight. Even though the technology

of flight, nuclear energy, rocketry, and computer systems have been and are still used to control and hurt people and the planet itself, this same knowledge has allowed us to prepare to put humans on Mars, a planet that we didn't even know existed until 1610. These breakthroughs have been achieved through a process guided by a common mission, collective effort, and formal risk management—critical and fundamental aspects for accomplishing any shared goal. The saying goes: "To go fast, go alone. To go far, go together." In fact, the ability to conceptualize intangible goals and work collectively toward a common objective is a uniquely human characteristic (Harari [New Tab], 2014, 2017). Educators have rightly identified the dangers and abuses of educational technology, but if they do not develop a common vision of what is desired, a vision will be imposed by those external to the education community. Likewise, without active participation by educators in building a better solution, one will be provided.

From a pragmatic perspective, it can also be helpful to look at the type of work that is needed to change a system of systems and decide where one is most apt and most interested. At the strategic level, a unified theory of learning with an understanding of the role of technology needs to guide decision-making. If that is too broad of a thought, consider the operational level, which looks at institutional strategies for integrating technology with pedagogy in line with the unified theory of learning (or the best estimation of it available at the time). And, finally, the tactical level is the effective application of technology and systems thinking to curriculum based on institutional strategies and a global vision of best practices.

In practical terms, based on one's knowledge, interest, capacity, and authority, ensure that the tools that one uses are appropriate and working as planned and as expected. Too often systems are adapted from the initially intended use to complete functions outside of the scope of the original design. Software and hardware are designed with a specific business or use case in mind and with specifications to meet the requirements of that business or use case. Routinely though, business processes change to adapt to

external conditions, but business cases are not amended, and so business tools remain the same. These tools are then modified in an ad hoc manner to complete tasks or otherwise function in ways not conceived of by the designers and testers, so gaps form and the potential for unintended consequences grows. This process can fester until conditions and tools become so out of alignment that the system fails, and unintended consequences are realized too late.

Education systems can also benefit from lessons learned in industry regarding system design and risk management to find processes that translate or can be adapted to an academic environment. For most businesses, complex technology integration is on the rise, and digital literacies (including data literacy) are becoming needed competencies and expected employee skills. Teachers and educators will be expected to utilize and manage IT systems, including interconnected and AI-powered applications, so investments in continuous professional learning are needed.

Conclusion

One day, while touring a military parachute packing facility, I was shown an area where specialized rigs were being packed to airdrop all-terrain vehicles and equipment. An impertinent young student paratrooper, possibly in an attempt to be humorous, asked if it was possible to airdrop a main battle tank. Given how massive and heavy a tank is, it seemed likely the answer was going to be no. However, the airborne sergeant replied with a surprisingly astute affirmation paraphrased as follows, "there is a rover rolling around on Mars right now because humans decided to put it there. If the mission required it, we could drop anything into a 10-foot square anywhere on Earth." His point has resonated with me since that day and has steered my focus toward problem-solving that looks past the technological problems and concentrates on the human factors. What the sergeant was possibly saying in his own way was that

human attempts at achieving a particular goal are not really about the technology; they are about the commitment and leadership needed to specify a clear mission and help the specialists find a way to achieve the goal. Applying this logic to artificial intelligence (AI), machine learning (ML), and big data, the assertion that we can use these technologies in positive and beneficial ways for humanity becomes plausible if we truly want it.

> New technologies get introduced into complex learning ecologies, and those complex learning ecologies require multiple changes at multiple levels to take advantage of new technologies. (Reich, 2020, p. 245)

We could change everything in education if we start from a belief in humanity, that under the right conditions we have the capability to have and use technology to positively augment all aspects of human living in a completely fair, economical, accessible, and safe manner. With that core belief, we only need the vision and political will to achieve it. There are processes to deal with the current misuses and abuses of technology and rectify the negative impacts and inequalities that technology is imposing on people, but we must have the courage and strength of character to use them. Technology is made by people and can be controlled and managed by people for the common good—if that is indeed what we choose.

Innovation disrupts existing systems, leading to intended improvements but also unintended problems; however, further innovation can be applied to deal with the negative effects of the first innovation. For example, the supercomputers and data farms required for more and more computing-related activities consume extreme quantities of electrical power and thus contribute to global warming and stress on aging power grids (Bakke, 2017). With further innovation, green power options will replace existing electricity-creating processes that cause harm to the environment, and new

technologies will allow the redesign of the existing power grid to ensure constant power is available where and as required. This example highlights the idea that avoiding innovation because it will cause disruption is short sighted.

In education, the argument that educators must resist the use of EdTech because companies are using it as a vector to accumulate a wealth of personal data about the student is problematic because the student is simultaneously pouring their personal information into the same databases through their personal online activities. IoT devices, personal assistants, social media, and wearable devices are siphoning data at such a rate that plugging the hole in EdTech software would amount to an undetectable reduction in personalization. Therefore, the focus must be on eradicating the commodification of humans and the great wealth that can be achieved by those in power by doing so. Ethical and equitable use of technology is possible but is currently being co-opted by greed and lust for power. These are the human factors that first need to be addressed (Swartz, 2000).

How can an educational system take advantage of rapid technological advances in a safe and socially responsible manner while still achieving its mandate of fostering and supporting learner success? Three key areas were highlighted in this chapter from an ethical perspective. To help achieve technological harmony and reap the most benefit, there must be (a) clear and agreed-upon goals; (b) collective and cohesive efforts where individual needs are subservient to the common good; and (c) a methodology to ensure designers, subject-matter experts, and end users work together to meet the needs of all parties equally not just accumulate profit.

> Sapiens can cooperate in extremely flexible ways with countless numbers of strangers. That's why sapiens rule the world, whereas ants eat our leftovers and chimps

are locked up in zoos and research laboratories. (Harari [New Tab], 2014, p. 25)

Remember that fundamentally, society created the education system, so it can be re-created, redesigned, or dismantled to suit people's needs. Arguably the role of education is to support society, and our society is one with technology integration, so it follows that learning both in and out of school should be enabled by educational technologies. This has yet to be the case: "Schools, with their innate complexity and conservatism, domesticate new technologies into existing routines rather than being disrupted by new technologies" (Reich, 2020, p. 136). Experiences coming from COVID-19 health restrictions have led to innovative examples where AI, ML, and big data excel and bring value to the teacher and the learner and education systems while also highlighting critical areas where problems must be solved. We each have a role in determining what this future looks like. What is yours?

Questions to consider

- What areas of learning, teaching, and assessment does EdTech currently support appropriately in education?
- How can we maximize and support the use of EdTech in education?
- How can humanity work cohesively to alleviate

stress on the areas where EdTech does not work well?

- If the utilization of AI, ML, and big data in education is successful, how will the system be better (more efficient, effective), and what does that mean for the individual (improved life, equity, freedom) and the common good?

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7. Chapter 7: Connect Care: Clinical Information Sharing

LACEY DUNHAM

The Alberta government is in the process of implementing a clinical information sharing (CIS) system called Connect Care, which has been created in partnership with Alberta Health Services (AHS) and Epic Systems Corporation. The leap to a province-wide CIS system was made after an independent review of AHS by accounting firm Ernst and Young found financial inefficiencies in AHS operations (Government of Alberta, 2020). According to a report by the Auditor General of Alberta (2020), Connect Care will cost more than one billion dollars, be used by more than 100,000 clinicians, and house the information of over four million Albertans.

Given the increase in the prevalence of chronic disease, in combination with strained health care resources and an ageing demographic, e-health and CIS have the potential to contribute to a better quality of life for all Canadians (AHS, 2018). CIS also has the potential to improve the quality and continuity of care across medical disciplines. With access to medical records, clinicians can have a better understanding of referring practitioners' ordered medical tests and findings, and of the efficacy of previous treatments, medications, and other interventions (Adler-Milstein & Jha, 2012; Teich, 1998). Along with these benefits, however, are several risks associated with using a digital healthcare platform.

Issues of cybersecurity, patient privacy, secondary data usages, and equitable distribution of assets all present inherent risks to CIS stakeholders. These stakeholders include AHS and their affiliates, regulatory bodies of practitioners, the Office of the Information and Privacy Commissioner of Alberta, health profession associations, health education and research institutes, the University of Alberta, the University of Calgary, clinicians, and patients (AHS, 2018).

Healthcare providers are bound to laws and their own oaths, which include upholding justice, beneficence, nonmaleficence, and patient autonomy. As such, we use a deontological perspective to identify the benefits and challenges of Connect Care. A deontological theory "emphasizes moral obligation and the rule-based nature of morality" (Farrow, 2016, p. 101). This chapter aims to address the question: Should Albertans be given autonomy over the uploading of and subsequent access to their medical information through Connect Care?

Description of Ethical Issues

The healthcare industry is seeing a major shift towards digitization of information for better management of time and resources. Finding increased efficiencies is necessary as national demographics are becoming more dependent on the medical system for chronic illness management (Gray et al., 2009).

Connect Care can reduce healthcare costs by allowing practitioners to access data from other healthcare providers and locations. Broader access to data can also reduce medical error prevalence and testing duplications, increase administrative efficiency, expand access to quality care, and help shift the medical system from reactive to preventative care through the use of big data and analytics (Béranger, 2015). Additionally, it is conducive to a more holistic and interdisciplinary approach to medicine. The goals of Connect Care and other CIS systems are to achieve high-quality, efficient healthcare, and to advance scientific research within the medical community (AHS 2018; Haux, 2010).

Although there is legislation protecting medical and digital records in Alberta, breaches of highly secured data can occur. In the healthcare system, multiple people and professions require access for functionality. As a result, there is more potential for issues surrounding privacy, especially with a digitized system housed in a

central location. The information in Connect Care will be controlled by AHS and stored in a provincial data centre within Alberta (AHS, 2018).

The benefits to individual patients as well as applications for advancing science, medical care, and public health must outweigh the possible negative outcomes. With the introduction of e-health technology, an increasing number of medical providers generate clinical data as a by-product of service. The availability of these data sets raises privacy concerns, yet sharing the data is essential for public health, longitudinal patient care, clinical research, and the shift to a preventative model of healthcare (Geissbuhler et al., 2013). If patients can select which information is uploaded or omitted from their files, or choose not to participate, it can skew the data and introduce data bias (Hill et al., 2013). Incomplete or missing data sets mean the aggregated data will be an inaccurate representation of the provincial population's health status. According to Perera et al. (2010), 20% nonparticipation could have major detrimental effects on research due to selection bias. If the data for any demographic or condition are withheld, then existing data sets can be misrepresentative of the population's needs, which could impact the allocation of resources. With all of these factors in mind, one must ask, do the personal outcomes and desire for privacy of individuals take a back seat to the necessity of broad-scale data collection for the betterment of all Albertans?

Connection of Ethical Issue to Privacy, Data Security and Informed Consent

Access to CIS and the networks in which these systems are housed pose security issues, not solely because of hackers but also because of communication breakdowns between providers and patients for intended and secondary data usages. It is ironic that the

characteristics regarded as the strengths of CIS are the same characteristics that create health information privacy concerns.

Inadequate Updates and Protocols

The IT infrastructure in healthcare is relatively new, and a significant amount of funding has gone to the upfront costs for Connect Care. Typically, organizations hoping to comply with CIS initiatives spend around 95% of their IT budgets on implementation and adoption, with less than 5% spent on security (Kruse et al., 2017). This insufficient investment of resources for maintenance and security make malware, information theft, and security breaches possible.

Ransomware Malware Hackers

Healthcare is currently one of the sectors most targeted by cybercriminals (Coventry & Branley, 2018; Kruse et al., 2017). "Hackers continue to take advantage of lax security to steal medical health records, deny access to health services or cause intentional harm" (Coventry & Branley, 2018, p. 50). Stolen prescriptions and illegal distribution of controlled substances can have serious implications for the general public (Kruse et al., 2017). In the United Kingdom, when a healthcare institution fell prey to a malware attack, the entire IT system was shut down, resulting in the cancellation of surgeries as well as outpatient appointments for four days (Coventry & Branley, 2018). Disruptions due to security breaches or malware attacks can have detrimental outcomes depending on the seriousness and urgency of the health services that are affected.

Communication Breakdowns

While CIS can allow for a more holistic approach to healthcare through interdisciplinarity, it can also create environments that may make patients feel betrayed or deceived. When a person accesses healthcare, there is implied consent for the practitioner to gather data, upload patient information, and use that data for the primary purpose of addressing medical issues. What may not be implied is consent for the sharing of this information with other medical professionals or for public health and research purposes. For CIS to be effective, it requires that information be shared between healthcare providers. This could include expected providers such as those working within diagnostics (e.g., pathologists, radiologists, etc.) and unexpected practitioners like occupational therapists, school psychologists, or disability support workers (Eastwood & Maitland-Scott, 2020). "The difficulty lies in the fact that the doctor may take it for granted that a holistic approach to health care and any subsequent information-sharing is in the best interests of patients whereas patients may neither expect nor approve of such an approach" (Eastwood & Maitland-Scott, 2020, p. 1). To provide the best medical care and patient experience, patients should be made aware of the potential benefits and challenges that accompany information sharing.

Secondary Usage and Informed Consent

Often, digital healthcare platforms have a secondary use for data, which can provide valuable insight into the health of the overall population. The collected data should be used for a secondary use only after all personal identifiers have been removed. It can be used in lieu of in vivo research studies, providing valuable demographic information without being intrusive (Hill et al., 2013; Geissbuhler

et al., 2013; Kruse et al., 2017). Further, the knowledge gained from aggregate or population data sets can be used to further medical knowledge, produce reliable health trajectories, and even predict epidemiological outbreaks (Hill et al., 2013; Spencer et al., 2016).

Consent for the secondary use of data should not be implied when a person accesses medical services. This is especially true given that the information may be automatically uploaded by caregivers, and patients may not have autonomy over what information is uploaded. However, anonymized data are often used for research purposes without consent or even patient awareness (Spencer et al., 2016). In 2019, Germany passed legislation that allows for the use of medical information without informed consent for research purposes (Richter et al., 2019). Society may be heading towards a standard where consent is not required for the secondary use of anonymous medical information. The secondary use of medical data, even with all personal identifiers removed, for research and public health directives should be explicitly explained to the patient, and regulations surrounding consent ought to be implemented.

Unethical Access

Although there have always been ethical issues surrounding the unauthorized access of medical information, CIS platforms increase the risk and reach of this access. Lack of professional conduct by healthcare employees who search for specific patients, such as celebrities, friends, family, or other healthcare employees, can carry a greater risk due to a larger database with a single point of access (Sulmasy et al., 2017). There is one significant benefit for Connect Care in this aspect; the system can track staff access, which is a key security feature that was previously unavailable.

Integrity by Avoiding Harm and Minimizing Risk

For Connect Care to be successful, it must uphold medical integrity, avoid harm, and minimize risks. To accomplish these requirements, both patients and providers must trust the Connect Care system, all stakeholders in the partnership, and each other, and there must be equitable access across the province.

Standardized Scales and Universal Language

To effectively use Connect Care across the province, there must be standardized instruments for acquiring data. These standards should include scales, clinical assessments, and quality indicators (Gray et al., 2009). Only when the entire healthcare network uses the same standards can information be shared accurately across locations and professions. All stakeholders, including patients, need to be versed in the meaningfulness of datified information. With a universal language, stakeholders will be able to have a ubiquitous relationship of care that can result in better health, as well as better opportunity for open and clear communication (Béranger, 2015; Gray et al., 2009; Kronenfeld, 2014).

Learning Together

Learning how to interface with Connect Care can be perceived as a barrier to cohesive care. Until stakeholders are familiar with the system, they may experience frustration, which could reflect poorly on the operability and functionality of Connect Care. In studies conducted by Sánchez-Polo et al. (2019) and Lee (2018), successful

implementation of healthcare technology depended on opportunities to learn and utilize active feedback loops for success. Both learning and feedback processes require that the patient and provider have sufficient knowledge and comfort using Connect Care. Having early adopters learn to use the system together, and then having these experts teach subsequent users, can mitigate feelings of frustration (Lee, 2018) and create better relationships between patient, provider, and CIS. When patients and providers trust each other and the system, better patient compliance can be achieved (Sánchez-Polo et al., 2019). Open communication and the opportunity for continuous learning can also mitigate any bias. As noted by Sánchez-Polo et al. (2019), patients and providers can help each other to problem-solve, which helps overcome mutual barriers and the prejudices that could exist within the system.

Equitable Access

Equitable access must be at the forefront of a province-wide, digitally implemented healthcare network. CIS can pose a greater risk for health imbalances if the service does not extend to already underserved communities. Access to the internet and internet-enabled devices must be available in every community in the province. The use of technology within healthcare can bridge gaps and make access to resources more equitable. This, however, only applies when all regions have the same access to the technology and options for care.

In underserved communities, such as rural, remote, and Indigenous regions, Connect Care accessibility faces challenges. In 2016, the Canadian Radio-television and Telecommunications Commission declared broadband internet access a basic human service (Kupfer, 2016) and made plans for 90% of the country to be connected by 2021; however, the infrastructure is lacking, and affordability remains an issue for many Canadians, even with the

federal Connecting Families Initiative, which provides low-cost internet and occasionally internet-enabled devices to eligible families (Government of Canada, 2019). Connectivity in rural and Indigenous areas are disproportionately affected. How can Connect Care serve these communities if the resources are not readily available to them? AHS is working to extend wireless networks to all the facilities they service; however, Indigenous and rural communities often do not have permanent AHS locations, and as such will not have the same access or priority for internet infrastructure. The Indigenous population is one of the most at-risk communities for poor health outcomes (Fitzpatrick et al., 2016). Without the ability to access their medical information, how can Indigenous populations provide opportunities for feedback loops to improve the system, and be empowered to make informed decisions regarding their health?

Connectivity Related to Health Disparities

Health care disparities matter more if they result in negative health outcomes (Clarke et al., 2020; Kronenfeld, 2014). Without equitable access, data collection will be incomplete or skewed, thereby causing more potential for overlooking and ignoring the needs of underserved communities. "Disparities remain in areas of access, quality, and across many levels and types of care including preventive care, treatment of acute conditions, and management of chronic disease" (Kronenfeld, 2014, p. 9). AHS, the Alberta government, and the Canadian government need to work in conjunction to ensure that rural, remote, and Indigenous populations are considered and included in health initiatives to improve health outcomes. This can be achieved, in part, through widespread reliable and affordable high-speed internet access.

Authentic Contexts, Personal Relevancy and Autonomy

When patients have access to their medical records in Connect Care, an opportunity to promote personal responsibility for health arises (Sulmasy et al., 2017). As patients view their health progress, treatments, and outcomes through Connect Care, they have the tools and access to gain knowledge, to be accountable, and make informed decisions regarding their health. Connect Care can increase participation and engagement in patient health care through access and improved communication, and encourage better public health outcomes.

Authentic Contexts

All patients, with additional focus on at-risk and Indigenous communities, need to be included in the data gathering process to ensure that all Albertans' health outcomes have a chance of improving. As patients gain awareness of Connect Care and its operability, they can be empowered to make informed choices about their health. Positive outcomes can only occur with ethical and informed information collection, access to Connect Care, and open feedback loops to reduce inherent bias and system prejudices (Fitzpatrick et al., 2016; Sánchez-Polo et al., 2016). Due to historical transgressions against the Indigenous community, especially in studies relating to healthcare (Fitzpatrick et al., 2016), special care and an intentional approach to including Indigenous voices in planning and implementation ought to be taken.

Autonomy and Altruism

Generally, when patients have been informed of the secondary uses of their data for research or public health outcomes, they consent (Grande et al., 2015; Hill et al., 2013; Spencer et al., 2016). Patients have embraced the potential for benefits that sharing their medical data can provide. However, when presented with potential risks, patients express concerns surrounding access and restrictions to information. In previous studies, Perera et al. (2010) found that practitioners and patients desired the ability to limit or restrict access to medical files to reduce the potential for misuse or information breach. This was particularly true when patients had stigmatized conditions like addictions, were abused, or mental health disparities. The desire for restrictions was less prevalent when the information was being used in universities and for medical research, provided personal identifiers were removed (Hill et al., 2013; Perera et al., 2010).

For patient autonomy to be upheld, there ought to be an option for the patient to revoke or limit access to medical records with the guidance of a primary healthcare provider or a panel. This can ensure that patients have a level of autonomy when instances of unauthorized or unethical practitioner access occur. The ability to restrict access to information could be a valuable feature of Connect Care. The logistics surrounding granting or denying record access, as well as access levels within the system, may be worth exploring: Does a registered massage therapist require the same access as a physician? Perhaps a framework for access levels based on profession, and a process for denying access to specific practitioners, ought to be implemented in an acceptable use policy until the logistics surrounding such variances in access can be addressed.

Relevancy

Knowing the benefits of big data within the healthcare system and on populace outcomes, should patients have autonomy concerning what information is uploaded into their medical profiles? Without a fundamental understanding of medical protocol, procedures, or the interconnectivity of healthcare, are patients truly able to make informed decisions regarding which data are required for the best health outcomes both individually and collectively? Connect Care provides an opportunity to include patients in the management of their own health by giving them access to their personal health information. As patients have access to Connect Care, they can view and manage their health status, see the impacts of their decisions, and make better, more informed choices regarding their care; all of these benefits are possible only if all health information is documented. CIS can be a conduit for providing options, answers, second opinions, best practices, and patient empowerment for a better provincial health status.

Conclusion

CIS and the collection of medical and health data can move the healthcare system from reactive to preventative, which can save money and create a healthier population. With the implementation of Connect Care, some major challenges must be addressed. Provincial healthcare spending needs to account for maintenance and updates within the network to keep medical data private. Healthcare practitioners require continuing education surrounding privacy protocols, new malware, and avoidance of unethical access. Healthcare professionals ought to actively seek informed consent for the secondary uses of medical data even when personal identifiers are removed.

A universal language surrounding datafied information should be in place to ensure smooth transitions between facilities, clinicians, and patients. Accessibility and equitable distribution of health resources can only be achieved when the entire population can use Connect Care equally. Currently, broadband internet infrastructure and affordability are two inhibitors for inclusion of the most at-risk demographics within Alberta. Only when all Albertans have equitable access to Connect Care can a positive provincial shift in health outcomes be anticipated. Provincial and federal legislation for equitable, accessible, and affordable internet access can help to reduce the data divide and aid in better healthcare outcomes.

The general population does not have a sufficient background in medical education or data analysis to understand how incomplete data sets affect bias and allocations of resources. For these reasons, protocols should be put in place to support patients in determining which of their data are uploaded into Connect Care. For example, the ability to grant or deny access to specific users with the guidance of a primary healthcare provider or review panel is an avenue to explore. The inability to access a file would remove the opportunity for unethical or unauthorized access to that information. Additionally, different levels of access to information dependent upon the needs of specific professions could promote public trust and allow for autonomy over data. Finally, a review of and amendments to acceptable use policies within AHS and government legislation related to healthcare information and consent, use, and disclosure should take place to address the incorporation of modern technology into healthcare provision.

Questions to Consider

- In what ways can we train medical professionals to inform and educate the public of all uses of their medical information?
- How can we ensure that medical professionals have sufficient training to avoid malicious cyberattacks, such as phishing?
- If offered, will opting out of sharing data for stigmatized conditions, such as mental health disorders, lead to unintentional underrepresentation of those conditions, further increasing stigma?
- Is inequality of patient access to their own medical information morally and socially acceptable?
- How can we test and implement a system that allows for access restrictions based on the recommendations of healthcare providers, the desire of the patient, and approval from a review board?
- When studies using medical data are publicly released, what will the implications be for health insurance policies and premiums?

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Conclusion: Teaching #EdTechEthics Course in the Open: An Instructor's Reflection

DR. VERENA ROBERTS

Introduction

Drawing on my dissertation research and scholarship in open education, and my teaching experiences in both post-secondary and K-12 contexts, I believe that teaching and learning using an open learning design and open pedagogy needs to consider learner awareness. Developing an awareness of open educational practices (OEP) and a readiness for engaging in open learning requires an intentional learning design. In this chapter, I will reflect on my experience designing and teaching the #EdTechEthics course in a professional graduate program in education in 2020 and 2021, and the characteristics that describe the process I used to help students develop an awareness of open education and a readiness to engage in OEP. The aim of this chapter is to help other educators interested in integrating OEP into their courses.

As I considered how to use OEP in the #EdTechEthics course, I wanted to ensure that I helped graduate students balance a focus on the learning process and learning outcomes with a clear understanding of the final learning product, a sustainable digital learning artefact. I wanted the students to have opportunities to develop an awareness of the concept of open learning and its potential to influence their engagement in learning experiences

that integrate formal and informal learning spaces and affordances. Furthermore, I wanted them to have the time for reflective practice throughout the course in order to consider the potential of open learning in their professional work-place contexts. I aimed to design the learning experience to promote learner agency through co-designing learning activities with the students. According to student reflections shared with me at the end of the course, this approach increased learner engagement in the course and contributed to a perception of successful learning. The underlying intention of the course design was to support learners in becoming active and knowledge-building participants who contribute to an open learning ecosystem.

Context of the #EdTechEthics Course

As mentioned in the **Introduction to this book**, the students worked on developing a sustainable digital learning artefact in the format of a book chapter with many layers of support and rounds of feedback. At the beginning of the course, the students were introduced to the project opportunity: to create and co-design one chapter that could be included in a collaborative open pressbook. From the beginning, the students knew they would always have a choice to publish their chapter openly or not. From the Winter 2020 course, 9 of 11 students chose to publish their chapters and of the Winter 2021 course, 7 of 11 students chose to publish their chapters. The students developed their own chapters based on current research and a topic of interest in educational technology and ethics. Students completed this project through multiple stages and check-ins throughout the course. As instructor, my goal was to provide the necessary contextual information and offer a relevant, authentic, and scaffolded learning experience for students (National Academies of Sciences, Engineering, and Medicine, 2018). My role was an active participant in the learning process alongside the students. The

students also provided a final reflective assignment about their perspectives on the learning process. The students submitted their draft chapter to fulfill course requirements and they were all provided with the option to take an additional step and share their work publicly by participating in the publication of the pressbook. This optional step required additional rounds of editing and revision beyond the duration of the course.

Adapting the OLDI Framework to the Course Context

Writing a paper can seem like a typical or classic type of graduate course assignment. Likewise, the structure of an online course with a learning activity of this type can look similar to other online courses focused on content delivery. However, the underlying design features of this course are unique, due to the use of an Open Learning Design Framework (OLDI) (Roberts, 2019). The foundational components of the OLDI framework include the integration of scaffolded and participatory open educational practices, formative assessment strategies, peer feedback loops, and reflection.

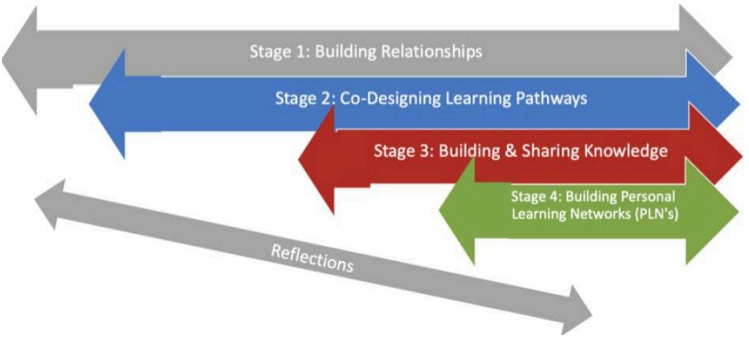

Figure 1 OLDI Open Learning Design Intervention (OLDI) Framework (Roberts, 2019)

The OLDI framework has four interconnected stages with underlying reflective practice promoted throughout a learning experience. Stage 1 focuses on building relationships between instructors and students. Stage 2 outlines the co-design process and each learners' personal learning pathway. This means that the instructor and learner work together to clarify and negotiate how the learner will demonstrate evidence of demonstrating competency in communicating the learning outcomes based on their personal learning needs and strategies for success. Stage 3 focuses on building and sharing knowledge and highlights how the learners choose to communicate their learning and thinking visibly and transparently with others. Finally, Stage 4 creates a bridge to sustain the learning beyond the course by developing and expanding upon personal learning networks. In the introduction chapter, we discuss an adapted version of the four-part open learning design framework.

It is the underlying open learning design principles that highlight and can provide one way to distinguish this course from other online courses. The principles of open learning design that guided my instructional design and teaching:

- Learning is dependent upon the opportunity for learners to co-design personally relevant learning pathways
- Learners collaboratively and individually share their learning experiences through open and closed feedback loops that include multiple people, spaces, perspectives, experiences and nodes of learning
- Learners need to transparently demonstrate their learning in meaningful ways that integrate curriculum and competencies
- Learning occurs through stages and continuums and is a personal learning experience that transcends formal learning environments
- Open learning emphasizes the learning process in order to build upon and share community knowledge (Roberts, 2019)

As illustrated in Figure 2, the principles of open learning design were embedded in the process from the instructor-facilitated design, student co-design expectations, multiple feedback loops and development of shared knowledge through digital artefacts (chapters). As an instructor, I continually reflected on my teaching and the learning design and at the same time students reflected on their learning. Figure 2 describes the learning framework for the #EdTechEthics course shared with students during a class in the Winter 2020 term:

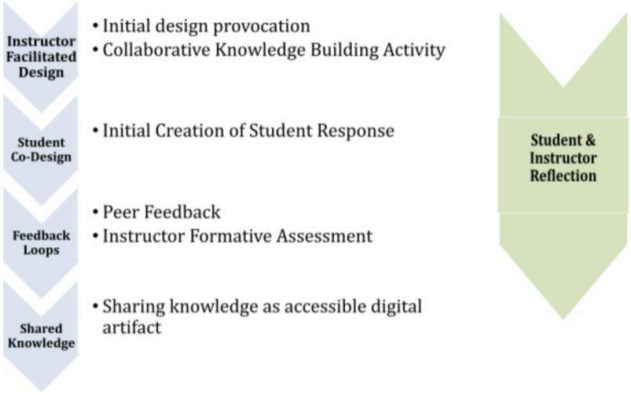

Figure 2 Initial #EdTechEthics Course Design

When discussing the process with students I recognized the importance of connecting OLDI with the course learning outcomes and key topics. I recognized the need to amplify co-design in the learning process and to generate an open learning experience between the student, instructor, and outside learning community.

Organizing the Course into Key Topics

The course had an overall focus on educational technology and ethics. I found it useful to provide a guiding framework to students as a way to integrate content knowledge based on ethical positions and to share contextual examples that could help students with their own inquiry. Farrow's (2016) Framework for the Ethics of Open Education was used to guide the key topics in the course, the course readings and guidance for the student inquiries and development of a chapter:

- Topic 1: Full Disclosure of Ethical Topics in Digital Learning Environments.
- Topic 2: Privacy, Data and Personal Security, and Informed Consent.
- Topic 3: Avoiding Harm, Minimizing Risk and Integrity.
- Topic 4: Respect for Participant Autonomy and Independence & Recognizing Bias

Modeling Open Education Practices

I noted that open publishing or sharing student work openly was likely something that a limited number of students may have experienced in the past. In many cases, graduate students in the teaching profession discussed how they asked their students to engage in similar learning activities; however, many graduate students noted they had never been asked to do the same thing themselves. I intentionally designed and integrated activities to help students build confidence, promote collaboration, feedback loops, and multiple ways to ask for help in order to learn using their own open pathway for the course, and potentially beyond the course.

I emphasized that every student in the course would have the option to publish their chapter in an open pressbook. Students were

reminded they would have supports from their peers, instructor, program coordinator, and members of a research and project team as this process would continue after the course was completed. It was essential to always emphasize that the option to publish the chapter would be the student's choice and there would be multiple opportunities to opt-in or opt-out before the final publication of the Pressbook. The students recognized that to ethically ensure that every student had the opportunity to make an informed choice as to whether or not they would openly publish their chapter, they also needed to fully understand the open learning process.

Boundary Crossing Between Informal And Formal Digital Learning Spaces

I used the institutionally supported learning management system and open digital tools and platforms to model how to learn within formal and informal digital learning boundaries and spaces. The course was completed over 12 weeks and each topic from Farrow's (2016) Ethical Framework was allocated approximately 3 weeks. The learning management system was organized into weekly asynchronous modules to help the students find the readings and activities for each week. A Google folder was also used to share resources and students received weekly update emails to guide their weekly activities. I also created a course hashtag #EdTechEthics which was used for course activities and a way to build an openly networked community on social media platforms including Twitter. This provided students an opportunity to consider their digital identity and presence online, to build online relationships, and to connect with others outside of the course. Students were supported in developing awarness about their digital presence using White and LeCornu's (2017) Visitor and Resident Map Tool and other open participattory activities throughout the course including considering personal data security and privacy

(like reviewing the UBC Digital Tattoo Activities) in order to promote student choice in what they share, why they share it and whom they share as – in digital contexts.

Clarifying Open Learning Principles

While Farrow's (2016) Ethical Framework guided the course content, there were underlying open learning principles that promoted open readiness in order for the students to gain the confidence and readiness to share their chapters in an open pressbook. The students were asked to reflect upon their open learning experiences in a blog or final reflective assignment to ensure they made their thinking and learning visible to themselves, their instructor, and others. Figure 4 shows how the #EdTechEthics course followed the four key topics from the Ethical Framework, and integrated open learning activities (e.g., instructor provocations, ongoing feedback loops in the class, and external feedback provided by members outside of the class).

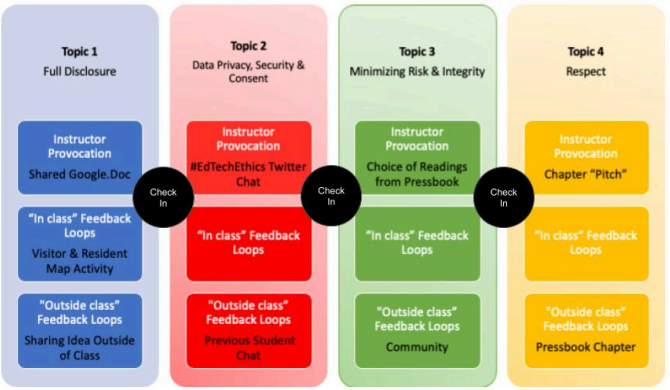

Figure 3 #EdTechEthics Open learning Design Framework (Winter 2020)

To ensure students had the opportunity to develop open readiness and confidence to share their chapters by integrating the open learning principles, the course activities were participatory, transparent, and helped model how to share, give and receive feedback while encouraging student reflection about their personal learning.

Figure 3 also highlights how the #EdTechEthics course was designed to adapt the OLDI framework, integrate the course content and key topics and design for specific activities to support the development of open readiness. Each topic also had a different audience in which to share and or give and receive feedback. For example, for Topic 1, students were introduced to emerging topics that considered the ethics of educational technology. The first week of the topic was guided by the instructor with the intention of providing a "hook" and provoking a reaction and challenge so the students could think about a topic in different and critical ways. In the second week, the students were given an open and participatory group activity to complete in small groups that I referred to as their social pods.

> ***What are social pods? The students were divided into social pods at the beginning of the course. Social pods are a semi-structured small group of learners who self-select to connect, interact, and give each other feedback throughout a course. The social pods provide an opportunity for the students to clarify instructor and course expectations while developing trusting relationships with peers throughout the course.***

In the third week, the students were encouraged to share their reflections through personal blog posts or through conversations about their open learning process with others beyond the course

walls (or class enrolment). For example, the students were encouraged to connect with the scholars who authored the articles included in their course readings as a way to connect with outside experts and learn more about their chapter topics in an authentic way.

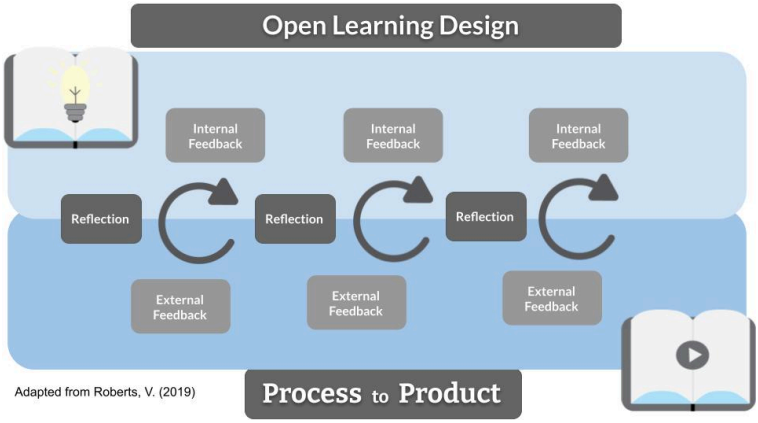

Figure 4: Open Learning Design in Any Learning Context: Process to Product (Roberts 2020 CC-BY)

As Figure 4 suggests, connecting open learning design with open co-design means supporting students to collaboratively and individually share their learning experiences through open and closed feedback loops. These feedback loops included multiple people, spaces, perspectives, experiences, and nodes of learning in formal and informal professional learning environments. The open learning principles helped the instructor to balance the focus on the completion of a chapter in an open textbook (learning product) with the awareness of the learning process. The principles promoted awareness about the open learning process, student choice about how to participate and contribute to a learning community, provided multiple mediums in which students could share and communicate their learning transparently, and ensured that they received and gave timely feedback in order to complete their

chapters. The four topics from Farrow's (2016) Ethical Framework and the iterative feedback loops within and at the end of each topic provided the students with timely opportunities to co-design their chapter and their learning pathway within the course.

Not only did I spend time designing for a course that met traditional constructive alignment guidelines (Biggs & Tang, 2013), I intentionally expanded upon more traditional guidelines by encouraging students to collaborate and connect with each other and those outside the course in order to build knowledge by sharing their experiences and ideas openly. This shift towards interdependence in learning provided the potential to explore the emerging open participatory co-design. The boundary between formal and informal learning was blurred as the learning activities within the course challenged learners to increase social interaction in multiple online spaces, communities, and networks.

Changes to Open Learning Design for 2021

Based on my personal teaching experiences and student feedback in the Winter 2020 term #EdTechEthics course, the following changes to the design were adopted in Winter 2021 term:

Assignment Expectations

Blogging was offered as an optional format that students could use for their reflections in the 2020 term. A few of the students used this format and I recognized the value in providing an open forum to reflect on the learning process during the course. In the 2021 term blogging became a main source for reflective practice for the students. I provided students with guidance for blogging by suggesting specific topics to consider when composing their blog

posts. The blog posts were designed to help the students identify stages of open learner readiness (Cronin, 2017) which considered developing an awareness about their online identity, personal online privacy and security concerns, how to share content and ideas online and who to share with. The blogs also provided students with a venue to give and receive critical feedback to each other and receive feedback and guidance from their instructor. The ability to receive and consider critical feedback throughout the course seemed to help students when working on edits and feedback on their written chapters later in the course. Blogging also seemed to help foster and develop relationships between myself and the students. I would consider this an essential learning activity in shaping and negotiating personal learning pathways that helped support the co-design process.

Highlighting Open Learning Design Principles to Support ANY Learning Context

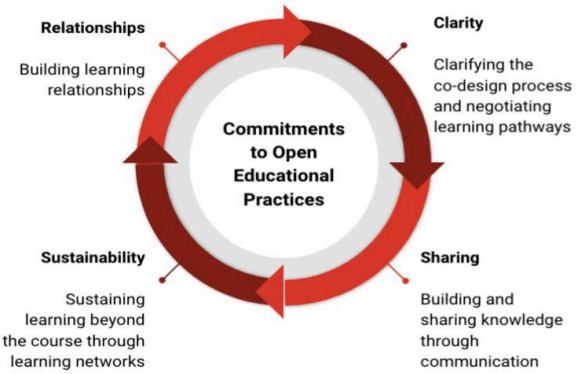

Figure 5 Commitments of Open Educational Practices (Roberts et.al, 2021, CC-BY)

As mentioned in the introduction in this pressbook, the OLDI framework was adapted. Figure 5 depicts the four-part open learning design framework as commitments. Working with a collaborative team and embedding this work in a larger research project (Jacobsen et al., 2021) provided an opportunity to engage in dialogue and unpack the commitments of open educational practices. It is my hope the commitments can provide instructors with a frame that can be used, modified or adapted to support educational contexts.

Supporting Students' Learning

Another area that I reflected on and aimed to improve was how to provide students with individual support. Students in the Winter 2020 term did not have an example of student-authored chapters on this topic. Students discussed their anxiety and fear of the unknown as they were assigned a learning task requiring them to co-design a pressbook chapter with me. In the following year, students in the Winter 2021 term were provided with a published pressbook as an example. They compared and contrasted their writing to what was previously done by former students and naturally used this as a target for their own work. Having an example that could be shared with students proved to be a great option for some of the students in the class, but not all. I encouraged all students to meet with me individually for a check-in within the first two weeks of the course to discuss their ideas and provide personal support. I was able to connect and interact with every student in the first two weeks in a variety of ways such as zoom calls, email, and phone calls. These early check-ins with students helped me identify individual learning needs early in the course.

It can be challenging for one instructor to provide all the necessary support and feedback required for an inquiry and development of a chapter. I invited former students from the earlier

term to serve as student-mentors. Many of my former students joined us for our synchronous course webinars and listened to the student pitches about their inquiry ideas. This helped the student-mentors recognize areas of connection and identify how they could offer support. In their reflections, I noted that students were impressed that former students would volunteer to help and offer their expertise.

The synchronous webinars were scheduled several times during the course and proved to be an important part of the course that complemented the asynchronous weekly learning activities. The webinars included time for whole-class interactions and provided scaffolded support as students worked on their chapters. I tried to ensure the learning was chunked into smaller steps with manageable timelines so that everything was not completed at once. I also ensured that I clarified feedback expectations during the webinars to help students with goal setting.

As discussed earlier, the students were arranged in social pod groupings to help them connect asynchronously or synchronously and interact with each other throughout the course, to give and receive emotional learning support, and for feedback on their writing. Many students met weekly with their social pods, outside of any assigned course time, to work on the weekly course activities and gain valuable feedback and insights from their peers. The student-mentors who were invited to provide additional support during webinars were also invited along with other outside experts to join our class on Twitter. I attempted to create a safe space to practice interacting with others who may have different perspectives both within the class boundaries and in public spaces. Although many outside experts volunteered to join us for a webinar it was often difficult to schedule with a group. In some cases, I created a video for the students to view at an alternate time. The videos with outside experts provided a collection of webinars that were Creative Commons (CC) licensed. This provided a way to avoid scheduling repeated webinars. Asking outside experts to come into our course webinar, prepare a recording, or join us during a public

forum to provide feedback and an expert perspective seemed to validate the student work. This additional feedback also helped enhance the instructor and peer feedback that is normally provided within the boundaries of a class. In the Winter 2021 term I opted to use more asynchronous options and created a course blog to share expert recordings, curated resources, content, and ideas to support students' learning.

Future Considerations

Promoting Diversity in Perspectives of Topics

Some students in the Winter 2020 term indicated in their feedback that the readings and discussion were heavily focused on K-12 learning contexts and did not necessarily consider their perspectives as students in different professional contexts. While the pressbook does have a diversity of learning contexts that integrate K-12 and Higher Education, changes were made to the learning design for Winter 2021 to ensure all students from a range of workplace contexts felt their perspectives were important and included in the conversations. The feedback from Winter 2021 students provided me with the assurance that the changes in my learning design to be more inclusive and diverse in my resources and support were appreciated. I will aim to continue to design learning for diverse topics and a range of learning environments and workplace contexts.

Collaboration with Colleagues from Across the Program/ Faculty / University

Throughout the Winter 2021 term, it became clear that I needed to depend upon other members of my university and learning community to provide students with the support needed to develop research and writing skills for drafting a book chapter. This included asking experts to come into the course to give the students feedback as their chapters progressed, librarians to help them with their research, the program coordinator to help connect and expand upon ideas in the other program courses as well as editing and feedback support from fellow colleagues to ensure the students received the content editing and copy editing they required. The conversations with my research team colleagues helped me rethink the potential of possible co-teaching opportunities and intentional interconnections between program courses in terms of learning outcomes, development of skills and competencies and actual assignments.

Sustainable Projects

As I contribute to the final edits on this second volume of the pressbook with the co-editors, I wonder if the students need to write a whole chapter in order to experience open learning. My interpretation of open learning design balances an emphasis on the learning process as well as a product. I think I would reconsider how many open learning activities like the social pods, Twitter hashtag integration, participatory online activities, and open webinars, that need to be included. Based on the data from the research, the students appreciated being able to publish their chapter in a pressbook. The editing and feedback required to support multiple students may not be sustainable with larger class sizes. I would

also reconsider what kind of open educational resource we could co-design and possibly consider vignettes, cases, or shorter manuscripts for a sustainable open educational resource (OER) or end product.

Human-centered Pedagogy

The #EdTechethics courses were taught during the beginning of COVID-19 (Winter 2020) when on-campus courses pivoted to online learning and then again during the global pandemic (Winter 2021) when most graduate students were still studying fully online. While other instructors struggled to get their courses online, the courses in this graduate program were designed as fully online courses at the outset in 2017. The #EdTechethics course was already up and running in an online format. In both semesters, the students were influenced by issues of equity and anxiety that prevailed across learning organizations during the global pandemic. I learned that it was not the online or on campus medium or modality for learning that affected my students; it was the need for relationships with their instructor and their peers during an unprecedented time and context with unforeseen challenges. Students needed flexibility and they needed to know that they would be supported by their instructor. As I reflected on my course design and open pedagogical approach, I recognized that particularly in a time of crisis, students needed support for how to ask for help and where to find resources. It is possible that the emphasis on sharing, collaboration, and interactions with peers, the instructor and external experts helped every learner meet learning outcomes and demonstrate their learning regardless of what was going on in the world.

I look forward to future iterations of the course and I am extremely grateful to Dr. Barbara Brown, Christie Hurrell, Dr. Michele Jacobsen, Nicole Neutzling, Mia Travers-Hayward and all the students from both sections of #EdTechEthics for helping me

learn so much about open learning design and the course that never ends!

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