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Social representation of the profession of psychology and the application of artificial intelligence: European Union regulatory authority and the application of psychology as a paradigm for the future[1]

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Abstract
The digitisation of work affects thinking with respect to who will work, what work will entail and how governments will control change. The development of artificial intelligence (AI) is recognized as a threat and as a facilitator of change. The European Union leads in the development of regulatory power in the area. We examine these regulations and how they may affect the application of AI to work, especially with respect to psychology. Psychology is a profession universally conceived in the recent past to be immune from the predations of automation due to the level of cognitive and emotional skills believed to underly competence. The image or social representation of the discipline/profession plays a role in how the discipline is perceived and understood and how it is placed within the predicted matrix of jobs under threat. We demonstrate that psychology may not be immune in the context of a contemporary social representation. Regulatory practices in training and employment put psychology under threat as a "safe" profession. Europe has regulated and commodified the practice and training of psychology and hence has magnified the threat of replacement of those practices by AI. Governments and the professions need to be mindful of these consequences.

Key Words: European Union, artificial intelligence, professions, social representations, regulation

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Introduction

The world of work in the 21st Century is under threat from numerous developments including the impact of the COVID-19 pandemic (Innes & Morrison, 2021a). Linked to this is the threat of digitization and artificial intelligence (AI) (e.g. Innes & Morrison, 2021a, 2021b, 2021c). Government regulation in the development of digital technologies, particularly in issues of data privacy and surveillance (e.g. Anglin, Nobahar & Kirtley, 2016; European Commission, 2019; Gurrier, 2016; Zuboff, 2019) plays a key role in the utilization of AI and the social consequences this will have, especially in employment, including the professions. We address the example of the European Union's (EU) expansion of regulatory and administrative powers into the field of AI (European Commission, 2020) using the specific example of a profession, namely the practice of psychology.

We take the example of psychology as reservations are usually expressed about any likelihood of developments in digital technology having significant impact upon professions (e.g. Innes & Morrison, 2017), especially psychology. The practice of psychology in the alleviation of the burden of mental illness and the remediation of organizational stress has been thought to be immune from developments in AI, as such practice is believed to be dependent upon high level social and emotional skills, beyond the capacity of robots. We demonstrate, however, that such intrusions may be achieved in the not-too-distant future and that the profession has already undergone a process of structuring its practices that renders it vulnerable to threats from the digitisation of those practices. We use the concept of social representations (Farr & Moscovici, 1984; Wagner 1994) to position the discipline of psychology in different contexts to demonstrate how the representation affects the acceptance or otherwise of the likelihood of replacement by mechanization.

The Practice of the European Union

In a speech defining the Commission's strategies with relevance to the digitisation of administration and work practices across all domains of work, President of the Commission, Von Der Leyen (2019: 13), called for Europe to grasp 'the opportunities from the digital age within safe and ethical boundaries', pledging that the EU and its Member States 'will jointly define standards for this new generation of technologies that will become the global norm'. This paper will first examine these ambitions through the lens of international relations (IR), particularly what *power* this represents, and we use Barnett & Duvall's (2016) multidimensional model of power in global governance to argue that European digital policy exerts a regulatory compulsory power over its Single Market, while manifesting normative power over the structure and values of the global digital economy and actors within it.

The Digital Economy & International Relations

The digital economy originated as a term used to describe economic transactions that occur through the internet (Tapscott, 1995: 14). The definition has evolved to describe a set of features: mobility and transnationality, reliance on data, and utilisation of network effects (OECD, 2014a, p. 26; OECD, 2014b, p. 84). Each aspect has contributed to tensions. Firstly, mobility and transnationality have made governance and taxation difficult (Bygrave & Bing, 2009, pp. 108-115; OECD, 2014b, pp. 2-6).

Secondly, the proliferation of 'Big Data' has raised concerns about privacy (Kirtley & Shally-Jensen, 2019, pp. 13-20). Thirdly, network effects engender monopolistic markets (Ezrachi & Stucke, 2016, p. 27-33). The difficulties in governing the digital economy and have turned it into an international relations issue. For example, American support for its tech companies has seen it clash with the EU over its attempts at regulation (Khan & Brunsden, 2019). This conflict bears similarities to global governance in other areas, as its post-territorial nature necessitates multilateral solutions that are locked in a struggle with 'divergent governance preferences' (Bygrave & Bing, 2009, p. 221; Aronson & Cowhey, 2017, p. 71-72).

Barnett and Duvall's (2005) framework for understanding power in global governance presents a fourfold typology of power. The first is "coercive" or compulsory, with one actor having direct control over another. The second is "institutional", with indirect controls which are designed in concert with other states over the longer-term. The third is "structural", where for example capitalism can result in divergence of social products. The fourth is "productive", where the development of concepts is socially produced and diffuse through time. The model is 'helpful in distinguishing between the distinct takes on power', which is vital as the 'answer where power lies in world politics has become more complex' (McCarthy, 2018: 226-227). Furthermore, this multifaceted characterisation of power can help to explain previous conceptualisations of European power as expressions of its different complexions, e.g. civilian (compulsory and institutional) or normative (structural and productive) (Moravcsik, 2009, pp. 403-422; Manners, 2002, pp. 235-258).

Artificial intelligence: A new frontier for European power?

The EU is an undisputable regulatory and normative power in the global governance of the digital economy. This is seen with data rights, where it has become *the* normative leader as demonstrated in the adoption of the General Data Protection Regulation (GDPR) as a global benchmark. The People's Republic of China is emerging as another strong regulatory force in the realm of digital technology (The Economist, 2021), with stricter and more wide-ranging rules than present in the GDPR. For the present, however, we examine the impact of the EU as the rules have been in place for a longer period and the impact has been via less authoritarian regulation.

In the case of the EU the reach of the authority in areas such as AI is less clear. However, member states have consolidated *compulsory* power in Brussels over the Digital Single Market. This regulation in domestic cyberspace thereafter generates *structural* power over digital economic practice beyond its borders and, via its digital foreign policy, it exerts *productive* power over other states and legislation through discourse and debate.

We take the example of AI and the development of this technology in a particular profession as a case study, to demonstrate the possibility of the opportunity for a global power, such as the EU, to extend its influence on the development and direction of technology. The EU has undertaken a significant role in the development of AI, the gradual process wherein 'machines have the ability to solve problems that are usually dealt with by human intelligence' (Barfield & Pagallo, 2018, p. 18). This has involved a two-pronged strategy whereby the EU has mobilized development of AI, as well as regulating it. The EU aims to accelerate 'AI- powered technological inventions, to AI-based technological and organizational solutions' by helping Europe 'leverage its

strengths to expand its position in the ecosystems and along the value chain' (European Commission, 2020). Central to this policy has been co- ordinating investment for R&D: direct EU funding has risen to €1.5bn in the past 3 years, a 70% increase compared to the previous period, making total investment €3.1bn including the private sector. The alternative side to European aims in AI is their ambition to facilitate 'an ecosystem of trust', a regulatory framework for AI such that it conforms with citizens' security and protects their 'fundamental rights', such as preventing 'algorithmic discrimination' (Carriço, 2018, pp. 29-36; Hacker, 2018, p. 1143).

This process of compulsory power has been leveraged on the control of risk. Highly risky applications are controlled by rules governing transparency and data quality to alleviate concerns of members about the nature of AI systems and their reliance on algorithms which are opaque to the user. However, the emphasis on regulation has generated fears that the EU risks 'handicapping' its own domestic industry (Wallace & Castro, 2018, pp. 5-28). Such control could lead to the exclusion of innovations that are seen by the public as beneficial to health and welfare, as for example, in the application of AI in the diagnosis and treatment of mental health and not just in the detection of terrorism. Furthermore, it is unclear that AI actually is controllable – an 'intelligence explosion' may outpace any attempts at regulation (Tegmark, p. 2017). The development of deep learning algorithms already results in outcomes unforeseen by their designers (Sejnowski, 2018).

This highlights potential issues dissimilar to data regulation: the EU's power with regards to AI is dependent on its ability to develop and control technologies domestically, which is far from certain. Nevertheless, efforts undertaken by the EU still represent a significant exertion of compulsory power over its domestic economy and Member States. It is unclear as to the extent these decisions will pay dividends in the long run.

With its AI strategy taking the long-term view, the impact of EU's intervention beyond its borders is likewise undetermined; the relation between AI and power abroad is similarly more complex. AI is different from other areas of the digital economy as it holds increasing promise as a hard power tool.

Allen and Chan (2017, p. 210) highlight that the US, Russia, and China see AI as the 'key technology underpinning power in the future' and thus 'vital' to their national security; Putin is reported to have said that 'whoever becomes the leader in this sphere will become the ruler of the world'. European AI policy stands in contrast to other key digital powers, with their 'civilian' focus: Moedas (in Carriço, 2018, p. 29), commissioner for AI, said in 2017 that 'artificial intelligence is not a threat, how we choose to use it is'. This could suggest limits to European structural power concerning the development of AI; the inability to pursue the national security dimension could leave the EU with little influence over the 'hard' power uses of the technology (Nurkin & Rodriguez, 2019, pp. 60- 84). As Dafoe (2019, p. 122) highlights, 'how we manage near-term challenges could determine how well-equipped we are to take on later issues.'

Forms of AI: The general and the narrow

We deal with the possible near-term consequences of the *narrow* version of AI, where developments in machine learning and the ubiquity of large computing capabilities and large data sources have accelerated automated services (cf. Rahwan et al., 2019 and Sejnowski, 2018). The implications of these developments in the short term are enormous. We are not commenting on the generalized, or 'true' version of AI (c.f. Barfield & Pagallo, 2018), that envisages the development of consciousness and self-awareness. Such developments would render obsolete everything that we consider here.

Our example of psychology as a profession that may be digitized demonstrates that 'true' intelligence may not be required for the effects of AI to be widespread. 'Narrow'AI can achieve many of the goals of control. Thus, how we determine European action over artificial intelligence through the lens of power is complicated: the structural power its European mobilization will yield at a global level is currently unclear, with AI potentially beyond control and other states far ahead in its development. The regulation of AI, however, can have unforeseen consequences upon the general employment of large sections of the professions, a mainstay in the regulation and functioning of society.

The Impact of AI on the Profession of Psychology

In this section we set out three steps of an argument to address possible future trends in the employment of psychologists. First, to demonstrate the power of regulation to determine in part the development of AI and its application. Secondly, to show how the regulation of AI can be aided by the prior development within a profession of a process of practice and training which renders it susceptible to the threat of being captured by AI (Innes & Morrison, 2017; 2021b; 2021c). Regulation may accelerate the development of technology and at the same time act significantly to impede such developments. The crucial point to be made here is that adoption of the *narrow* version means that we can see to what degree *simulation* of human capacities can be represented by robots. We do not have to *replicate* the human processes, which is an implication of the *generalised* version. Robots do not have to *be* like us; they can *behave* like us.

Implications for Employment of Psychologists.

The impact of technology upon employment has been debated over centuries. AI has accelerated the intensity of the debate, whether there will be decline or increase in overall employment, and upon which forms of employment the impact of AI will be greatest (e.g., Acemoglu & Restrepo, 2017; Elliott, 2019). While the debate has assumed that many jobs will be replaced by robots, we specifically address the implications for the employment of professionals in the health and helping sectors portrayed as immune to developments in automation (cf., Frey & Osborne, 2013; Susskind & Susskind, 2015). Psychology, for example, has been considered a "calling" (Seligman, 2018), a profession to help people deal with complex problems by using a plethora of high order social skills. Frey and Osborne (2013) developed algorithms based upon various "bottlenecks" to the capabilities of automated systems which impinge or not on human jobs. These bottlenecks were identified as the requirement in a job for perception and fine task manipulation, creative intelligence (originality and

ability to innovate), and social intelligence (caring for others, ability to negotiate and to persuade). They calculated the probability that psychology had only a 0.0043 likelihood within a decade of being replaced, thus *quantifying* the presumption that a "helping" profession was unlikely to be replaced by a machine.

Frey and Osborne (2013), however, appear ignorant of what a psychologist actually does "in the room", adopting the idealized notion of the caring psychologist. A qualitative analysis of a job, however, rather than a stereotypically based, quantitative analysis such as that of Frey and Osborne, sharpens our understanding of AI and greatly affects the prediction that the profession can be replaced. Our point is that much of the day-to-day activity of a psychologist has already been replaced by algorithmic systems. The humans may be removed and completely replaced by machines. The Susskinds are realistic in their evaluation. Developments in training and execution of psychological technology have already changed the landscape of practice. Even "controllable" AI which to some degree is achievable today may be able to replace large sections of the delivery of mental health interventions in the near future. We cannot speculate realistically about what may eventuate with further developments in general artificial intelligence.

The representation of psychology and the helping professions

The job of being a psychologist is that of being an *expert* in the analysis and understanding of the causes and consequences of human behaviour. Training to be an expert has been traditionally regarded as a process of socialisation into the practices of an expert group; it is a social process of training and service, with close relationships between the expert trainer and the novice. We invoke the crucial distinction by Collins (2019) between *explicit knowledge*, the shared and conscious skills to do the job (written down in text books and portrayed in lectures) and *tacit knowledge*, the deep understanding of the practices acquired through social immersion in the groups who possess it. Becoming a psychologist is not only learning the theories and the methods of the job through explicit tuition. Expertise is based upon immersion of training with practicing psychologists.

A consequence of the emergence of mass higher education, however, with increasing numbers in tertiary institutions and the difficulty of providing immersion training in skill development, has been the development of lists of skills which are seen as required for performance; *attempting to make the tacit explicit*. These are listed under various rubrics, including "inherent characteristics" and "graduate attributes". For psychologists and counsellors these include being a good communicator, curious, creative, compassionate, non-judgmental and empathic (e.g., Cranney et al., 2009).

These characteristics, however, are essentially *personal attributes*, matters which are essential to the *character of the person* and which the person may bring to the job. They can be separated from *skills*, attributes of the job which can be taught. The implicit argument is that the psychologist's skills are based upon the personal attributes of the person; good psychologists are born and not made.

But the training regimen within the helping professions, in the time of mass higher education, can be seen as the inculcation of explicit skills to enable the person to perform as an expert, without the necessity of acquiring the deep skills. While character may not be simulated, skills can be copied. The modern "standards" for

psychological training encompass this thinking. Completion of training is based upon a model of competency where the candidate meets a minimum standard (c.f. Health and Care Professions Council, 2015; Humphreys, Crino & Wilson, 2018; Lunt, I., Peiro, J.M., Poortinga, & Roe, 2014). These tasks are based on the "evidence based" training of a professional helper, where practices are based upon scientifically established evidence, invariably quantified data from observations and experiments conducted in controlled conditions. These standards are emerging across nationalities, including Australia, Europe, and the UK.

The adoption of such a structured position enables a curtailment of the range of skills and practices that are required in training; particular practices are believed to be insufficiently "evidence-based" and therefore need not be included in the training regimes. An example, within psychology, is the rejection of therapies based upon psychodynamic (Freudian) principles, even though there is copious evidence for their efficacy (e.g., Shedler, 2010). The fact that the evidence base for the adoption of "cognitive behaviour therapy" (CBT) as the overwhelmingly superior model for the treatment of a wide range of psychological disorders is itself greatly exaggerated (Leichsenring & Steinert, 2017) is largely ignored and the weight of evidence continues to be believed as supporting CBT.

We are addressing the *possibilities* of the substitution of human actions and processes by automated (machine based) processes, based upon algorithmic learning machines. We are not advocating that all of the process of treating a client who is burdened by mental illness should be turned over to a robot. This would be in contravention of the EU legal regime of data protection which explicitly protects individuals against decisions made about them based on automated data (Article 15 of Directive 95/46/CE, cited in Rouvroy & Berns, 2013). We are proposing the prospect that fewer human psychologists will be managing and mediating the data profiles of clients which are developed by algorithmic systems. We conceive AI as a form of prophylactic device, broadening the skills of the human operator, while at the same time reducing significantly the need for many such operators (Innes & Morrison, 2017; 2021a; 2021b; 2021c.)

It must be noted here that we are invoking a particular representation of the discipline and profession of psychology. The social representation or collective representation of a profession has been used in other contexts in order to demonstrate how representations can shape the adoption of change, for example in economics (Stark, Kogler, Gaisbauer, Sedmak & Kirchler, 2016), in management of organisations (Kummerow & Innes, 1994) and in the science of climate change (Moloney, Leviston, Lynam, Price, Stone-Jovicich & Blair, 2004). The social representation of a concept does not preclude the representation of that concept in other, individualistic, terms. The crucial element of social representations theory is that belief systems can be shared between members of communities or between members of groups within communities. In scientific terms they can be recognized as akin to the paradigms (Kuhn, 1962; Scerri, 2016) that scientists share in the development of particular fields of work (cf. Augoustinos & Innes, 1990 for an analysis of these linkages). The representation of psychology has been made in (Caillaud, Haas & Drozda-Senkowska (2021) and we adopt some of their conceptualization to make our case for our representation of psychology in a mechanistic/technical form. There are other representations, but this one is increasingly being cited in the dominant clinical and professional literature.

The job of the psychologist

The contemporary job specification for a professional psychologist specifies four tasks, whatever the area of specialization, whether the client of the psychologist is an adult, child, a school or a commercial organization. These tasks are assessment, formulation, intervention and evaluation, based upon evidence derived from the scientific disciplines of psychology, economics and cognitive science. Economist authors Levy and Murnane (2003) make a similar point, looking at jobs as bundles of skills rather than as a totality.

Assessment entails the observation of the client and the measurement of traits and characteristics to identify the state of the client prior to intervention. This is done by behavioural observation, psychometric testing and structured interview. More than sixty years ago Meehl (1954) demonstrated that statistical aggregation of assessment was virtually always superior to judgement by the clinician. The development of computer tests has increasingly supplanted assessment by clinicians. Computers can deliver test items and score and monitor test taking behaviour superior to anything that a psychologist can do in the room. Technology enables a test to be tailored to the client within real-time. Computer based monitoring may assess emotional changes in the client, superior to judgments made by clinicians. Interpretation of test results can be generated from algorithms based upon protocols originating from "objectively" validated experts.

Formulation comprises the development of hypotheses to account for causal relationships between observations and the behavioural outcomes that were reason for the client contacting the professional. Clinicians demonstrate low performance in diagnosis and prediction, but uncertain relationships between cues and outcomes can be identified and the clinician trained to make more predictable links (Kahneman & Klein, 2009). But such identification also enables machines to learn and to generalise to unseen cases, *superior to the human operator*. The argument is clear. Given particular assumptions, intuition need not be mysterious; it can be taught, and the AI system will be more reliable than the human (Morrison et al., 2017). Questions are being asked in the psychological literature whether psychologists are trained to assess and intervene competently (e.g. Schulte-Mecklenbeck, Spaanjaars, & Wittman, 2017; Vollmer, Spada, Caspar, & Burri, 2013). AI systems can aid and render better these judgements.

The recent advent of AlphaGo©, a program able to master the complex 'Go' board game, has signalled a turning point in the design of *intuitive* robots. These machines can visualise the likely outcomes for an array of different options, calculate probabilities regarding their success, and use knowledge learned from training. Such machines are challenging our understanding of human intuition. Many reject an analogy between the practice of psychology and chess, but the developments of algorithms in the understanding of chess at the highest levels of competence have been revelatory. They have transformed the ways in which grandmasters learn new tactics (Sadler & Regan, 2019) change thinking about fundamental problems (Tomasev et. al., 2020). While we are aware of concerns about the validity and adequacy of much research in AI (Innes & Morrison, 2020), the momentum to adopt the technology is powerful and will affect the workplace.

Intervention constitutes design of an intervention to change behaviour. The use of evidence to demonstrate the efficacy of a narrow range of interventions enables a small number of therapies to be formulaically treated and used to train clinicians. Specific components of therapy can be identified and introduced at specific points in the therapeutic process within limited time frames. The dominance of CBT is testimony to the prevalence of this methodology. The relationship between the therapist and the client (cf. Tracey et al., 2014) previously regarded as vital, can be downplayed as less robust than the main effect of the therapeutic technique itself (Lilienfeld et al., 2014). The importance of the so-called therapeutic alliance (TA) has been regarded by influential commentators as an outcome of successful intervention rather than a cause of success (c.f. Kazdin, 2008; Kazdin & Blase, 2011). The development of a "mechanistic scientific approach" allows the replacement of a clinical intervention with a mechanistic one (Sharp & Elder, 2019).

A broader, central and related argument used by those who assert that psychologists are not at risk of replacement is that psychologists require the attribute of *empathy* to act as psychologists (e.g. Reese, 2018). Empathy is described as the ability to "put yourself in their (the client's) shoes", being caring and understanding. Without empathy, it is argued, there can be no relationship formed in therapy and therefore no ability to help the client. But we do not need to ponder the issue of there being individual differences in empathy. Some people are undoubtedly kinder than others, but the question is whether empathy and kindness are *necessary* for therapeutic effectiveness. There is confusion in the use of the term. It can be used to mean "compassion", feeling for others and sharing their joy or grief; it is felt *emotion*. It can also mean a sense of cognitive understanding; felt *cognition* (Batson, 2011). Cognitive understanding can be used to solve problems, but the induction of the emotional component can lead to bias and misunderstanding (cf. Bloom, 2016). The argument is simple. *Without emotional empathy the trained psychologist is better able to analyse and thereby help a person*. We may not need a *kind* psychologist. We need an *insightful* one.

The fourth component, *Evaluation,* comprises the measurement of the states after the intervention to ascertain whether change has occurred and is beneficial. The assessment can be addressed in the same manner as the prior assessment, can be computer based, to link pre-measures to post-measures and the data then actuarially examined. This eliminates the biases which have been identified to be present when clinicians make judgments (cf. Lilienfeld et al., 2014).

It is important also, to be aware of developments in the methodology and analysis of psychological experiments and interventions. A realization that changes in behaviour resulting from induced changes in the setting or context, can be due to cumulative effect of small outcomes and is not dependent upon large changes from massive interventions. In fact, the cumulative effect of small effects may be more general and ultimately more widespread (Gotz, Gosling & Rentfrow, 2021; Richard, Bond & Stokes-Zoota, 2003). The impact of incremental changes in digitization in virtual and telehealth manipulations and in the introduction of AI systems may seriously underestimate how fundamental the effect of such change upon a person's behaviour may be.

To summarise, there are four points in this argument. First, the elements of a psychologist's job can be specified in detail to enable an automated version to replace the human being. AI will do it better, with less bias, no procedural errors and with no fatigue. Therefore, there is a clear possibility that psychologists will be replaced by machines and this is already in progress (cf. Innes & Morrison, 2017; 2021c). Psychological societies have systematically set out the range of competencies, with specific descriptions of what is required to have mastered every particular skill and none more so than in the development of the European Certificate in Psychology (Europsy)[2]. Second, while some particularly skilled psychologists may be required to continue to develop psychological theory and methodology, we are seeing the algorithms *learning to learn*. Even the most skilled and insightful human psychologist could be replaced, in time.

Third, reduction in the psychological workforce will be dependent upon the time spent with these four components. Already psychologists' roles are changing, to monitor an electronic therapeutic intervention rather than act in a face-to-face role, with equivalent outcomes in the delivery of internet-based therapy compared with face to face. With such changes come issues related to a need for new skills in the management of cases and cases which lie "outside of the loop". The skill set of even the most proficient psychologist may change. This leads to the next issue.

There are implications for the future training at postgraduate and at undergraduate levels. While there are other views within the discipline which do not predict the wholesale adoption of technology to deliver services, the 2019 Accreditation Standards in Australia (*Australian Psychology Accreditation Council*, 2018) mirror the standards explicit in the Europsy and the competencies models referred to and are dependent upon the model outlined above and adopted in the training of psychologists. Psychology as a discipline represents one of the largest disciplines in the university sector in enrolments worldwide. Any decline in employment of psychologists will have large impact in tertiary education. Within that training system, the demands for different skills and the management of high-level technological systems will require re-tooling of the psychologists.

Why is this happening now?

Why has the matter of replacement of psychological skills by AI, among many others, become more urgent? Developments in automation have been occurring for decades without the issue of the replacement of professionals being seen as a significant problem. Economists have puzzled why developments in information technology have not been structurally reflected in productivity output. Recent analyses strongly suggest that the lag in impact of technology can be explained by the need to develop infrastructure in practices to implement the technological changes and settle them firmly into the systems that deliver the outcomes (Brynjolfsson, Rock, & Syverson, 2019). The period of lag may be over and the acceleration of acceptance of AI will occur.

One final note: The immediate impact of the COVID-19 pandemic cannot be underestimated. In Australia alone, the Federal government has instituted the provision of digital (telehealth) consultations in the mental health care arena at a cost in excess of $100m. These sessions enable the public to become more familiar with

[2] Europsy Regulations can be located in www.europsy.eu.

non-face-to-face consultations and further allows the use of digitised assessments and interventions which can then further be supported and enhanced by developments in AI. The future of mental health provision has changed due to many separable forces. Acceptance of digitization can create the circumstances for the later adoption of systems increasingly dependent upon more sophisticated AI.

Conclusions

Our analysis of the training of psychologists reveals ability to specify essential skills in fine detail that can be acquired by the novice psychologist. This specification can then provide the programmer of an algorithm with a detailed procedure which can then be translated into machine learning. With the machine able to develop further skills and interpretations of the rules the machine can learn to assess, formulate, intervene and evaluate the outcome of a diagnosis of mental illness or organizational dysfunction as well as, and in many cases better than, a human psychologist.

The regulatory and administrative oversight provided for the advent of significant AI by the EU enables the institutionalization of the procedures, using the extensive documentation already provided by the training and regulatory organisations in all countries. The goal of governmental regulation therefore accelerates the digitisation of the profession of psychology and hastens the effects upon education and employment, accelerating rather than moderating outcomes. These developments do not require the development of 'true' artificial intelligence at some distant point in time. They can be achieved now. The automation and routinization of the delivery of mental health services is possible.

Is the global profession of psychology aware of these developments and ready to adjust to the effects? The primary ethical question arises, namely that *best practice*, *based upon the available evidence,* should be adopted in the delivery of services. If best practice can be achieved by the automation of delivery, then the argument must be that automation should be used. The profession of psychology needs to address the question of what is to be the mixture of human and machine expertise to best deliver the service. It appears inevitable that this will result in the loss of a substantial number of psychologists with resultant impact upon on the entry of students into the training institutions.

Europe, with the overall regulation and administration of the development of AI in good order and with the regulation and specification of the practices of psychologists available at the same time, and the educational processes to train those practices, is in a place to oversee the replacement of psychological services by humans with learning machines. These implications will have substantive effects upon employment in the health and education sectors. And the role of government is paramount in the process. The nature of normative power in the development of technology and its application in the hands of government can enhance the development and impede employment in the realm of artificial intelligence.

The image of psychology that we portray as a social representation enables us to foresee the replacement or at least the significant augmentation of the profession of psychology by automation. As we have noted, other representations of the discipline are feasible (for example positive psychology; psychodynamic psychology, humanistic psychology) and these can be used to mount an argument against the replacement by

AI proposal. The representation that we portray, however, is one that has widespread acceptance and authority within the training institutions and universities and therefore has hegemony in the direction of acceptance and adoption in the future (e.g. Ahn, 2021; Sharp & Eldar, 2019). Alternative representations need to move to assert authority and change the modus of training if the replacement rather than the augmentation of psychological interventions by machines is not to occur.

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