

A Systemic Approach to Law and Technology at Ryerson University
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Abstract

In this article I advocate for the relevance of a systemic approach to teaching law and technology and I introduce Ryerson's efforts to teach law students about the technological production of law. I outline Ryerson's pedagogic approach to technology based on two teaching pillars: user based learning and innovation based learning. I argue that by placing these methodologies at the centre of the program, Ryerson may enable students to see the systems or institutions in which law is already situated, how to identify the core characteristics of those systems, and how to identify when those core characteristics are altered by new procedural or computational technologies.

Introduction

Many have warned that information technology has made the future of legal practice uncertain.¹ It seems evident that information technology will continue to improve practice efficiencies through standardization and systemization and lawyers will adapt.² However, what remains almost entirely unknown is whether legal practitioners will be able to acknowledge and address the tensions technology will produce for their clients and for the legal profession itself. New technology can deliver positive change, including accessibility, mobility, and knowledge. However, it can also unravel the norms and relationships at the heart of social organization. This is especially cogent where individuals and entities are newly empowered or disempowered in relation to each other as a result of technology.

A new professional consciousness about technology has led to criticism that legal education has not yet analyzed its own role and responsibilities in preparing lawyers to engage with it in practice. However, efforts to have law schools train students to use relevant technologies have generally been associated with broader professional demands to provide more practice based education and have had limited impact on curricular reform.³

In this article I advocate for the relevance of systemic thinking in teaching law and technology and outline how the new faculty of law at Ryerson University has undertaken relevant curricular reforms. I present a rationale for a program which places systemic thinking about technology at the centre of legal education based on the following insight: If technology has become or will become deeply implicated in how law is accessed as well as how law is formulated, then students should be taught how to analyze technology's effects.⁴ For the same reasons that law schools think students should be taught how to critically analyze the systemic effects of legal doctrine, so

¹ Richard Susskind & Daniel Susskind, *The Future of the Professions: How Technology Will Transform the Work of Human Experts* (New York: Oxford University Press, 2015).

² John O McGinnis & Russell G Pearce, "The Great Disruption: How Machine Intelligence will Transform the Role of Lawyers in the Delivery of Services (2014) 82 Fordham Law Review: 3041

³ *Infra*, pages

⁴ Simon Canick, "Technology in Law School Curriculum" (2014) *Capital University Law Review* 42, 663, 665-668; Craig T Smith, *Technology and Legal Education: Negotiating the Shoals of Technocentrism, Technophobia, and Indifference*, (2002) 1 *J. Association Legal writing Directors*, 247, 248

too should they be taught how to analyze the effect of technology on law's production.⁵ Ultimately, it is because technology is disrupting the essential role that lawyers play in the interpretation, application, delivery, and transformation of law, that students need to be taught how to analyze law differently. As such, finding a way to incorporate technology (as a tool, as a discourse, and as a social lens) into practice seems to be a way to move beyond the current model of legal education.

I begin, in Part I, by linking curricular reform to the recognition that technology is disrupting the legal profession and legal education. I outline these disruptions in order to highlight that the call to reform legal education to ensure practice readiness includes a call to teach students how to use technology and how to engage with its effects. However, in outlining these changes, I identify that the demand for technology education has (by association) become embroiled in the debate over the role of law school in professional education.

In Part II, I present the above rationalization for including technology in law school education that recognizes technology's effect on law's articulation and delivery. By recognizing the various ways technology is implicated in law's production, I seek to transcend or at least mediate the tensions with teaching technology in law school. I then present the way legal learning at Ryerson could orient itself towards understanding the institutions and systems used to produce law while teaching practice within them. I draw on two of Ryerson's teaching pillars (user based learning and innovation based learning) to illustrate how it has chosen to better student understanding of technology.⁶ Only time will tell Ryerson can teach a consciousness about technology alters the production of law. However, if it can teach students to see the systems or institutions in which law is already situated and how to identify when law altered by new procedural or computational technologies, then it will be well on its way.

I. The Disruption of Legal Practice and Legal Education

The Disruption of Practice

A large scholarship has documented the rise of legal technologies and attempted to predict its disruption of professional practice.⁷ Broad professional interest in the use of technology within legal practice can be sourced to the U.S. economic crisis of 2008 and the decline in demand for expensive legal services. Economic changes in this period bolstered customer expectations for fixed fee arrangements, discounts, and efficiencies. As Richard Susskind argued, firms turned to new technologies to create cost effective solutions.⁸ At the same time, global demands for more innovative, technologically savvy, and nimble approaches to managing interactions across multiple jurisdictions and between sectors grew. The effect of these changes was to put pressure

⁵ Daniel Bates, "Are Digital Natives Equipped to Conquer the Legal Landscape" (2013) 13:3 Legal Information Management 172-178; Anne Binsfeld, "New Barristers' Information Literacy Challenges as they Transition from Education to the Workplace" (2019) 19:1, 36-45.

⁶ In this I rely on the inclusive definition of technology as systems, as described by Val Dusek, *Philosophy of Technology: An Introduction* (New Jersey: Wiley-Blackwell, 2006) at 26-37. All systems in which physical hardware and rules are applied in ways that implicate the organization of people in relation to law

⁷ For discussion of disruption as a term in the legal context, see Brian Sheppard, "Incomplete Innovation and the Premature Disruption of Legal Services" (2015) Mich. St. Law Review 1797

⁸ Richard Susskind, *Tomorrow's Lawyers: An Introduction to Your Future*, (Oxford University Press: 2013) 3-5

on the legal profession to change how service would be provided. As the Canadian Bar Association (CBA) warned, the “legal industry in Canada is not immune to the major macro trends that are transforming virtually every industry in the world.”⁹

Professional and scholarly commentators have identified many innovations that have already disrupted or likely to disrupt the legal industry.¹⁰ Disruption is most often invoked as an economic concept, in which quantitative assessments are used to define a product that makes an expensive and inaccessible product affordable and accessible to a much larger population.¹¹ This concept of disruption translates in the legal field as access to justice, as there is a need to make legal services much more affordable and accessible to a greater number of people. However, access to justice innovations can be divided for the purposes of this discussion into two types: technologies that create efficiencies for professional lawyers and technologies that create efficiencies for non-professional users (i.e. clients, government agencies, arbitrators, mediators etc).

Of those relating to lawyers, McGinnis and Pearce identified five key areas of legal practice in which machine intelligence (e.g. high-tech) will dramatically alter practice in the near future: discovery, legal search, document generation, brief generation, and case prediction.¹² Several machine learning technologies developed in Canada, such as Blue J Legal, Ross Intelligence, and Clause Hound, typify this market.¹³ Blue J Legal offers predictive analysis for employment law based on filters that analyze a range of statutory and specific issues related to type and frequency of conduct, work environment, existence of employer policies, and the age and gender of the complainant. Ross Intelligence, powered by IBM Watson, responds to natural language queries with legal answers, backed by analytics of the documents it used to generate the answer. It also purports to predict the outcome of future cases based on analysis of case law and patterns in the cases themselves.

Similar types of efficiencies in assembling and analyzing client data are expected to be achieved through machine learning in other areas of practice. E-discovery companies provide automated analysis of large data sets needed for evidence in litigation and corporate matters. Block-chain uses systems that independently verify identities, ownership, registration, and legal existence in secured and commercial transactions, real estate transactions, and dispute resolution.

⁹ Richard Susskind, *The Future of Legal Services in Canada: Trends and Issues*, June 2013, submitted to the Canadian Bar Association (Ottawa: CBA Legal Future Initiative, 2013) at 4.

¹⁰ Richard Susskind, *Tomorrow's Lawyers: An Introduction to Your Future*, (Oxford University Press: 2013); Raymond H Brescia et al, "Embracing Disruption: How Technological Change in the Delivery of Legal Services Can Improve Access To Justice" (2014) 78:2 Alb L Rev 553; Clayton M. Christensen, *The Innovator's Dilemma: When New Technologies Cause Great Firms To Fail* (1997); Jordan Furlong, "The Pivot Generation: How Tomorrow's Lawyers Will Help Build a New and Better Legal Market" (2017) 50:3 Suffolk UL Rev 415.

¹¹ Disruptive Innovation Explained, Harv. Bus. Rev. (Mar. 6, 2012), <https://hbr.org/2012/03/disruptive-innovation-explained.html>.

¹² John O. McGinnis & Russell G Pearce, *The Great Disruption: How Machine Intelligence Will Transform the Role of Lawyers in the Diversity of Legal Services* (2013) 82 Fordham Law Review 3041

¹³ For early comparison between these databases and AI, see Richard Susskind, "Expert Systems in Law: Jurisprudential Approach to Artificial Intelligence and Legal Reasoning" (1986) Mod L Rev 168 at 169.

All of these technologies are differentiated from earlier technological changes by their reliance on machine learning to alter who (or what) provides the service to clients.¹⁴ Tasks previously undertaken by lawyers to transfer assets, ensure validity in a commercial transaction or liaise with clearing agencies, depositories, registries and regulators are now undertaken by programs that replace the trust or validation of a lawyer. As a consequence of automation, the ability to access legal knowledge is expected to increase and the costs for accessing it are expected to decrease.

The impacts from automation on professional practice are potentially immense. For example, commentators have asked who is responsible when non-lawyers or lawyers use technology to provide legal services but do not possess the analytical tools needed to assess whether a particular technology is adequate for the task.¹⁵ One answer is that these technologies will be blocked from the legal market or their scope of use will be limited.¹⁶ Others disagree and see their uptake as continuing apace with few implications for liability. For example, McGinnis and Pearce argue that while unauthorized practice statutes pose some barriers to the use of machine intelligence, standards for professional ethics, market forces and scope of uptake will increase reliance.¹⁷ A third body of commentators has called for an entirely new model for assigning liability to the machines themselves.¹⁸ Ultimately, these debates clarify that professional liability and responsibility resulting from technology will remain ambiguous in the near future.

Similarly, reliance on predictive programs is different in nature from web-based repositories because they remove most of the labour previously needed to provide opinions about the law. This is expected to disrupt both legal training and the distribution of income within the practice of law in the near future.¹⁹ The labour normally carried out by junior lawyers and those lawyers who provide routine legal services will be replaced by technologies that write research memos, write simple wills, manage house closings, and register documents.²⁰ While many predict greater efficiency for consumers, the entire structural use of junior lawyers within firms may change as will the method for obtaining skills needed for mid-career practice.²¹

¹⁴ Brian Sheppard, "Incomplete Innovation and the Premature Disruption of Legal Services" (2015) Mich. St. Law Review 1797

¹⁵ Dana A. Remus, *The Uncertain Promise of Predictive Coding* (2014) 99 IOWA L. REV. For discussion of the issue in the United States, see Larry E. Ribstein, *The Death of Big Law*, 2010 Wis. L. Rev. 749, 807-08; Ray Worthy Campbell, *Rethinking Regulation and Innovation in the US Legal Services Market*, 9 NYU J. L. & Bus. 1, 45-51 (2012).

¹⁶ See, for example, Gillian Hadfield, *Legal Barriers to Innovation: The Growing Economic Cost of Professional Control Over Corporate Legal Markets*, (2008) 60 STAN. L. REV. 1689, 1720-21, 1724-25.

¹⁷ John O. McGinnis & Russell G. Pearce, *The Great Disruption: How Machine Intelligence Will Transform the Role of Lawyers in the Diversity of Legal Services* (2013) 82 Fordham Law Review 3041 at 3059-3064

¹⁸ Ignacio N. Cofone, *Servers and Waiters: What Matters in the Law of AI* (2018) 21 Stan. Tech. L. Rev. 167; Dafni Lima, "Could AI Agents Be Held Criminally Liable: Artificial Intelligence and the Challenge of Criminal Law" (2017) 69 South Carolina Law Review, 677.

¹⁹ Jon M. Garon, *Legal Education in Disruption: The Headwinds and Tailwinds of Technology*, (2013) 45 Connecticut Law Review 1165. Jordan Furlong, *The Evolution of the Legal Services Market: Stage 3*, LAW21 (Nov. 7, 2012), <http://www.law21.ca/2012/11/the-evolution-of-the-legal-services-market-stage-3/>.

²⁰ John O. McGinnis & Russell G. Pearce, *The Great Disruption: How Machine Intelligence Will Transform the Role of Lawyers in the Diversity of Legal Services* (2013) 82 Fordham Law Review 3041 at

²¹ On the reduction of those providing bespoke services, see Brian Sheppard, "Incomplete Innovation" (2015) Mich. St. L. Rev. 1797 at 1877-1879; William E. Foster, Andrew Lawson, "When to Praise the Machine: The Promise and Perils of Automated Transactional Drafting" (2017) 69 South Carolina Law Review, 597 at 633.

Of those technologies relating to non-professionals, the quest for efficiencies has led to the introduction of automated systems in key fields where individual judgement is time and risk-intensive. These technologies disrupt responsibility and liability for decisions made and raise more fundamental questions about how lawyers can effectively represent clients within these systems²² Recent studies have documented the use of predictive analytics by legal professionals in assessing bail as well as assessing the risk of recidivism in pre-trial and sentencing decisions.²³ However, similar technologies are being used by non-lawyers to predict hot spots for increased surveillance, to promote intensive police presence²⁴ and to assist regulatory decision making. For example, a recent study of Canada's Immigration and Refugee System show automated decision systems are being used to classify immigration cases, triage applications, generate scores, produce factors to support reasoning, identify cases for human oversight or investigation, and provide recommendations for or against approvals.²⁵

These types of technologies generate nuanced outcomes that raise concerns that while disruption might bring unprecedented access to the legal system, it might also reduce the ability to deliver progressive outcomes.²⁶ Moreover, those unable to engage with these issues bear some responsibility for their impacts. In her work on the future of coding, Dana Remus identifies that lawyers who lack competence to analyze the structural impact of a given technology are not well positioned to deliver critical advocacy.²⁷ Jamie J. Baker similarly argues that without knowing how the algorithm generated results, lawyers are left to their own devices to evaluate results, ultimately undermining their ability to advise and advocate.²⁸ These commentators reflect a common concern that the effect of these kinds of technologies may be to disempower the legal profession, especially when it is most needed.

The Disruption of Legal Education

Despite professional uptake of legal technologies, there is criticism that legal education has not yet looked inward to analyze its own role and responsibilities in preparing lawyers for technology in practice. As a result, there is little evidence that legal education has undergone any real disruption.²⁹ Critics have raised concerns that law schools do not train law students to use

²² For warnings, see Ian Kerr, Prediction, Preemption, Presumption: The Path of Law after the Computational Turn" in *Privacy and Due Process After the Computational Turn*, Mireille Hildebrandt, Solon Barocas and Katja de Vries (eds.) (London: Routledge 2013); Michael Geist and Milana Homsí, Outsourcing our Privacy?: Privacy and Security in a Borderless Commercial World (2005) 54 University of New Brunswick Law Journal 272-307

²³ Julia Angwin et al, "Machine Bias", online: (2016) ProPublica <www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing>.

²⁴ Andrew Guthrie Ferguson, *The Rise of Big Data Policing: Surveillance, Race and the Future of Law Enforcement* (New York: NYU Press, 2017).

²⁵ Petra Molnar & Lex Gill, "Bots at the Gate: A Human Rights Analysis of Automated Decision-Making in Canada's Immigration and Refugee System" (2018) Creative Commons Attribution-ShareAlike 4.0.

²⁶ Brian Sheppard, "Incomplete Innovation" (2015) Mich. St. L. Rev 1797 at

²⁷ Dana A. Remus, *The Uncertain Promise of Predictive Coding* (2014) 99 IOWA L. REV

²⁸ Jamie J Baker 69 S. C. L. Rev. 557 (2017-2018) Beyond the Information Age: The Duty of Technology Competence in the Algorithmic Society, 557

²⁹ Jon M Garon, "Legal Education in Disruption: The Headwinds and Tailwinds of Technology" (2013) 45:4 Connecticut Law Review, 1165; Raymond H Brescia et al, "Embracing Disruption: How Technological Change in the Delivery of Legal Services Can Improve Access to Justice" (2014) 78:2 Alb L Rev 553

technologies or how to practice in relation to them.³⁰ While we may be living on the cusp of the technological age of law, there remains an unmet need to teach how to understand, analyze, explain, or control these systems.³¹ While technology appears to be everywhere, students are not widely using it in the classroom³² nor are they being prepared for using technology in practice.³³

Where curriculum reform has begun, schools have either supplemented the regular curriculum or provided elective courses on technology and the practice of law.³⁴ These limited curricular changes reflect a two prong belief that law school assessments are incongruous with information processing normally undertaken by digital natives and that technical training is needed for practice.³⁵ For instance, the use of WebCT, computer supported peer review,³⁶ and presentation technologies³⁷ have been used to alter assessment but also to teach students about professional communication and collaboration.³⁸ Similar efforts have been undertaken in legal research and writing,³⁹ interviewing and dispute resolution,⁴⁰ and the use of subject specific

³⁰ Bernier, Barbara L., and F. Dennis Green. "Law School Reset—Pedagogy, Andragogy, and *Second Life*." In *Educating the Digital Lawyer*, edited by Marc Lauritsen and Oliver Goodenough, 11-1–11-15. New Providence, NJ: LexisNexis, 2012.

³¹ For new efforts at analyzing legal text, see Wolfgang Alschner, Julia Seiermann and Dmitriy Skougarevskiy, Text of Trade Agreements (ToTA) – A Structured Corpus for the Text as Data Analysis of Preferential Trade Agreements (2018) 15:3 Journal of Empirical Legal Studies 648-666;

³² Simon Canick, "Technology in Law School Curriculum" (2014) Capital University Law Review 42, 663, 665-668; Craig T Smith, Technology and Legal Education: Negotiating the Shoals of Technocentrism, Technophobia, and Indifference, (2002) 1 J. Association Legal writing Directors, 247, 248

³³ Daniel Bates, "Are Digital Natives Equipped to Conquer the Legal Landscape" (2013) 13:3 Legal Information Management 172-178; Anne Binsfeld, "New Barristers' Information Literacy Challenges as they Transition from Education to the Workplace" (2019) 19:1, 36-45.

³⁴ For an excellent bibliography of efforts in the United States, see Pearl Goldman, Legal Education and Technology III: An Annotated Bibliography (2019) 111:3 Law Library Journal, 326.

³⁵ For different examples, see Desmond A Butler "Closing the Loop 21st Century Style: Providing Feedback on Written Assessment via MP3 Recordings." (2011) 4:1 *Journal of Australasian Law Teachers Association* 99–107; Stephen Colbran, Anthony Gilding, and Samuel Colbran. "Animation and Multiple-Choice Questions as a Formative Feedback Tool for Legal Education." (2016) 51:3 *Law Teacher: The International Journal of Legal Education* 249–73.

³⁶ Kevin Ashley and Ilya Goldin. "Computer-Supported Peer Review in a Law School Context," *University of Pittsburgh Legal Studies Research Paper* No. 2012-24, Pittsburgh, PA, 2012, <http://ssrn.com/abstract=2145570> [<https://perma.cc/3AQE-RRHF>]

³⁷ Barker, Charles, and Claire Sparrow. "Technology and Presentation Skills Teaching: Activity Theory as a Tool for the Design and Evaluation of Strategies for the Use of Video as a Learning Tool in Presentation Skills Teaching." (2016) 3 *European Journal of Law and Technology* 7,

³⁸ Anneka Ferguson and Elizabeth Lee. "Desperately Seeking . . . Relevant Assessment? A Case Study on the Potential for Using Online Simulated Group Based Learning to Create Sustainable Assessment Practices." *Legal Education Review* 22, no. 1 (2012): 121–45

³⁹ Maharg, Paul. "Convergence and Fragmentation: Legal Research, Legal Informatics and Legal Education." (2014) 5:3 *European Journal of Law and Technology*

⁴⁰ Goldberg, Jordan. "Online Dispute Resolution and Why Law Schools Should Prepare Future Lawyers for the Online Forum." (2014) 14:1 *Pepperdine Dispute Resolution Law Journal* 1–24; Harding, Maebh. "Using Interviewing and Negotiation to Further Critical Understanding of Family and Child Law." In *Legal Education: Simulation in Theory and Practice*, edited by Caroline Strevens, Richard Grimes, and Edward Phillips, 127–50. (Farnham, UK: Ashgate, 2014)

technology.⁴¹ While these changes are small in scope, frequency of adoption reflects a desire to make legal education relevant to the digital realities of practice.⁴²

Others have undertaken deeper experimentation with technology in clinical and experiential education. For example, a number of law schools have incorporated an experiential practicum that allows participating students to identify legal problems and use technology to solve it. Some versions of technology clinics use high tech training to introduce students to established technologies (such as those dedicated to e-discovery⁴³ and legal research and writing⁴⁴). However, more experimental ones involve the use of authoring software to enhance current applications or design new ones.

For example, several law schools in the United States have used A2J Author software to create apps that turn tacit knowledge held by lawyers into information that could be accessed by underserved populations.⁴⁵ Scholarship from faculty at several schools indicate that students using A2J learn to master substantive and procedural law as well as to identify social needs of particular client groups.⁴⁶ This approach can be compared with efforts to design entirely new software packages. Design courses, such as the Suffolk Law School's course in Coding the Law, teach students to generate apps and software.⁴⁷ These types of design courses require students to engage with those capable of computer design or to teach students how to code the software themselves.

An alternative to this approach is found in virtual clinics that engage students in real or simulated tasks for clients. While these do not necessarily apply emerging technologies, students must use communication technology to provide relevant services and communicate within a virtual firm.⁴⁸ Simulation can also be packaged with expertise where technology clinics are linked to a deeper specialization in technology and law. For example, the Centre for Law, Technology and Society

⁴¹ Cadmus, Femi. "Five Steps to Successfully Developing a Law Practice Technology Course." (2014) 24 *Trends in Law Library Management and Technology* 25–31.

⁴² Richard S. Granat & Stephanie Kimbro, The Teaching of Law Practice Management and Technology in Law Schools: A New Paradigm, (2013) 88 *Chicago Kent Law Review*. 757, 769; Conrad Johnson & Brian Donnelly, If Only We Knew What We Know, (2013) 88 *Chicago Kent Law Review*. 729, 730

⁴³ Paula Schaefer, "Injecting Law Student Drama into the Classroom: Transforming an E-Discovery Class (or Any Law School Class) with a Complex, Student-Generated Simulation." *Nevada Law Journal* 12, no. 1 (2011): 130–59.

⁴⁴ Brian Sites, "The Influence of Algorithms: The Importance of Tracking Technology as Legal Educators." (2016) 23:1 *Law Teacher*, 21–25.

⁴⁵ Conrad Johnson and Brian Donnelly. "If Only We Knew What We Know." (2013) 88:3 *Chicago-Kent Law Review* 729–42

⁴⁶ Conrad Johnson and Brian Donnelly. "If Only We Knew What We Know." (2013) 88:3 *Chicago-Kent Law Review* 729–42; Ronald W. Staudt and Andrew P. Medeiros. "Access to Justice and Technology Clinics: A 4% Solution." (2013) 88:3 *Chicago-Kent Law Review* 695–727; Tanina Rostain, Roger Skalbeck, and Kevin G. Mulcahy, "Thinking Like a Lawyer, Designing Like an Architect: Preparing Students for the 21st Century Practice." (2013) 88:3 *Chicago-Kent Law Review* 743–55; Robert C. Blitt, and Reece Brasser. "Experiencing Experiential Education: A Faculty-Student Perspective on the University of Tennessee College of Law's Adventure in Access to Justice Author." (2016) 50:1 *John Marshall Law Review* 11–51.

⁴⁷ Suffolk Law School, Coding the Law Syllabus available <https://www.codingthelaw.org>

⁴⁸ Ann Thanaraj, "Making the Case for a Digital Lawyering Framework in Legal Education." (2017) 3 *International Review of Law* 2017 Amanda Stickley. "Providing a Law Degree for the 'Real World': Perspective of an Australian Law School." (2011) 45:1 *Law Teacher: The International Journal of Legal Education*: 63–86

at the University of Ottawa provides a JD in Law and Technology which uses a mixture of course learning, clinical practice, moots and internships. Similar examples are found at the Legal Technology and Informatics at Stanford, the Technology Innovation and Law Practice at Georgetown, the Suffolk Institute on Law Practice Technology and Innovation, and Chicago-Kent Centre for Access to Justice and Technology. Naturally, these specializations are elective and targeted at a small percentage of a law school class.

These changes are important because they use contextual learning about technology as a pedagogic tool. As Canick notes, any singular use of technology for presentations, communication, discovery, practice management and legal research could be taught as a separate course but in doing so, they lack context. Instead, infusing skills into other classes gives reality to both the doctrine being taught and the technologies used in practice.⁴⁹ Context based practice moves away from a singular reliance on case law and journal articles for providing the information needed to analyze a problem or for providing a solution to that problem.⁵⁰ The curricular reforms canvassed above introduce problem sets that better reflect how information is normally presented to lawyers and the non-judicial methods they can use to resolve them.⁵¹

Naturally, the use of context for learning technology is deeply reliant on broader efforts to improve experiential learning and clinical learning in law schools. The use of simulation, observation and information gathering through client interviews or negotiations are now being introduced as early as first year in some programs. Moreover, law schools are adding a wide range of clinical opportunities, simulations and field placements in upper year. Margaret Barry has summarized its benefits succinctly: clinics provide skills training by relating substantive law to competencies like client interviewing and counselling, communication, fact investigation, drafting, negotiation, ethics and professionalism, problem-solving, and social justice.⁵² By design or necessity, students in legal clinics obtain proficiencies needed for service provision.

Some commentators source the increasing appetite for experiential learning in law school to student capacity and need.⁵³ Drawing on adult learning theory, Maranville argues that optimal learning is achieved from context because of interest in the human character of the issues, better comprehension of application and better memory storage.⁵⁴ Lorne Sossin argues for a similar rationale in favour of experiential learning. He argues that it represents a more effective, rigorous and intellectually engaging means of teaching and learning law, as it deploys legal knowledge in order to understand law and its contexts.⁵⁵

Nevertheless, while student learning may be one motivation for change, experiential learning is generally touted as the core method for providing skills that meet market demands for practice-

⁴⁹ Simon Canick, "Technology in Law School Curriculum" (2014) *Cap. U. Law Review* 42, 663, 665-668, 682.

⁵⁰ Deborah Maranville, "Infusing Passion and Context into the Traditional Law Curriculum through Experimental Learning" (2001) 51:1 *J Leg Educ* 51

⁵¹ Simon Canick, "Technology in Law School Curriculum" (2014) *Cap. U. Law Review* 42, 663, 665-668, 682

⁵² Margaret Barry, "Practice Ready: Are We There Yet?" (2012) *Boston College JL & Soc Just* 252.

⁵³ Deborah Maranville, "Infusing Passion and Context into the Traditional Law Curriculum through Experimental Learning" (2001) 51:1 *J Leg Educ* 51, 53

⁵⁴ Deborah Maranville, "Infusing Passion and Context into the Traditional Law Curriculum through Experimental Learning" (2001) 51:1 *J Leg Educ* 51, 53

⁵⁵ Lorne Sossin, "Experience the Future of Legal Education (2014) 51:4 *Alberta Law Review*, 849.

ready lawyers.⁵⁶ As Stuckey et. al. advocate in *Best Practices for Legal Education*, context based education provides this by teaching theory, doctrine and analytical skills as well as how to produce documents, resolve human problems and cultivate practical wisdom.⁵⁷ Canadian law societies agree. The Federation of Law Societies of Canada and provincial law societies have privileged experiential approaches in their regulation of core competencies. Canadian law schools have responded to this pressure much in the same way as they have in the United States – they have increased experiential learning opportunities but have not fundamentally altered the way they deliver doctrinal material.⁵⁸

Faculty reluctance to incorporate technological learning as practice readiness stems largely from the refusal to bend to what Margaret Thornton calls corporatist and commodifying trends in legal education.⁵⁹ Law schools are increasingly being asked to train students to practice in ways that produce a faster return on investment for firms. Commentators, such as Susan Boyd have argued that a highly competitive environment between law schools and between law students influenced by corporatism is confining the mission of Canadian legal education to vocational training, at the expense of obtaining other capabilities.⁶⁰ These critiques identify how an applied/vocational emphasis can obviate a focus on the ways law and legal institutions are situated within particular social, historical, economic, and cultural contexts. For example, Boyd identifies the impacts of neo-liberal influences on legal education and legal research that counters neo-liberal norms. She argues that current trends of privatization, corporatism and commodification have accompanied the shift from an imperfect and relatively brief social liberalism to neoliberalism.

A more explicit turn to corporatism within universities has also required that university faculty operate in ways that reflects corporate models of efficiency and consumer need.⁶¹ Promises for professional placement have in turn rationalized higher tuition fees for those seeking the lucrative benefits of legal practice and the redirection of legal education to meet the needs of those (generally large and corporate firms) who will hire new entrants. Combined with pressures to obtain highly paid jobs in conservative firms, Boyd notes that students will often internalize the need to focus on courses that prepare them for bar admission and thereby project traditional values of a socially conservative bar. As a consequence, law schools become places that reinforce the status quo, rather than teach methods for creating change.⁶²

Given the push for experiential learning, it should come as no surprise that the call to include more technology is often linked with market demands for ensure practice readiness. However,

⁵⁶ William M. Sullivan et al, *Educating Lawyers: Preparation for the Profession of Law* (San Francisco: Jossey-Bass, 2007).

⁵⁷ Roy Stuckey Et Al., *Best Practices For Legal Education* 133 (2007)

⁵⁸ Deborah Maranville et al, “Re-vision Quest: A Law School Guide to Designing Experiential Courses Involving Real Lawyering (2012) 56:2 NYL Sch L. Rev 517; For an example in Canada, see Osgoode Hall Law School, which created a requirement that students complete 40 hours of public interest work and in 2011 created an experiential course (praxicum) requirement for graduation, <https://www.osgoode.yorku.ca/programs/juris-doctor/jd-program/osgoode-public-interest-requirement/>

⁵⁹ Margaret Thornton, “Technocentrism in the Law School: Why the Gender and Colour of Law Remain the Same” (1998) 36 Osgoode Hall Law Journal, 369

⁶⁰ Susan Boyd, “Corporatism and Legal Education in Canada” (2005) 14 Social and Legal Studies, 287

⁶¹ Margaret Thornton, “The Law School, the Market and the New Knowledge Economy” (2009) 10 (6-7), 641-668

⁶² Susan Boyd, “Corporatism and Legal Education in Canada” (2005) 14 Social and Legal Studies, 287

this association between practice and technology has embroiled curricular reforms in the debate over what is the role of law school in professional education. Critical scholarship on legal education has raised fundamental concerns about the responsibility of law schools to teach students to think critically. The fear is that by focusing on practice, schools will reproduce a positivist and managerial conception of law; a conception students will then be ill-equipped to critique or change in their future practice.

II. Ryerson's Practice Contribution - Attend to Technology as a System of Law

In a conscious effort to meet market demand for practice ready students, Ryerson University has carved out space in the legal curriculum to include legal service delivery as a system worthy of study in and of itself. In Ryerson's approach, law students are meant to emerge ready to provide some minimal level of professional service. However, what is happening at Ryerson is not simply a pragmatic effort to train students to service law simply and cheaply - although should it even do that, it would have achieved something close to miraculous. Rather, Ryerson has operationalized an understanding that technology is deeply implicated in the practice of law and that law schools should prepare students accordingly.⁶³

In this Part, I provide a rationalization for a program which places systemic thinking about legal technologies at the centre of professional education. An applied understanding of legal technology often overlooks debates about the generative effects of technology on the substance of law that is simmering at the edges of legal education scholarship.⁶⁴ By highlighting impacts to users, I rationalize a change to legal education that privileges learning about the effects of technology. As a result, I rationalize a much deeper change to curriculum than practice readiness presumes. Instead, students in a technology program should understand that what has been disrupted is the essential role that lawyers play in understanding and designing legal technologies and what those technologies do to the interpretation, application, delivery, and transformation of law.⁶⁵ This requires systemic learning.

I then forward an outline of how Ryerson's pedagogy can be used to teach students about the production of law through the pragmatics of practice (and include legal technologies in that conception). As will be explored below, this builds on Ryerson's *user based learning*, including the adoption and effect of new technologies and *innovation based learning*, including curriculum for design and adoption of new technologies. Questions about whether the suggested changes are sufficient for systemic learning or come at the expense of other skills are raised and sometimes answered by the scholarship on learning. However, I conclude with the argument that Ryerson

⁶³ Mireille Hildebrandt, "Law as Computation in the Era of Artificial Legal Intelligence: Speaking Law to the Power of Statistics" (2018) 68:Suppl UTLJ 12 at 14; Paul Gowder, "Transformative Legal Technology and the Rule of Law" (2018) 68:Suppl UTLJ 82.

⁶⁴ For thinking on this turn in legal thinking, see Alschner, Wolfgang, Joost Pauwelyn and Sergio Puig "The Data Driven Future of International Economic Law" 2017 20:2 Journal of International Economic Law

⁶⁵ For thinking on the topic of systemic legal education I am indebted to the following scholars: Harry Arthurs, "Law and Learning in an Era of Globalization" (2009) 10 German LJ 639; Harry Arthurs, "Madly Off in One Direction: McGill's New Integrated, Polyjural, Transsystemic Law Programme" (2005) 50 McGill LJ 707; Roderick A Macdonald & Jason MacLean "No Toilets in the Park" (2005) 50 McGill LJ 721; Rosalie Jukier, "Transnationalizing the Legal Curriculum: How to Teach What We Live" (2006) 56 J Leg Educ 172..

could be successful if students graduating from its program can identify when the core characteristics of a law are altered by new procedural or computational technologies.

It is early days yet and the nature of faculty and student recruitment at Ryerson will certainly have a large impact on the degree to which a systemic approach can be implemented. Nevertheless, at the core of the program already lies an ambition to engage with legal practice but not be limited to its pragmatics. By turning an institutional lens towards addressing technologies' effects on the substance of law, Ryerson can lead thinking about how to train those who will promote, critique, and design technologies. In this approach, law school remains a place where there is sufficient time and capacity to question how law is constructed through technology, including legal technologies.

A. Rationalizing a Systemic Approach to Technology in Legal Education

Systemic learning involves learning about the structures used to obtain other kinds of knowledge.⁶⁶ Systemic learning about technology is rationalized if technology alters the substance and procedures of law in ways not easily addressed by the mainstays of legal education. If technology is used to produce and reproduce law but the method by which it achieves its ends are inaccessible to those (lawyers, judges, and legislators) invested with authority to administer it, then it seems reasonable that legal education be oriented in ways that better teach how law is produced and the institutional structures in which it is produced.⁶⁷

There is considerable scholarship that describes the ways law and technology are co-produced. Much of that scholarship describes the capacity of law to effect science and it is often included in law school curriculum.⁶⁸ Examples are found in Sheila Jasanoff's descriptions of how law is used to articulate societal needs and shape scientific outputs⁶⁹ and in Laurence Tribe's description of environmental assessment, which called on the legal field to analyze law's effect on regulation and expert practice.⁷⁰ Moreover, in addition to scholarship that analyzes law's effectiveness, there is scholarship that attempts to explain the opposite - how law is shaped by

⁶⁶ Max Miller, "Some Theoretical Aspects of Systemic Learning" (2002) 3:3 Sozialer Sinn 379–422

⁶⁷ In Canada, the law schools at McGill University and University of Victoria stand out in their attempt to centrally design systemic thinking in the legal curriculum in their attempt to teach its student body both how to understand the systems within which common, civil, and Indigenous law operate as well as how to think across and between those systems. For discussion about McGill's experience, see Helge Dedek & Armand de Mestral, "Born to be Wild The Trans-systemic" Programme at McGill and the De-Nationalization of Legal Education" (2009) 10:7 German LJ 889; H Patrick Glenn, "Doin' the Transsystemic" (2005) 50 McGill LJ 86. For discussion of University of Victoria's experience, see Hadley Friedland and Val Napoleon, "Gathering the Threads: Developing a Methodology for Researching and Rebuilding Indigenous Legal Traditions (2015) 1:1 Lakehead Law Journal, 16; John Borrows, "Outsider Education: Indigenous Law and Land Based Learning (2016) 33 Windsor Yearbook of Access to Justice, 1; Sarah Morales, "Locating Oneself in One's Research: Learning and Engaging with Law in the Coast Salish World" (2018) 30:1, 144

⁶⁸ This approach has usually been fueled by the work of those associated with Science and Technology Studies.

⁶⁹ Ronald Brickman, Sheila Jasanoff, and Thomas Ilgen Controlling Chemicals: The Politics of Regulation in Europe and the United States (Ithaca, NY: Cornell University Press, 1985); Sheila Jasanoff, Science at the Bar: Law, Science and Technology in America (Twentieth Century Funds Books, 1997); Alex Faulkner, Bettina Lange and Christopher Lawless, "Introduction: Material Worlds: Intersections of Law Science, Technology and Society" (2012) 39:1, 1-19

⁷⁰ Laurence Tribe, Channeling Technology Through Law (Bracton Press, 1973)

society's non-legal processes.⁷¹ For example, Bruno Latour advances the use of actor-network theory to describe the networks and actors that change or fail to change law⁷² and Susan Silbey, has used this theory to specifically describe how law is changed by scientific processes.⁷³ Deeply empiricist, this second approach seeks to demonstrate the wide range of human (and non-human) actors required for law to operate and how law is formed by them.

This body of scholarship provides important insight for those lawyers interested in how processes and forms have an effect on the interpretation of law. For example, numerous scholars write of the effect of standard form contracts on theories of contract and attendant interpretations. David Slawson offered relevant insights 30 years ago when he linked changes to the central organizing principle of agreement to the rise of standard form contract. He argues that the shift in jurisprudence from mutual assent to reasonable expectations is a result of when expectations arise when using standard form contracts.⁷⁴ More recent interest in the medium effecting function are generated by online contracting. For instance, Hillman and Rachlinski argue that Internet does not fundamentally alter the theories of blanket assent that underpin the interpretation of standard form consumer contracts, where it is mediated by unconscionability and reasonable expectations.⁷⁵ However, they note the medium can have a unique effect on factors that normally impact interpretation. They point to the lack of social contact, the way marketing and contracting are blended online, and changes to cognitive decision-making.⁷⁶

Considerations such as these are often taught in law school curriculum as special applications or exceptions to the prevailing legal rule. What then is the added benefit of being explicit about the fact that the medium effects the law? Well, if the profession seeks to slowly teach the implications of process as an added consideration then perhaps there is little added value. But if lawyers want to anticipate change or have a better ability to respond to technological challenges then building the ability to analyze typologies and mechanisms across disciplines, should provide lawyers a better ability to anticipate change and adapt more quickly. Moreover, a consciousness about the effects of technology on legal outcomes (across and within fields of practice) can be used by lawyers to guide technology development for particular stakeholders. This approach stands in stark contrast to the current model, which sees technology developed for the market without a deep consciousness of how it may impact different stakeholders or how path dependencies quickly limit alternatives.

⁷¹ Niklas Luhmann, *Law as a Social System*. Trans. Klaus Ziegert. (Oxford: Oxford University Press, 2004); Gunther Teubner, *How the Law Thinks: Toward a Constructivist Epistemology of Law* (1989) 23 *Law & Society Review*, 727-58; Gunther Teubner, *Law as an Autopoietic System* (Oxford, UK: Oxford University Press, 1993).

⁷² Bruno Latour, "Scientific Objects and Legal Objectivity" in Alain Pottage and Martha Mundy (eds.), *Law, Anthropology, and the Constitution of the Social: Making Persons and Things*, 73-114. (Cambridge, MA: Cambridge University Press 2004); Ron Levi & Mariana Valverde, "Studying Law by Association: Bruno Latour Goes to the Conseil d'Etat" (2008) 33:3 *Law & Soc Inquiry* 805.

⁷³ Susan Silbey and Patricia Ewick "The Architecture of Authority: The Place of Law in the Space of Science" in Austin Sarat, Lawrence Douglas, and Martha Umphrey *The Place of Law*, ed. (Ann Arbor: University of Michigan Press, 2003) 75-108.

⁷⁴ W. David Slawson, "The New Meaning of Contract: The Transformation of Contracts Law by Standard Forms" (1984) 46 *U. Pitt. L. Rev.* 21.

⁷⁵ Robert A. Hillman, Jeffrey J. Rachlinski "Standard Form Contracting in the Electronic Age" (2002) 77 *N.Y.U. L. Rev.* 429.

⁷⁶ *Ibid.*

This is where the work of new legal scholars on emerging technologies has provided some deeper systemic analysis. This scholarship describes the ways decision-making is transferred to automated systems and thereby invests those systems with the power to produce law. For example, Solon Barocas and Andrew Selbst explain how AI technologies allow powerful actors to make algorithmic decision that have a disparate impact on subordinated groups.⁷⁷ By this they mean that large, complex socio-technical systems that mix personalization, opaque rules, and machine learning raise novel challenges for ensuring non-discrimination, and due process where bias can be encoded into automated decisions.

Moreover, the removal of humans from individualized decision-making creates an accountability gap that has little parallel in previous theorizing about power. Automated decision systems process information based on algorithms, which are a set of instructions that aims to generate data to solve a question or problem, articulated in computational terms.⁷⁸ Because the ranking of results in a technology that uses machine based learning requires the use of an algorithm to achieve a goal, the way the programmer determines how to achieve that goal will limit the type of factors or inputs identified by the programmer as relevant. This has widespread implications where the goal is to predict risky behaviour in order to more efficiently observe, police, sell, market, intervene, or prosecute in any given case. It quickly becomes apparent that the values, assumptions, biases, shortcomings, and blind spots involved in the selection of relevant data will impact both outputs and outcomes for those observed, policed, sold, marketed, intervened with, or prosecuted.⁷⁹

Empirical scholarship has also described the way feedback loops determine output in ways unintended by programmers. A feedback loop is when machine learning propagates biases built into certain identifying characteristics, like income, race, residency, insurance profiles etc. in determining outputs.⁸⁰ For instance, algorithms directed at bail decisions in the U.S. have been twice as likely to falsely label black prisoners as high risk for re-offending as white prisoners.⁸¹

However, even where programmers select alternative variables that do not appear or even intend to be discriminatory, these alternative variables can serve as proxies for racial categories.⁸² In this way, variables based on postal code can affect the same racial profiling as race itself. This form of proxy discrimination is difficult to detect but also difficult to amend, given how programs are discursively positioned to provide neutral and objective outputs and that the

⁷⁷ Solon Barocas and Andrew Selbst, *Big Data's Disparate Impact* (2016) 104 Cal L. Rev 671 at 675.

⁷⁸ Tarleton Gillespie, *Algorithm in Digital Keywords: A Vocabulary of Information Society and Culture*, ed by Ben Peters (Princeton: Princeton University Press, 2016) at 19 <<http://culturedigitally.org/wp-content/uploads/2016/07/Gillespie-2016-Algorithm-Digital-Keywords-Peters-ed.pdf>>.

⁷⁹ Petra Molnar & Lex Gill, "Bots At The Gate: A Human Rights Analysis of Automated Decision-Making in Canada's Immigration and Refugee System" (2018) Creative Commons Attribution-ShareAlike 4.

⁸⁰ Cathy O'Neil, *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy* (New York: Crown Publishing Corp. 2016).

⁸¹ Julia Angwin et al, "Machine Bias", online: (2016) ProPublica <www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing>.

⁸² For application in other contexts, see Jason Millar, *An Ethics Evaluation Tool for Automating Ethical Decision-Making in Robots and Self-Driving Cars* (2016) 30:8 *Applied Artificial Intelligence* 787-809; Jason Millar, *Technology as Moral Proxy – Autonomy and Paternalism by Design*, (2015) 34:2 *IEEE Technology and Society* 47-55.

programming itself is not often transparent.⁸³

Similar concerns have been raised in the recent report by Citizen Lab on the use of AI in immigration decisions. The authors of the report forecast feedback loops that create an environment ripe for algorithmic discrimination that computes the truthfulness of a refugee story based on indicators derived from past applications and outcomes or one that predicts positive settlement or future lawfulness of immigrants based on their country of origin.⁸⁴

Altogether different concerns have arisen in the use of automated vehicles, such as self-driving cars and autonomous drones. Who should be responsible for accidents caused by self-driving cars, if the decision-making matrix was premised on choices authorized by regulation? Can the owner of AI car technology be responsible for an accident, if the programming only permitted limited choice? These types of questions are even more cogent where threat to life is built into design. For example, challenges to human rights clearly arise where autonomous drones are used to carry out surveillance and warfare.⁸⁵ However, these issues become more complex when used by state agents, such as the Coast Guard, in counter narcotics.⁸⁶ As Jack Balkin noted, AI presents new problems for how to distribute rights and responsibilities that arise from actions of non-human entities as well as AI agents.⁸⁷

For legal educators, consciousness about the way technology can structure legal rights raises questions about how to train students to understand, use, and create legal technologies that attend to particular social values. At the heart of critiques like those outlined above are questions about how private corporations and public governments can use predictive and analytical technologies in ways that could negatively impact anyone. However, it also raises questions about how to teach legal practice as a series of institutional structures that are accessed and organized through legal technologies in ways that may not be aligned with the foundational principles of access to justice.

B. A Different Learning Technique

Where is Ryerson in all of this? Ryerson has made technology one of the pillars of its new law school program and has used central planning to ensure technology skills are included in learning outcomes.⁸⁸ Students are taken through two years of mandatory course work, including intensives in non-legal subject areas deemed helpful for practice. Technology factors into this practice based curriculum through two types of learning 1) *user based learning* and 2) *innovation based learning*. User based learning imparts technical capacity to work with existing technologies (low and high) as well as the tools for analyzing the effects of uptake. Innovation

⁸³ Joshua A Kroll et al, “Accountable Algorithms” (2017) 165:3 U Pa L Rev 633 (limitations on transparency).

⁸⁴ Petra Molnar & Lex Gill, “Bots at The Gate: A Human Rights Analysis of Automated Decision-Making in Canada’s Immigration and Refugee System” (2018) Creative Commons Attribution-ShareAlike 33-36.

⁸⁵ Yoram Dinstein, *Autonomous Weapons and International Humanitarian Law*: Heintschel von Heinegg W., Frau R., Singer T. (eds) *Dehumanization of Warfare* (Springer, Cham 2018)

⁸⁶ Michael Sinclair “Proposed Rules to Determine the Legal Use of Autonomous and Semi-Autonomous Platforms in Domestic U.S. Law Enforcement” (2018) 20:1 North Carolina Journal of Law and Technology, 1.

⁸⁷ Jack Balkin, *The Path of Robotics Law*, (2015) 6 Calif. L. Rev.. 45, 46

⁸⁸ For similar recommendations, see R. Michael Cassidy, *Reforming the Law School from the Top Down* (2014) 64 Journal of Legal Education, 428

based learning shows students how to think about design and adoption of new technologies. When these learning approaches are provided in combination with positivist and constructivist approaches outlined above, students should be better trained to identify when the core outcomes of a given law are altered by procedural or computational technologies.

A. User Based Learning

User based approaches in education are those driven by the need to prepare students to use technologies already developed and relevant to practice. These may include processes and forms commonly used for court filings or regulatory approvals (low-tech) as well as digital and computational methods (high tech). Ryerson's user outcomes are achieved from sprinkling technology use throughout the curriculum as well as creating intensive courses in which students engage deeply with its social implications and future needs. I outline these curricular changes in the next few paragraphs and relate them to similar efforts in legal education.

Like most law programs, Ryerson's first-year curriculum requires students to enroll in contracts, torts, property, criminal, constitutional, and administrative law, all of which are delivered in semester length classes. In this first year, proficiency in issue identification, rule identification, and rule application is ensured through traditional legal exams. However, first year classes are co-taught with practitioners who will introduce students to doctrinal applications and the 'low tech' technologies of law. Obvious examples would be teaching first year contract law in conjunction with an actual contract that students must interpret and rewrite. Similarly, property law could be taught using electronic filing under the *Personal Property Security Act* or submissions to the *Landlord and Tenant Board*. This undertaking reflects a broader shift to include transactional learning in the legal curriculum early and often.⁸⁹ This includes the interpretation and drafting of low-tech contracts,⁹⁰ and transactions in business associations.⁹¹

Teaching first year students to use law and regulation to promote stakeholder interests in relation to technology is one obvious opportunity for focusing student attention on technology. Indeed, questions about the impact of techno-scientific innovations on particular stakeholders have occupied scholars, practitioners and educators for decades and have manifested in the study of expertise, privacy, risk, bio ethics, and numerous other questions linked to the relationship between law and science.⁹² As Kieran Trantner has noted in his survey on the literature, the great

⁸⁹ Craig Scott, "A Core Curriculum for the Transnational Legal Education of JD and LLB students: Surveying the Approach of the International, Comparative and Transnational Law Program at Osgoode Hall Law School" (2004-2005) 23 Penn State Intl L Rev 757

⁹⁰ West, Glenn D., Teaching Contract Drafting through Caselaw—A Syllabus and A Collection of My Musings about Contract Drafting Based upon Recent Cases (August 29, 2017). Available at SSRN: <https://ssrn.com/abstract=3028971> or <http://dx.doi.org/10.2139/ssrn.3028971>

⁹¹ Constance C. Wagner, Training The Transactional Business Lawyer: Using The Business Associations Course As A Platform To Teach Professional Skills (2015) 59 St. Louis University Law Journal 745.

⁹² Science and technology Studies has given this scholarship an intellectual home in the social sciences but its influence on lawyers remains an open question. Examples include, Alvin M Weinberg, "Science and Its Limits: The Regulator's Dilemma" (1985) 2:1 Issues in Science & Technology 67; D Collingridge, "Incremental Decision Making in Technological Innovation: What Role for Science?" (1989) 14:2 Science, Technology & Human Values 141-162; S Jasanoff, *Science at the bar* (Cambridge: Harvard University Press, 1995) at 275; S Jasanoff, *Making Order: Law and Science in Action. The Handbook of Science and Technology Studies*, 3rd ed by E Hackett et al, (Cambridge: MIT Press, 2008) at 761-786.

bulk of law and technology scholarship is framed by the investigation of how law deals with a crisis event; a specific technology that generates problematic technological futures.⁹³ A focus on social media and its effects on privacy, copyright, misrepresentation, and theft is typical of this work.

The use of law and regulation to address technology reflects a positivist approach to doctrinal interpretation. A typical positivist approach to teaching technology would be to identify patterns in a feedback loop that impact established rights otherwise protected by statute or the common law. Once identified, students are taught to generate a legal interpretation that reasserts the privilege of that stakeholder or rights holder or provides interpretations of related doctrine that explain why others' rights should instead be privileged.⁹⁴ The outcome of this teaching approach is to teach law and legal reasoning as a framework that can convert social entitlements, including entitlements created by technology, to legal ones.

The prevalence of doctrinal learning in relation to technology illustrates that a deeply positivist training in law is key to addressing technology's effects on legal systems. This is because, in order to learn substantive technology law, students must obtain knowledge about the structures needed to understand, advise, and deliver law. Legal education therefore requires students to make presuppositions about vocabulary, logical structures of reasoning, the relevance of basic concepts upon which law relies (i.e. social norms), as well as the relevance of institutions or complex concepts that constrain and define law's application (i.e. democracy, justice).⁹⁵ When addressing the effects of technology, law is capable of providing reasoned responses.

Teaching students to identify legal impacts from technology can also be achieved through constructivist (or socio-legal) approaches to law. A constructivist approach requires students to use deep descriptions of the law's force and effect to understand its systemic characteristics. It involves turning student attention to the non-legal contexts in which law operates (or fails to operate) in order to provide a more realistic understanding of law's operation.⁹⁶ As a result, students learn how to analyze the systemic effects of law, mainly through reading socio-legal scholarship that details such effects, going on student excursions to observe impacts, and discussing how law is experienced by different stakeholders.

As it pertains to using technology, constructivism is already used in schools to support clinical and simulated practice. For example, Paul Maharg describes a simulated practice program at the

⁹³ I borrow this phrase from Kieran Tranter, "The Law and Technology Enterprise: Uncovering the Template to Legal Scholarship on Technology" (2011) 3:1 L Innovation & Technology 31-83. For a survey of scholarship and journals devoted to the issue of law and technology, see Kieran Tranter, "The Law and Technology Enterprise: Uncovering the Template to Legal Scholarship on Technology" (2011) 3:1 L Innovation & Technology, 31-83. In this article, Tranter identified at least 92 specialist law journals dedicated to law and technology and focused on the law of specific technologies

⁹⁴ Kieran Tranter, "The Law and Technology Enterprise: Uncovering the Template to Legal Scholarship on Technology" (2011) 3:1 L Innovation & Technology 31-83

⁹⁵ Ibid.

⁹⁶ See, for example, Jerome Frank, "Why not a Clinical Lawyer-School?" (1993) 81 University of Pennsylvania Law Review 907; Jerome Frank, What Constitutes a Good Legal Education? (1933) 19 ABA J 723.

Glasgow Graduate School of Law that uses, what he calls, transactional realism.⁹⁷ A typical approach would involve producing law and legal systems, including the study of guidelines, policies, forms, and processes through which the pragmatics of law are implemented. In this approach, law schools use the technologies of practice in combination with social science methodologies to provide students with a critical understanding of the law and technology interface. Just as they would for any social issue, students are expected to use these descriptions to identify social needs and convert them to claims about the way law is accessed or implemented.

Second year courses at Ryerson are organized around intensive doctrinal learning and simulated practice that reflect a similar approach to using technology. Students will work in groups of seven as part of a simulated firm and produce practice appropriate work related to ten key subjects. The second year modules currently relate to the business of lawyering, business law and consumer relations, wills and estates, civil procedure, evidence, international private law, legal innovation, family law, advocacy, and international public law.

Simulations in these courses are expected to help students use doctrine in combination with the technologies used to practice law. They might be presented with a legal claim that implicates technology and its social impacts, as discussed in the socio-legal literature on technology canvassed above. Alternatively, they could require students to use practice management technologies or technologies that are used to access the law. For example, students will be trained in how to use low-tech technologies in legal practice, including Word, Excel, Pdf, and Google Docs in addition to the legal technologies that are the mainstay of legal practice (Quicklaw and Westlaw) and those emerging but quickly defining the field (ediscovery).

Much of what Ryerson will be doing has been experimented with in various programs. What differentiates this approach is Ryerson's centralized effort to act upon recommendations to teach all students (not just those who self-select) how legal practice makes unique uses of these applications. For instance, Simon Canick argues that because many courses still do not explicitly incorporate even basic technologies, a course on how to take effective legal notes (i.e. interview notes, discovery notes etc.) on laptops would signal curricular change.⁹⁸ Canick notes that word processing and power point appear so basic that most schools overlook express training but firms report that students begin practice without a sophisticated ability to use them to the benefit of their clients.⁹⁹ These changes recognize that technology (high and low) is a mainstay of legal practice.¹⁰⁰

⁹⁷ Paul Maharg, *Transforming Legal Education: Learning and Teaching the Law in the Early Twenty First Century* (Routledge, 2007) 14.

⁹⁸ Simon Canick, "Technology in Law School Curriculum" (2014) *Cap. U. Law Review* 42, 663,

⁹⁹ Monica Goyal, "Tech Competence a Must", *Canadian Lawyer* (1 September 2017); Catherine Sanders Reach, "Essential Tech Skills for the New Lawyer" (2 November 2017), *Before the Bar* (blog), online: <<https://abaforlawstudents.com/2017/11/02/essential-tech-skills-for-the-new-lawyer/>>.

¹⁰⁰ For the lack of credible description on what lawyers presently do now or in the future and the need to study legal practice in order to evaluate legal education, see Harry Arthurs, "The Future of Legal Education: Three Visions and Prediction" (2013) 51 *Alta L Rev* 705, 706; Keny Grady, "Our Confusion Over What is a Lawyer: A Profession Facing an Existential Crisis", (June 6, 2018) *Algorithmic Society*, online: <<https://medium.com/the-algorithmic-society/our-confusion-over-what-is-a-lawyer-c827732a5f2>>.

This approach to technology learning reflects what Maranville calls spiral education - the provision of multiple opportunities to train in the overlap between doctrine and practice.¹⁰¹ Skills that arise in e-discovery simulations illustrate this interface. Characters in simulation produce emails, use e-discovery rules, analyze evidence cases, use best practice guides and ethics rules, plan conferences, prepare interrogatories, and draft discovery requests and replies that reflect a range of digital sources.¹⁰² Training in the use of communication technologies will arise through the generation of reports and analysis used in legal practice. Simulation could be directed at reporting requirements, project management, risk assessment and management, regulatory advocacy, international advocacy and policy advising. Moreover, students might produce different types of simulations, documents or videos at various stages of law school.

Simulation at Ryerson is also meant to scale up the learning students traditionally obtain through a placement in a legal clinic. While the program exposes students to a range of fields, rather than just one, the learning objectives are similar. On the job, students must familiarize themselves with the substantive law needed to offer advice as well as become proficient in the procedural and documentary requirements of practice.¹⁰³ Naturally, there are impediments that differentiate simulation from clinical learning. As Barton, McKellar and Maharg point out about their own experience with transactional learning at the Glasgow Graduate School of Law, simulation cannot provide the same authenticity as real clinical work.¹⁰⁴ By authenticity, they mean the complexity and variation that arises in reality and the dynamic interaction between the learner, the task and the environment. Nonetheless, the authors describe successful outcomes where drafters constantly attend to the learning objectives and capabilities needed to mimic authentic practice. The detailed insights of those using simulation, will be helpful in reviewing and revising the technology learning outcomes Ryerson will undertake.

Concern with simulation and (by association practice readiness) is that it places too strong an emphasis on the mechanics of practice, at the expense of other valuable lessons.¹⁰⁵ Essentially, the criticism is that secondary education is not an optimum site for a series of "how-to" courses. Rather than spend the limited time students have in the program dealing with filing forms, the argument is that students should be taught how to analyze law, the role of law in socio-economic and political struggles in which they will practice, and their role as advocates in those struggles. There are doubts that any practice based curriculum could produce thoughtful outcomes by students.¹⁰⁶ Repetitive, systemized practice is not often associated with the type of critical and

¹⁰¹ Deborah Maranville, "Infusing Passion and Context into the Traditional Law Curriculum through Experimental Learning" (2001) 51:1 J Leg Educ 51

¹⁰² Simon Canick, "Technology in Law School Curriculum" (2014) Cap. U. Law Review 42, 663

¹⁰³ For examples, see Patience A Crowder, "Designing a Transactional Law Clinic for Life-Long Learning" (2015) 19 Lewis & Clark L. Rev. 413

¹⁰⁴ Karen Barton, Patricia McKellar & Paul Maharg, "Authentic Fictions: Simulation, Professionalism and Legal Learning" (2007) 14:1 Clinical L Rev 143.

¹⁰⁵ Harry Arthurs, *The Political Economy of Canadian Legal Education* (1998) 25 Journal of Law and Society 14; Harry Arthurs, *Poor Canadian Legal Education: So Near to Wall Street, So Far from God*, (2001) 38 Osgoode Hall Law Journal 381; Harry Arthurs, *The State We're In: Legal Education in Canada's New Political Economy*, (2001) 20 Windsor Yearbook of Access to Justice 35

¹⁰⁶ See the critiques of legal education reform from Harry Arthurs: Consultative Group on Research and Education in Law, *Law and Learning: Report to the Social Sciences and Humanities Research Council of Canada* (Ottawa: The Social Sciences and Humanities Research Council, 1983) [Arthur Report]; Harry W Arthurs, "The State We're In: Legal Education in Canada's New Political Economy" (2001) 20 Windsor YB Access Just 35.

creative thinking needed to identify problems with law and legal practice and to identify solutions.¹⁰⁷

This is a cogent argument. If the mechanics of practice are less intellectually demanding than a curriculum dedicated to analytical jurisprudence and critical thinking, then law students, who are some of the brightest and most motivated in the country, should be able to graduate and learn the mechanics from the profession quickly. This division of duties has defined legal education since it was first integrated into university education. Universities will teach students how to think (using Landgellian methods supplemented by constructivist critique) and the profession will teach the pragmatics of practice. Both are valuable and necessary. Changing market demands, arising from the profession's diminishing interest in training entry level lawyers, does not alter the pedagogic value of university education.¹⁰⁸ Nonetheless, with this gap in training deepening, the question whether law schools can do both persists.

Reflecting on increased efforts to make experiential experiences a greater part of education at Osgoode Hall Law School, former Dean, Lorne Sossin notes that while experientialism can degenerate into a practitioner oriented series of "how-to" courses, or reflect the needs of markets more than the public interest, it need not do so. In fact, he argues that experiential education has the potential to promote critical thinking about law and the impact of markets more effectively than its classroom doctrinal or theoretical counterparts.¹⁰⁹ This includes a commitment to socio-legal learning that grounds critical thinking.

Ryerson's response to this concern has been to make space in the curriculum through intensive learning. Intensive learning is expected to maintain key learning outcomes that law schools are excellent at providing while making room in the curriculum for additional skills. It does this through two types of learning methods. The first is boot camps. Ryerson has made space in the semester to deliver five intensive boot camps on non-doctrinal skills. As it stands now, Ryerson has proposed five boot camps on 1) career management, 2) legal technology, 3) accounting and financial analysis, 4) social innovation, and 5) emotional/cultural quotients. These are compulsory one-week units on subject matter chosen to be essential to professional success and future innovation. The second type of intensive learning is block learning. In the second year of enrollment students move away from semester-length classes and towards 2 week block learning. In this year, each course is to be delivered as a two-week module of substantive content and associated practice. Ryerson has maintained the average number of total teaching hours for the substantive material, requiring students to attend 3-hour lectures each morning over a two-week period and engage in approximately 3 hours of practice simulation in the afternoons.

The degree to which Ryerson uses intensive learning sets it apart from other programs offered in Canada. However, it is primarily used in the program to make room for other pedagogic changes related to simulated practice and the introduction of complementary skills. Its success presumes student ability to learn doctrine quickly by second year and begin application in practice based learning. Ryerson has consciously maintained semester learning in the first and third year but its

¹⁰⁷ Margaret Thornton commodifying etc.

¹⁰⁸ For a discussion of market forces, see Harry Arthurs, *Law and Learning in an Era of Globalisation* (2009) 10:7 *German Law Journal*, 629.

¹⁰⁹ Lorne Sossin, "Experience the Future of Legal Education (2014) 51:4 *Alberta Law Review*, 849, 856

adoption of intensive modules reflects an expectation that students can learn the substantive content in shorter periods of time in order to make room for applied material.

Many law schools have made some use of intensive learning.¹¹⁰ Short courses, moots, clinics, visiting lecturers, integrative weeks etc. have all been used sparingly. The limited scholarship on its use indicates that while students are highly engaged, the method may not allow sufficient time for reflection and analysis of what is being taught, that teachers may not cover material in sufficient detail; and that it can favor convenience over substantive learning outcomes.¹¹¹ These insights raise questions for incorporating intensive learning into the curriculum, Questions include, do students have sufficient time to process the quantity of material studied? Is the quantity provided necessary or is it insufficient for the learning objectives? Is the depth of the material sufficient covered sufficient for reflection? Does learning provide spiral education, so students are building on knowledge and skills or is material experienced as fresh every single course? Are students more stressed by intensive learning and if so, is it a manageable levels of stress? Are there supports in place for those who can't learn at the same speed as others? Does the intensive learning actually reflect practice based learning and if so, is it only the early years of practice? Does intensive learning methodologies provide skills for students for those early years? Ryerson's use of intensive learning should attend to feedback received from its use in other disciplines, which cautions careful use.

B. Innovation Based Learning

As the dominant methodologies of legal education, positivism and constructivism are essential to any user based reforms aimed at improving professional abilities in law and technology. Nonetheless, it is arguable that they are not sufficient. As Trantner argues, constructivism certainly provides a more theoretically sophisticated approach than positivism to thinking through the role of law in addressing technology and a critical description of its workings. Nonetheless, both are limited by their orientation towards law as a remedial tool.¹¹² One solution is to have legal education train lawyers to design and market programs that overcome these problematic effects. That only a limited number of legally trained people are thinking about design and converting those thoughts into useable programs gives some indication of how much more law school could contribute to this development.

In contrast to user based learning, innovation based learning in Ryerson's program describes learning that teaches students to create new processes, forms, digital systems, and computational methodologies for legal practice. This also includes curricular attempts to teach how to think about the role of legal technologies in achieving positive social good and the institutional

¹¹⁰ Paul Maharg, *Transforming Legal Education: Learning and Teaching Law in the Twenty First Century* (London, UK: Routledge: 2007); Carel Stokler "Rethinking the Law School: Education, Research, Outreach and Governance" (Cambridge University Press, 2014)

¹¹¹ Ian Ramsay, *Intensive Teaching Law Subjects*, (2011) 45:1 *The Law Teacher*, 87-100; A Kuiper, I Solomonides, L. Hardy, "Time on Task in Intensive Models of Delivery" (2015) 36:2 *Distance Education*, 231-45

¹¹² Kieran Tranter, *The Law and Technology Enterprise: Uncovering the Template to Legal Scholarship on Technology* (2011) 3:1 *Law Innovation and Technology*, 31-83

impediments to taking up those technologies.¹¹³ This use of the term, innovation, should not be so broad as to include any change in law, policy, or programming.¹¹⁴ Rather, it seeks to differentiate the task of advocating through established institutions towards the role of innovation in determining how law is organized through emerging technologies.

Ryerson delivers innovation related curriculum through compulsory modular learning about technological design, including topics such as learning how to code, how to undertake data analytics, applications of artificial intelligence (AI) and quantitative legal prediction (QLP). In its legal design course, students are taught how to think critically about legal problems and to think creatively about using technologies to solve them. In its coding class, students will be taught basic skills in data analysis, algorithmic choice, and the use of computer code to achieve a deeper understanding of the information before them.

Reflections from those who have conducted technology clinics or courses such as these are sparse but suggest that a two prong approach (practice orientation and analyzing the procedures of law) is at the heart of effective curricular change.¹¹⁵ For example, Columbia currently offers a course, Data and Predictive Coding for Lawyers, which introduces students to the empirical methods currently used in predictive coding and statistical inference for law. This experiential course introduces econometrics and machine learning, with a focus on qualitative reasoning, rather than mathematical derivations.¹¹⁶

At its core, Ryerson's approach provides some technical training but should also illustrate that coding is political. New methods and processes shift the accumulation, creation and production of knowledge. A technological focus should increase understanding about the ways that technologies create new producers of laws (who are largely hidden from users). Added to modules on non-legal skills are others that go to the heart of legal practice in relation to legal technologies. These include modules on the business of lawyering and legal innovation (including technological, business and social innovation). These courses include subject matter, such as the introduction of new technologies within firms as well as training in bringing technology to market.

Innovation training will also be supported by Ryerson through a capstone design module in which students identify an emerging legal problem and design a technological solution. The requirement that students take a design thinking course orients students towards creative

¹¹³ Lorne Sossin, "Law School as Social Innovation" (2017) 48 VUWLR 225; Lorne Sossin & Devon Kapoor, "Social Enterprise, Law and Legal Education" (2016) Osgoode Hall LJ 997. (describing a shift in legal education to an outward focus on problem solving, community engagement, law reform, social and economic innovation and putting ideas into action for social good).

¹¹⁴ For example, see the use of the term to describe how law can respond to the challenges posed to development objectives through developing the law. Hassane Cisse et al, eds, *The World Bank Legal Review: Innovation and Empowerment for Development*, 5th vol (Washington: The World Bank, 2013).

¹¹⁵ Karen Barton, Patricia McKellar & Paul Maharg, "Authentic Fictions: Simulation, Professionalism and Legal Learning" (2007) 14:1 Clinical L Rev 143

¹¹⁶ This is a course taught at Columbia Law School by Joshua Mitts, *L8013 Data and Predictive Coding for Lawyers*, (Columbia Law School) online: <<https://www.law.columbia.edu/courses/sections/22987>>.; Also see, Aaron Goodman, "Predictive Coding: A Better Way to Deal with Technically Stored Information Litigation" (2016) 43:1 American Bar Rev. For similar course description, see offerings by Northwestern University Pritzker School of Law, Quantitative Analysis for Lawyers.

processes as a foundational way to approach law.¹¹⁷ Few students will go on to design new technologies within the program or in practice. However, Ryerson joins other disciplines, such as business and engineering, in seeking to elicit different kinds of thinking from their students. Iterative experimentation in the class room treats innovation as a discipline that teaches how to find the right problems to solve, develop solutions through prototypes, and test them.

One outcome of innovation learning that attends to systemic effects should be to teach students to provide better client service to innovators they will service or those clients impacted by innovation. In the client service model, students are taught about how they can understand technical issues in order to be better lawyers for those who are innovators. This is a model often associated with how law schools teach subjects such as intellectual property law – where lawyers are expected to possess sufficient knowledge of a technology to commercialize and protect it. However, teaching how to represent impacts to rights should be informed by what it means to operationalize a right when it is conceivable that only programmers can explain what data points were considered and how they were weighted in a given decision. The high unlikelihood of programmer participation in dispute resolution is made even more complicated by the role of machine learning in technological development. Where programs rely on machine learning, they create processes that do not include the programmer in the decision to incorporate new factors and their evaluation.¹¹⁸ This requires advocacy beyond identifying new impacts that are irreconcilable with pre-existing rights.

Lack of technical capacity in the design of emerging technologies has been identified as a particular challenge for those tasked with meeting stakeholder goals.¹¹⁹ For example, the Treasury Board of Canada Secretariat has recently highlighted a lacuna in the skill set of Canadians related to technology. It has noted that government will continue to adopt emerging technologies in its service and management practices. However, should it do so without complementary hiring of employees capable of understanding, evaluating, and explaining these technologies, it will be destined to become reliant on the technical capacity of the private sector. With the private sector in control of technologies, governments and the public will become increasingly beholden to pay the costs dictated by a small group of providers and comply with the sectors' competitive interests to keep source code closed and unavailable for widespread scrutiny.¹²⁰ While the Treasury Board focuses on the need for technical oversight, purportedly separating out data analysts and data scientists from those with substantive legal oversight, these organizations could be served by those trained in both fields.

The private business sector (i.e. large and small businesses) faces the same problem with the use

¹¹⁷ For an example of curriculum, see the Duke Centre for Law & Technology and courses on law and technology at Duke Law <https://law.duke.edu/dclt/>.

¹¹⁸ For discussion see Petra Molnar & Lex Gill, "Bots at The Gate: A Human Rights Analysis of Automated Decision-Making in Canada's Immigration and Refugee System" (2018) Creative Commons Attribution-Share Alike at 49-54.

¹¹⁹ Canada, Treasury Board of Canada Secretariat, *Responsible Artificial Intelligence in the Government of Canada* Digital Disruption White Paper Series (Ottawa: Treasury Board of Canada, 10 April 2018) at 29; For discussion in relation to legal practice, see Law Society of Ontario, *Practice Management Guidelines on Technology*, Ottawa: LSO <<https://lso.ca/lawyers/practice-supports-and-resources/practice-management-guidelines/technology>>.

¹²⁰ Canada, Treasury Board of Canada Secretariat, *Responsible Artificial Intelligence in the Government of Canada*, Digital Disruption White Paper Series (Ottawa: Treasury Board of Canada, 10 April 2018) at 29.

of legal technologies that it poorly understands and does not control. The future development of smart contracts illustrates this gap. While smart contracts self-execute and supposedly limit the need for lawyers, outstanding questions about the data points and conditions upon which those contracts self-execute and the verification methods to be used implicate the need for new types of analysts: those able to evaluate the technology's value to different types of contracting parties and stakeholders. Lawyers able to work with and analyze the legal implications of complex technologies and ideally improve them would serve an important function in an automated future.

Lawyers should also be able to advocate for competing rights and entitlements within software programs.¹²¹ Therefore, teaching students how to advocate for those impacted by programs that give primacy to one interpretation over another could involve teaching them how to educate the courts on how to control technologies that create new procedures. It is a rare judge that would order the restructuring of a 'sometimes' problematic technology without an alternative in mind. Advocacy for the adoption of critical or alternative technologies – ones that promote the adoption of different computational techniques – could preserve primacy to legal rights and policy preferences that are compromised by the design of particular systems.¹²²

A second outcome of innovation learning that attends to systemic effects is to provide students with the opportunity to be innovators themselves. As used here, the term legal innovation is implicitly tied up with creativity and design thinking. Liedtka, Salzman, and Azer define design thinking as a problem-solving approach with a unique set of qualities: it is human centred, possibility driven, option focused and iterative.¹²³ Rather than confine notions of innovation to big breakthroughs by special people in relation to aesthetics or technology, they see the emergence of democratized innovation, where everyone can use design thinking as a common language by which to solve problems. It encourages distinct shifts in mind-sets and behaviours. It is not only about the design of products or even user experiences. It is a problem-solving process that can map onto other professional methodologies.

Scholars, such as Paul Gowder, call for building innovations that allow subordinated groups to use collective action to advocate for different kinds of legal entitlements. Rather than build innovations that make legal conflict cheaper and supposedly more accessible, they advocate for tools that can advance more egalitarian access to justice. Gowder illustrates his point by comparing technologies that make highly invasive practices by powerful actors more efficient and those that allow the underprivileged to use data to promote collective action. Examples of the accessible technologies are the Miranda App, which provides suspects with a computerized message,¹²⁴ automated credit reporting that limits access to funds,¹²⁵ or smart cities that

¹²¹ Kieran Tranter, "The Law and Technology Enterprise: Uncovering the Template to Legal Scholarship on Technology" (2011) 3:1 L Innovation & Technology 31-83.

¹²² Joshua A Kroll, et al, "Accountable Algorithms" (2017) 165:3 U Pa L Rev 678.

¹²³ Jeanne Liedtka, Randy Salzman & Daisy Azer, *Design Thinking for the Greater Good: Innovation in the Social Sector* (Columbia University Press, 2017)

¹²⁴ Andrew Guthrie Ferguson & Richard A Leo, "The Miranda App: Metaphor and Machine" (2017) 97 BUL Rev 935.

¹²⁵ Frank Pasquale & Glyn Cashwell, "Four Futures of Legal Automation" (2015) 63 UCLA L Rev Disc 28.

authorizes extensive surveillance in exchange for market access.¹²⁶ In contrast, collective action technologies involve creative thinking about overcoming disincentives to individual action. For example, Gowder conceives of a service that allows cancellation of automated standard form contracts with discriminatory clauses where a critical mass of claimants is reached. This aims to overcome a company's disinterest in individual cancellations but intense interest in large-scale cancellation. Gowder sees this as an abstraction of the class action; a technology that allows individuals to overcome impediments to access through collective action.

A third outcome of innovation learning that attends to systemic effects is to train students to be critical users of innovation. As a term, legal innovation is morally neutral or agnostic, in so far as it can be used to promote technologies that could be beneficial or harmful in effect. Teaching it in a law school requires attendance to the aims of innovative design and who will assume its costs and benefits. Studies on design thinking and governance illustrate these processes.¹²⁷ For example, in a recent study by McInnis et al, the authors document their use of crowdsourcing law and policy to rethink crowd-civic systems. In their workshop, they used design thinking to address both the opportunities and challenges of crowd-civic systems to develop best practices for public engagement with law and policy.¹²⁸ This study focused attention on several key questions, such as whose views are prioritized in crowd-civic systems, how the results are used, how results from different systems can be compared, what barriers and risks exist etc. A study by Fraser and Roberge describes legal design as a problem-solving model that uses mindset, thinking, and action for client benefit.¹²⁹ They sketch out a double loop learning process that differs from a focus on risk assessment. These differing models reflect a general consensus that design lawyering and how to think about its future is in its infancy.

Naturally, some are skeptical that innovation training can be incorporated into legal education. Debates about the value of technology oriented education are largely based on accounts by law instructors. For example, Ken Grady, who reflects on his teaching in the blog, *An Algorithmic Society*, is a proponent for some technological training but argues for limits due to student inability, how quickly technology skills become outdated, and the limited space in the curriculum.¹³⁰ Grady's comments reflect concern that students do not have the necessary foundation in math and statistics to effectively engage in these courses. The inference is that the course material will either be too facile to be of any practical use or too complex to be accessible. This is a fundamental question about capacity.

Drawing on his experiences, Daniel Linna Jr addresses the widely voiced concern that law students are not usually well prepared to undertake the statistical components of quantitative

¹²⁶ Jathan Sadowski & Frank Pasquale, "The Spectrum of Control: A Social Theory of the Smart City", online: (2015) 20:7 *First Monday* online at <<http://firstmonday.org/article/view/5903/4660>>.

¹²⁷ Michael Howlett, "From the 'old' to the 'new' policy design: design thinking beyond markets and collaborative governance" 47:3 (2104) *Policy Sciences* 187-207.

¹²⁸ Brian McInnis et al, "Crowdsourcing Law and Policy: A Design-Thinking Approach to Crowd-Civic Systems" (2017) Companion of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing.

¹²⁹ Veronique Fraser & Jean-Francois Roberge, "Legal Design Lawyering: Rebooting Legal Business Model with Design Thinking" (2016) 16 *Pepp Dispute Resolution LJ* 303.

¹³⁰ Ken Grady, "What Teach Legal Tech Could Mean: The Balance Between Going too Far and Not Far Enough", (30 April 2018) *The Algorithmic Society*, online: <<https://medium.com/the-algorithmic-society/what-teaching-legal-tech-could-mean-bf31cf0d4d10>>

analysis.¹³¹ He argues that this knowledge gap is what these courses address - learning how to use statistical analysis and how to use the tools used to analyze and present that data, such as R, Python, and Tableau. To his mind, any increased ability to work with statistical sampling for fraud, algorithms for sentencing, data-driven transactions, or advocacy based on statistical arguments will be of value to practice.

Others have raised concerns with the ability of students to complete design projects within a semester. Stadt et al highlighted this concern on a course at Chicago Kent in which students use A2J software to generate A2J Guided Interviews.¹³² In order to overcome time restrictions, they recommend using established design software and assigning projects with a very narrow scope. They also advocate strongly for focusing on projects that improve access to justice for underserved populations, as this involves practice based skills, including just-in time learning, intake triage, document assembly and providing legal information to low income people.

These concerns explain why law schools opt to adopt a think tank or centre, as a way of analyzing the effect of technology on the development of law or create specialty programs for interested students.¹³³ However, limiting education reform in this way would require being completely oblivious to how law and legal practice is already moderated by technology. The discussion provided in this paper evidences that confining technology's relevance to a small technocratic few is increasingly unrealistic.

III. Conclusion

To train lawyers to provide the same services that the generations before them have provided is necessary but not sufficient. To find a way to incorporate technology (as a tool, as a discourse, and as a social lens) into practice seems to be the way to move beyond the current model. Should it teach the effects of technology on law as well as practice, Ryerson could lead thinking about how to train those who will promote or critique the effects of technologies on the socio-legal context in which they operate. Creating space in the traditional legal curriculum to deliver a systemic approach to law based on technological learning will be key to developing critical thinking about legal service and law production as a system in and of itself.

¹³¹ Daniel W Linna Jr. "Why Law Students Should Take Quantitative Analysis: Big Data, Algorithms, Courtrooms, Code and Robot Lawyers" (22 October 2016) *LegalTech Lever* (blog), online: <<https://www.legaltechlever.com/2016/10/law-students-take-quantitative-analysis-big-data-algorithms-courtrooms-code-robot-lawyers/>>.

¹³² Ronald W Staudt & Andrew P Medeiros, "Access to Justice and Technology Clinics: A 4% Solution" (2013) 88:3 *Chicago-Kent L Rev* 695.

¹³³ For example, in response to the demand for interdisciplinary research in this field, New York University has launched the AI Now Institute, a research center dedicated to examining the social implications of artificial intelligence. The Ethics and Governance of Artificial Intelligence Initiative, a hybrid research effort and philanthropic fund led jointly by the Berkman Klein Center at Harvard University and the MIT Media Lab, is another example of academic development in the field. See: "AI Now," *AI Now Institute* <<https://ainowinstitute.org/>>; "The Ethics and Governance of Artificial Intelligence Initiative" <<https://aiethicsinitiative.org/>>; and Christopher Bavitz & Kira Hessekil, "Algorithms and Justice: Examining the role of the state in the development and deployment of algorithmic technologies", online: (July 2018) Berkman Klein Centre <<https://cyber.harvard.edu/story/2018-07/algorithms-and-justice>>; Canadian Institute for Advanced Research, "Pan-Canadian Artificial Intelligence Strategy" <<https://www.cifar.ca/ai/pan-canadian-artificial-intelligence-strategy>>; Ulster Centre for Legal (not sure if something missing here)

What is happening at Ryerson is not simply a pragmatic effort to train students to service clients simply and less expensively. The vision presented here is much more complicated. Once one begins to approach the idea that law is deeply implicated in the technologies used to develop it, then what is at stake is the essential role that lawyers must play in understanding those technologies and what it does to the interpretation, application, delivery, and transformation of law. However, layered into this program is a symbiotic effort to question how to teach legal innovation and how to teach those who will be at the forefront of understanding its effects. If it can achieve its best self, Ryerson and other law schools that adopt a technological focus should respond to societal demands for access to justice with lawyers who can both use and make the technology needed to achieve it.

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