The Need **for Lawyers**

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1. Introduction

It is becoming a frequent refrain that the future will not need lawyers, or at least not as many of them. This is the argument made by the Susskinds in their book *The Future of the Professions*[2] and it forms part of current media stories on automation and job losses.[3] Predicting the future is generally unwise, so this paper does not challenge those forecasts directly. Instead it makes a normative claim that runs counter to these predictions – that society is better off having people with legal training in an increasingly automated future.

It also makes a more specific point, being that a kind of lawyer that will increasingly be needed is one that has sufficient grasp of these new technologies to understand the ways in which they support or challenge fundamental legal norms and values. This does not mean that every law student should learn how to code, but it does mean that legal education should include opportunities to reflect on the ethical, legal and social implications of increasingly prevalent technologies. It also highlights the importance of having

sufficient numbers of legal graduates with interdisciplinary expertise that enables them to make more specific and targeted critiques in relation to particular applications of artificial intelligence and technology and to build systems that will incorporate the kinds of fundamental values that are a core part of a legal education.

Lawyers will be needed in the future, but only if they can work effectively alongside automated processes, with a critical awareness of their limitations. We will need lawyers to establish governance frameworks for automated decision-making, to construct expert systems creating legal documents and providing legal information, as well as to understand the relationship between intentionality in a contract and automated processes (including "smart contract" elements). Despite the rhetoric around automation, new technologies, including artificial intelligence, thus *create* as well as *reduce* legal work. But the lawyers of the future will need to be in a position to understand and challenge the roles that technology plays. And that is a challenge that universities need to take on.

In accordance with the "rule of three",[4] what follows is three sections each comprising three subsections. Section 2 explains why we need lawyers to challenge technology. While arguments about the need to critique and challenge technology are old, the focus here is on the necessary *legal* components of such critique and why this needs to combine with an understanding of the technological context. Section 3 discusses predictions of increased automation of legal services and dispute resolution, arguing that pessimistic job predictions and the issues highlighted in Section 2 combine to pose challenges for legal education. Section 4 explores those challenges further and outlines how my own institution (UNSW Law) is responding. Section 5 concludes.

2. Wanted: Legal knowledge, skills and values

Our socio-technical landscape is constantly changing. While scientific discovery and technological invention, innovation and diffusion are occurring across a range of fields, the implications of the developments in automated

processes and data-assisted decision-making have particularly pertinent implications. These developments, across the fields of artificial intelligence (expert systems, machine learning and contextual adaptation)[5] and information technology more broadly, are changing how decisions are made by individuals, governments and corporations as well as the form taken by transactions. While automation generally supplants human workers and doers (see further Section 3 below), this section will argue that human legal analysis remains crucial as these new socio-technical structures continue to evolve. There is thus still a need for legal expertise in determining how and to what extent transactions, sentencing decisions, administrative decisions and the provision of targeted legal information should be automated, as well as advocating for remedies when technology fails.

2.1 Government decision-making

Governments are increasingly relying on automation to make decisions that affect the lives of individuals.[6] In particular, there is a move towards self-service, where individuals enter relevant information about themselves online, with consequences and benefits automatically determined by the system itself.[7] In principle, the Australian government is concerned that these systems replicate legislative requirements, retain discretion where appropriate or required, and incorporate audit trails and reasons for decision.[8] But there are questions about the ability of administrative lawyers, familiar with doctrines of unreasonableness, irrelevant considerations and so forth, to be able to understand the new "reasons for decision" in order to mount effective challenges.[9]

Automated processes sometimes rely on faulty processes and false assumptions and, where this is the case, these are replicated across more decisions than might have been made by a poorly trained employee.[10] An example in government decision-making affecting many individuals can be seen in the online compliance intervention system created for raising and recovering debts owed to the Commonwealth Department of Human Services.[11] This matched, across individuals, the earnings recorded in Centrelink records with employer-reported income data from the Australian Tax Office.[12] Individuals who did not confirm or update their income online were assumed to earn a fortnightly income figure calculated pro rata from annualised data reported to the Australian Tax Office.[13] The initial letter sent to individuals asked them to confirm their annual income information without explaining the fact that recording the lumpiness of this figure was important to an accurate calculation.[14] Non-transparency as to how the system worked (including the averaging of annual figures to calculate the fortnightly figure) also led to confusion for individuals engaging with the online system.[15] The final result was that some of the debt calculations and hence debt notices were based on a flawed calculation. This example was relatively simple – it does not require significant skills in mathematics, statistics, computer science or machine learning to realise that fortnightly amounts cannot necessarily be deduced from an annual figure. The problem was largely one of program administration, requiring clearer explanations to affected individuals of the importance of entering fortnightly figures online (as well as mechanisms for those who were not computer literate), rather than a coding error.[16]

However, it will not always be so simple to deduce the erroneous assumptions and errors in automated decision-making and decision-support systems used to make administrative decisions. There are at least 29 Commonwealth Acts and instruments that specifically authorise automated decision-making.[17] None of these sets out at the legislative level what is required in terms of the transparency of the system's logic or evaluation of the relevant decision-making programs against fixed criteria. Rather, the processes for evaluating software seem to be internal.

For example, the *Migration Act 1958* (Cth) s 271(1)(l) contemplates a certificate that might be signed stating whether or not a specified computer program was "functioning correctly", which then becomes *prima facie* evidence of the matters stated in the certificate for the purposes of migration proceedings. "Functioning correctly" is defined as producing outcomes that comply with the Act and the regulations and that would be valid if they were personal decisions of the Minister.[18] However, nothing in the Act explains how these matters can be properly challenged in court proceedings or subjected to independent testing. Further, it is unclear how functioning is assessed in situations where a decision is made automatically based on a probabilistic assessment. For example, a program that assumes that J Smith is the same person as John Smith living at the same address might be in line with a data-matching program's statistical parameters, but it could still result in an error. It is not clear whether data matching software in this situation could be certified or how an individual or their legal advisor could be put into a position where they can detect the error. The same issues arise with similar provisions in the *Australian Citizenship Act 2007* (Cth).[19] Evaluation of the functioning of software is ultimately more complex than the duality of correct functioning (or not) assumed in legislation. Obtaining or reverse engineering, and then understanding, reasons for decision from automated decision-makers, will be crucial.[20]

It is likely that automated systems will make errors. These might be systemic, as in the case of the Department of Human Services. However, even programs without similar large-scale problems may still draw wrong conclusions for particular individuals. Without mechanisms in legislation to expose government systems to rigorous independent evaluation and testing, and in light of internal priorities that may focus on cost reduction or debt recovery rather than individual

justice, automation does not reduce the importance of administrative law challenges to government decision-making. Administrative decisions made on the basis of erroneous logic should be challenged whether that logic is human or automated.

To do this, we need lawyers who are able to understand that, while computer programs are not "disobedient", they can rely on erroneous assumptions, contain flawed logic or be programmed to draw inferences that may be right most of the time, but wrong in a specific instance. The code used by the Department of Human Services, for example, functioned in accordance with its programming, yielding accurate results for those with non-fluctuating incomes, but for many individuals the program used the wrong formula to calculate the relevant debt. Even this would not have been a problem had sufficient explanation been given early in the process, encouraging and enabling those with fluctuating incomes to record their information accurately. But where decisions are flawed, administrative lawyers need to be able to interpret automated reasoning and mount an effective challenge.

2.2 Risk assessment tools

In the United States, "risk assessment tools" (relying on correlations in historic data) are employed in bail, parole and most recently sentencing decisions. "Risk assessment" has a long history in criminal justice, having been used in matters such as the management of prisoners. However, its use at earlier points on the process, such as bail applications and during sentencing, is growing. The sales pitch is strong, with companies like equivant (formally Northpointe Inc) marketing its tools directly to judicial officers, district attorneys, court administrators and clerks and public defenders in the United States.[21]

These tools have limitations, most prominently the potential for differential impact on minority communities.[22] In particular, in the United States, African Americans are more likely than whites to be given a false positive score by COMPAS risk assessment software.[23] The discrimination is not necessarily the result of intentional bias or even the use of a race variable in the analysis. A minority community will be disadvantaged where negative correlations applicable to the majority do not apply equally to that minority. Indeed, in some cases, discrimination in practice can only be avoided through a deeper understanding of the impact of historic

human racial bias on data quality and racially distinct causation pathways.

The example of racial bias also highlights a more fundamental challenge that goes to an understanding of *what these tools do* and the lack of alignment with *what courts do*. Tools based on data analytics and machine learning rely on historic data to determine correlative links between particular characteristics or particular survey responses and particular future events (such as that an offender will re-offend when released from prison). A particular offender is compared to people "like" them in various ways and allocated a risk score based on the behaviour of those other people.

There will be occasions where this aligns with what courts do. For example, if an offender has a long history of committing violent assaults then, like other people with similar histories, it may be appropriate for a court to take into account the risk that would accordingly be posed were bail granted. But the *reason* why the logic works in that case is not simply because of the broad empirical fact that people who have been violent frequently in the past are likely to be violent again, but rather because the offender has demonstrated a lack of self-control and there is thus a significant risk that such lack of self-control will manifest again leading to harm. In other words, there is a causal explanation that explains why we treat a defendant with a long history of violent assaults as high risk as well as a connection to the defendant's own actions.

Not every correlation can be fairly taken into account on the same basis. Race, discussed above, is something that our society has determined should not generally be taken into account. [24] But what about other characteristics that might be historically correlated with particular behaviours? Those developing these tools would include anything statistically correlated with relevant behaviour, including physical characteristics such as shoe size.[25] If lawyers do not develop the appropriate specifications and limits for such tools, based on fairness and an understanding of what ought to be relevant in making particular kinds of decisions in the criminal justice system, systems and tools will be designed without taking these matters into account. We need to insist that the metrics are not based purely around predictive accuracy but reflect the nature of the decisions concerned.

The response of judges in the United

States to these tools shows a lack of critical understanding of these tools that can hopefully be pre-empted in Australia. In its 2011 Annual Meeting, the Conference of Chief Justices in the United States came out in favour of risk assessment tools, including their use in the sentencing process.[26] Similarly, in *Wisconsin v Loomis*, the Supreme Court of Wisconsin concluded that partial reliance on a black-boxed risk assessment score in sentencing (affecting probation rather than overall severity) did not violate the defendant's right to due process.[27] None of these discussions and decisions have engaged deeply with the kinds of fundamental questions suggested above. Risk assessment tools are rather treated as a "scientific" means of reducing incarceration with minimal "risk". The judges ultimately deferred to the technical metrics.

We need lawyers with sufficient technical expertise to understand the difference between the logic embedded in these tools and the goals of different decisions in the criminal justice process. Without their clients arguing otherwise, technologists will continue to be concerned primarily with metrics for predictive accuracy.[28] Addressing the questions that these tools pose requires individuals who understand both the legal context and the data-driven, correlation-seeking tools being used. We need judges and lawyers who are in a position to take on this role. This is not only a question for judges and criminal defence lawyers, but also for administrative and intellectual property lawyers in a position to rethink how the law can be adapted to encourage openness in decision-support systems, particularly when they are used by government.

2.3 Automation of lawyering

There are many aspects of traditional legal services that are being automated. While this does replace some legal tasks, legal skills are necessary in the design process to ensure that automated systems are used appropriately.

Legal expert systems provide an opportunity to provide targeted and relevant legal information as an alternative to seeking advice from a human lawyer. Commercial software such as Neota Logic and open source tools such as Datalex make it relatively easy to programme chains of "if…then…" reasoning without computer coding skills. These are being used to increase access to justice and legal information, leveraging the capacities of not for profit and pro bono organisations,[29] as well as by commercial

law firms. Building expert systems requires lawyers with an understanding of relevant areas of law, the ability to conceptualise them as a series of logical propositions and a realisation of the limitations of such an approach in light of vague and contested concepts.

The full impact of blockchain and smart contract technologies on how transactions are recorded and implemented is not yet known. What is already clear is the need for lawyers employing these tools to understand their limitations. This can be illustrated through the fate of the DAO (decentralised, autonomous organisation), which was to operate on the Ethereum blockchain as a stateless, contractless investment vehicle. An "attack" (valid within the code but not within the intention of the founders/investors) led to a so-called hard-fork in the blockchain. This ought to have been foreseeable by those understanding the role that contract law plays in ensuring that agreements are enforced in line with parties' intentions. Someone who says that a contract among multiple parties intended to operate over an extended period of time enacted purely in computer code is a good idea has not read enough contract cases.

What we need are lawyers who have a deep understanding of the fundamental values and commercial interests that our legal system protects and are able to combine this with a practical understanding of the tools that they use to benefit clients. In addition, advocacy by lawyers (as representatives and within organisations) remains crucial in ensuring that technology does not replace fundamental values in a drive for efficiency and progress.

3. Technology replaces lawyers

3.1 Susskind's argument

Richard Susskind, through a series of sole and co-authored books,[30] has articulated his vision of the future of the legal profession. In general, he predicts a future of fewer lawyers as we currently think of them, with tasks being broken down into those able to be done by artificial intelligence, those that lay people can accomplish themselves with online self-help tools, those able to be done by (cheaper) paralegals assisted by technology, and so forth.[31] A similar future, he and Daniel Susskind argue, is likely for all professions based on the provision of "expertise".[32] In justifying his prediction, Susskind focusses primarily on economic drivers for reducing the cost of legal services, the ability to commoditise legal services and decompose them into separate tasks, and the trend towards automation.[33]

My concern here with Susskind is not that he has the wrong answer to the question he poses, which is a prediction as to the nature of legal work in the future, although I have argued previously that what machines offer is not the same as what they replace.[34] My concern here is rather addressed to the question that Susskind does not ask, which is how legal analysis (combined with technical know- how) is particularly important both to society and to clients *because* of the move to automation. As an example of the difference in our approach, consider the following passage from one of Susskind's books:

> Likewise, self-executing contracts, possibly enabled through the currently much-vaunted Blockchain technology, will be able to initiate actions and automatically execute processes and provisions, without directly involving lawyers.[35]

In my view, in this shift to self-executing contracts, lawyers remain crucial. The example of the DAO illustrates the naivety of assuming that automation implies that law is not required here.

Humans entering into contractual relationships intend that this will achieve certain results and will be disappointed where this is not the case. Lawyers will be needed first to provide techno-legal advice that explains the consequences of entering into self-executing contracts including both how the code works and the legal implications where it does not perform as expected. Many clients will be better served by a more sophisticated blend of contract protections and automated execution than was involved in the DAO. Lawyers will also be needed to litigate the disputes where code contains errors, does not perform as expected, or is truly "hacked".

Susskind argues that automation, among other forces, will reduce the need for lawyers. While I do not argue with Susskind quantitatively, I believe that automation will simultaneously increase the need for *appropriately skilled* lawyers advising clients as they navigate transactions and decisions.

Lawyers are good at being sceptical about law – we have seen the sausage factory and know its biases, inefficiencies, and circular reasoning. The technology that takes over from lawyers, whether in the form of machine learning, expert systems or blockchain, is often flawed as well, albeit in different ways. The legal profession of the future may well be smaller, but it will need lawyers who can understand the limitations of law and technology and weave them together in ways that increase efficiency without increasing risk, and ensure clients are protected where code does not perform appropriately.

3.2 Australian Law Firms

Susskind and I agree on the fact that automation is and will continue to increase, and that this has important implications for those entering a career in law. Law firms, in Australia as elsewhere, are drawing on technology to perform tasks previously undertaken by lawyers. One example is Allens, which has put together an application called REDDA, or Real Estate Due Diligence App, to streamline due diligence of lease agreements in the context of real estate transactions.[36] The application is able to extract relevant information from lease documents in order to flag particular issues for further review, thus reducing the need for lawyers to manually scan large numbers of leases.[37] This reduces, in particular, the need to hire junior lawyers, apparently saving the firm up to 6 hours per lease.[38] Similarly, Gilbert + Tobin is using Luminance's artificial intelligence technology for due diligence in mergers and acquisitions.[39]

The Neota Logic platform used as part of REDDA, and other tools for building expert systems, can also automate responses to legal questions, document assembly and some practice management tasks. An expert system asks users a series of questions and, based on the responses given, provides targeted legal information, selects appropriate clauses for insertion into a document and substitutes relevant entity names, or indicates the kinds of legal services that are available to solve the user's problem. These functions can also be combined, as in the case of PLEXUS's "Promotions Wizard" that guides users through state, gambling, social media and alcohol restrictions to ensure that relevant laws are followed, while also automatically generating terms and conditions, obtaining permits and generating reminders.[40] Similarly, LawPath, an Australian company focussed on automatic generation of legal documents, now has a chatbot to assist.[41] As is the case for systems that automate due diligence and discovery, expert systems can capably perform repetitive tasks that were previously undertaken by junior lawyers.

3.3 Impact on law graduates

As illustrated in the previous section, the loss of jobs will impact most on positions for junior lawyers, at least in the immediate future. This is the group that would have otherwise performed time-consuming repetitive tasks requiring relatively low levels of skills and experience, such as due diligence,

discovery and routine legal advice. These roles, while often dull, have been an important means through which junior lawyers could contribute to transactions and litigation, while gaining at least some expertise and experience in these areas through observation.

One solution that is often suggested and may be inevitable over the longer term is to reduce the number of students admitted into law degree programs. Fewer graduate-level jobs will, over time, reduce demand for law degrees, as has been the case in the United States.[42] This is unfortunate, as we need the social benefits that come from having legally trained people ask the questions raised in Section 2. Legal skills are needed not only in the profession, but also in government and industry, at least if we want to avoid sacrificing legal values and virtues on the altar of efficiency and progress. Nevertheless, it is important to recognise that law firms are unlikely to be willing to continue to operate as the practical training ground for future lawyers.

All of this raises profound issues for legal education. Law schools need to expose students to cross-disciplinary contexts, provide graduates that are more immediately useful to their employers, all while still teaching the doctrinal content that continues to be mandatory. If law graduates are to remain employable despite the circumstances set out in this Section, while becoming able to meet new challenges of the type highlighted in Section 2, then legal education needs to change.

4. Legal education

The challenge for legal education is how to train students to work productively (and immediately) alongside artificial intelligence, with a clear understanding of its limitations, while ensuring that sufficient numbers of students are equipped to challenge new technologies from a legal perspective where their use is inappropriate, discriminatory, unfair or contrary to law. Unfortunately, current regulation of legal education is of little assistance.

4.1 The mandatory curriculum and what all law students should learn

The challenge for the current mandatory curriculum is that it does not always ask the right questions. The core requirement for law schools, in terms of ensuring that our students are eligible for admission to practice, remains the "Priestley 11" set out in Schedule 1 of the *Legal Profession Uniform Admission Rules 2015*. These are articulated as "academic areas of *knowledge*" and are focussed entirely on areas of law that students should *know*. The reality is that tools such as Google search and IBM Watson are already better at knowing basic *information* and that future tools will come to "know" more complex or advanced knowledge. Of course, there is more to understanding a topic such as "fiduciary obligations" than knowing information and no expert system can always accurately conclude whether a fiduciary relationship exists in a particular situation. But we need to think about what capabilities students need beyond knowledge, particularly where knowing things leaves our students with a declining competitive advantage over artificial intelligence.

A different attempt to articulate what needs to be learnt within a law degree was the threshold learning outcomes (TLOs) developed by the Learning and Teaching Academic

Standards Project of the Australian Learning and Teaching Council as part of the Tertiary Education Quality and Standards Agency framework.[43] This went beyond knowledge to more complex combinations of skills, such as the "intellectual and practical skills needed to identify, research, evaluate and synthesise relevant factual, legal and policy issues."[44] Also included in this framework are ethics and professional responsibility, thinking skills, communication and collaboration, and self-management. While this is a useful way forward, it is important to recognise that they are designed as minimum requirements.

Preparing lawyers for the future, where they will work alongside automated systems, requires law schools to go beyond the TLOs.

A third set of standards is the PLT (Practical Legal Training) Competency Standards for Entry-level Lawyers, recommended by the Law Admissions Consultative Committee and endorsed by relevant admitting authorities.[45] Although it can be combined with a law degree in some institutions, this is generally a step taken after formal legal education and is thus not discussed further here.
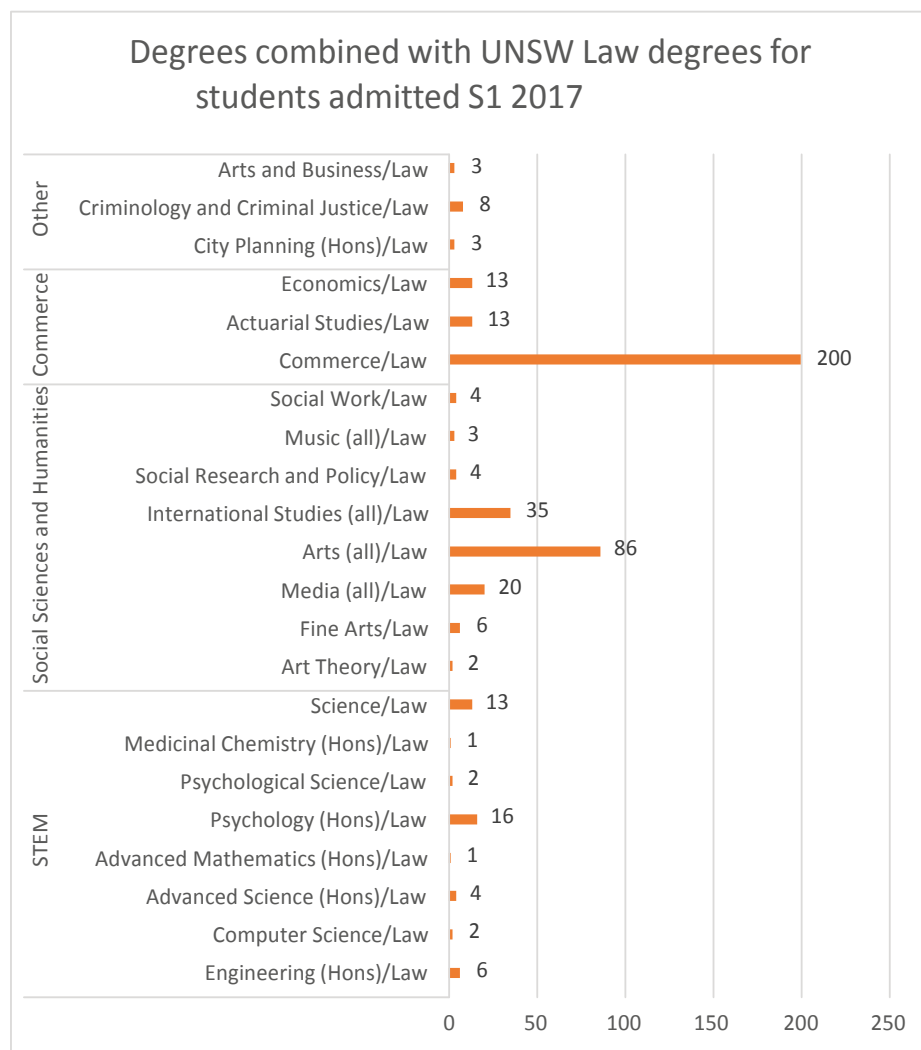
With compulsory requirements for students to *know* things and university-level requirements that focus on general skills (often based on the TLOs), finding room in the curriculum for anything new is challenging. This problem is compounded by the fact that students often assume that they are in law school to learn "the law" rather than gain new capabilities, understandings and ways of looking at society. The solution cannot be simply to add *more* to what a law degree should do. Instead, universities should be encouraged to be creative by enhancing variety across the scenarios students are asked to consider in class and in assessments. Exposure to the questions raised in Section 2 is not just about content, it is about understanding how existing concepts apply in new contexts. The technical context in which these questions arise is often no more difficult to explain than the complex commercial and family situations that crop up in the caselaw. Exposure to these questions can thus be woven into examples in relevant subjects.

4.2 Combined law degrees and the need for techno-legal experts

One way in which students are able to gain cross-disciplinary skills is through

the requirement at many Australian universities that Law students do a combined degree program. The alternative, also offered at many law schools, is the Juris Doctor program, requiring students to have already completed another degree. The number of universities where students are only exposed to the single discipline of Law is

science/law degree, although additional students may be taking computer science subjects with a general Engineering (Hons)/Law or Science/Law degree, within an information systems major in a general Commerce/Law degree, or as a "free elective" within any other program. The data can be seen below.

Degrees combined with UNSW Law degrees for students admitted S1 2017

Category	Degree	Value
Other	Arts and Business/Law	3
Other	Criminology and Criminal Justice/Law	8
Other	City Planning (Hons)/Law	3
Commerce	Economics/Law	13
Commerce	Actuarial Studies/Law	13
Commerce	Commerce/Law	200
Social Sciences and Humanities	Social Work/Law	4
Social Sciences and Humanities	Music (all)/Law	3
Social Sciences and Humanities	Social Research and Policy/Law	4
Social Sciences and Humanities	International Studies (all)/Law	35
Social Sciences and Humanities	Arts (all)/Law	86
Social Sciences and Humanities	Media (all)/Law	20
Social Sciences and Humanities	Fine Arts/Law	6
Social Sciences and Humanities	Art Theory/Law	2
STEM	Science/Law	13
STEM	Medicinal Chemistry (Hons)/Law	1
STEM	Psychological Science/Law	2
STEM	Psychology (Hons)/Law	16
STEM	Advanced Mathematics (Hons)/Law	1
STEM	Advanced Science (Hons)/Law	4
STEM	Computer Science/Law	2
STEM	Engineering (Hons)/Law	6

thus small. This mechanism provides law students with a significant advantage in a world where few problems can be solved within a single discipline.

However, at least at my own institution, UNSW Law, most students choose a relatively narrow range of combined degree programs. For example, the data for students commencing in Semester 1 2017 (including transfer students) has only 45 students enrolling in STEM degrees alongside their law degree compared to 158 in social science or humanities degrees, 226 in commerce degrees and 14 in other degrees. Within the STEM combined degrees, only 2 students are doing a specialist computer

What these data demonstrate is that the proportion of students combining legal studies with science and engineering subjects is low. All of the combined programs offer students something of real or potential value. The point is not that only a particular category of combined degrees are worth doing, but rather that there are advantages for the profession as a whole in maintaining diversity of cross-disciplinary expertise across legal graduates. My sense, based on the discussion in Section 2, is that the supply of legal graduates with general technical expertise, and particularly with computer science and engineering expertise, is below the potential demand. However, the empirical analysis here is fairly thin, being restricted to one cohort

in one university and without further data on majors and subject choice. Further research would be required to test the depth and breadth of my hypothesis. It will also be interesting to monitor enrolments in the new Data Science and Decisions/Law combined degree commencing at UNSW in 2019.

What does seem clear is that the demand for students with legal and technical expertise, for Susskind's legal knowledge engineers, legal technologists, legal hybrids and legal data scientists,[46] is likely to increase. Clayton Utz has a new Forensic and Technology Services practice that includes the identification and management of cyber-risk and the design and implementation of anti-fraud programs as well as the management of IT forensic analysis, preservation and data review programmes.[47] Corrs Chambers Westgarth, as well as launching a multidisciplinary cyber security team,[48] is itself developing tools useful in legal practice and beyond, such as JustOCR which improves the quality of optical character recognition for scanned documents,[49] and is looking to develop further tools through its partnership with Beagle Asia Pacific

Pty Ltd.[50] It is likely that Australian law firms will follow the example of the United States and hire people with interdisciplinary expertise in fields such as data science.[51] Like in the United Kingdom, we could also get "legal engineering" firms, specialising in designing and building legal solutions using data, law and technology.[52]

But if we are to offer future law students the employability benefits of combining a law degree with a program such as computer science, we need to convince high school careers counsellors that this is a useful path for suitably capable students. Not only would that benefit the students concerned, it would also ensure that, as a society, we are in a good position to manage new and important questions at the interface between technology and society, including those described in Section 2.

4.3 The UNSW Law response

UNSW Law is responding to the issues raised in this paper by reflecting on three questions. The first is the extent to which the core curriculum can and should be revised to provide the kinds of opportunities

for critique of automation outlined in Section 2. The second is the creation of new elective courses that provide opportunities for motivated students to delve deeper into the questions surrounding techniques of automation and artificial intelligence. The third is how we can motivate students to consider a broader range of combined degree programs when entering university. This section focusses on the first two of these; the third is largely a question of rewriting dual program descriptions and marketing material to emphasise the advantages of non-traditional combinations.

The process for revising the core curriculum has not yet concluded. It began with a "mini-curriculum review" working group that was asked to address two issues. The first, not relevant here, was the internal UNSW issue of trimesterisation and how existing courses (scheduled over 12 weeks) could be taught within a shortened term through more weekly hours of classroom teaching and/or greater reliance on blended learning incorporating on-line activities. The second was the need to map the extent to which relevant practical skills and the kinds of critique

outlined in Section 2 were already included in core subjects and use this as a basis for considering the need for any revision. Both of these processes are currently underway, culminating in a faculty-wide workshop scheduled for later this year involving guest speakers from legal practice, industry, the judiciary and academia as well as opportunities for reflection and discussion. Through this process, we hope to identify courses where relevant skills can be taught and opportunities for informed critique opened.

All law students need a basic understanding of the technologies that are becoming *part of* the practice of law and the administration of justice. This is not only about "professional legal training" or a "how to" guide, but rather as deep critical thinking about the advantages, limitations, assumptions and impacts associated with technology generally and artificial intelligence in particular. If these technologies are part of the new working environment, students need to know how to use them appropriately and in ways consistent with the rule of law and associated values including fairness, natural justice, and legal equality. We also need to make sure that future judges and practitioners do not embrace tools such as risk assessment, predictive analytics and blockchain without understanding the limitations as well as the benefits.

We have also introduced two new elective courses, providing opportunities for students who wish to explore these issues in more depth. The first is an overseas short course on *Law and Technology: Comparative Perspectives* that encourages students to think critically about the role of law and regulation in setting innovation policy, co-ordinating new forms of conduct, and limiting the development and use of new technologies are consistent with ethical, legal and social values as well as the role of judges in resolving uncertainties and inconsistencies in the application of law to new, often unforeseen, situations. In the course, students compare different government approaches to issues raised by technologies such as 3D printing, "disruptive" platforms such as Uber, automated decision-making, and surveillance technologies in Australia, the United States and Europe. The second is a more practical course, *Designing Technology Solutions for Access to Justice*,[53] that teaches students how to build a legal expert system as well as how to think critically about the advantages, disadvantages, limitations and consequences of such systems. After learning technical basics, students work in groups for a not-for-profit organisation, such as a community legal centre, to build an application that supports access to justice through the provision of relevant information, through

the automation of document-generation or through the automation of client intake systems. While undertaking this work, students read critical literature around the use of legal expert systems and articulate their own thoughts and ideas through a series of reflective notes. The course culminates in a series of group presentations where students present their applications as well as discussing relevant limitations, including those due to limited literacy or access, where relevant. Similar courses are also offered at the University of Melbourne and the University of Technology Sydney. These new courses stand alongside more established courses such as Information Technology Law, Cybercrime, Security and Digital Law Enforcement, and Surveillance Security and Democracy (among others) that encourage students to think about specific issues at the intersection of law and technology.

None of these courses do replace a Bachelor degree in computer science or similar discipline. But we ought not leave the design and building of decision-making and decision-support systems exclusively to those with exclusively technical training. If we want to embed the values taught at law school into tools that provide access to legal information, answers to legal questions, and dispute resolution assistance, then we need legally trained people on the team. Not every law student needs these skills but it is crucial not only to the legal profession but also to the broader community that such tools be designed by teams that incorporate legal expertise. We thus need to expose all law students to the technical contexts in which contracts are negotiated and decisions are made and offer opportunities for students to explore these questions further, while encouraging interested law students to pursue a technical degree alongside a law program.

5. Conclusion

Whether or not we create new minimum requirements for universities preparing students for an increasingly automated future, law schools should consider what their students *need to know* about technology and what additional *opportunities* should be made available to them. The most important ingredient is the more general one – the need for law students to be trained in critical thinking so that future legal professionals and judges remain appropriately sceptical about what precisely new technologies offer them and where their limitations lie. Legal knowledge and skills will remain an important component of

broad technology assessment and responsible innovation, particularly where technologies alter how law, legal information and legal solutions are formulated, accessed and used. Critical legal thinking, enhanced by a sufficient technical understanding, is the best protection against unfair applications of risk assessment tools and poor applications of blockchain technology. We need lawyers to appeal against inappropriate uses of data analytics and expert systems in government decision-making and we need them to retain core rule of law values in the face of pressures to enhance efficiency in dispute resolution. The future may be one with fewer lawyers, but legal knowledge and skills, enhanced by technological literacy, remain crucial. The challenge for law schools is to deliver the depth of education that will equip our students to protect their clients' rights and interests in an increasingly automated world.

NOTES:

1. The author would like to thank Adrian Agius for his research assistance.
2. Richard Susskind and Daniel Susskind, *The Future of the Professions: How Technology will Transform the Work of Human Experts* (Oxford University Press 2015).
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53. This course is sponsored by Gilbert & Tobin and uses the Neota Logic platform.