Redefining HRD roles and practice in the Machine Learning Revolution

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Abstract

Our challenge to the Human Resource Development (HRD) community, is how far we should proactively take responsibility and get involved in shaping future skill development and human interactions with technology? Or will they, as in the past, retain a passive observer position?

There is much talk of the displacement of humans by technologies with Deloitte's (2018) reporting that employment in 44% of occupations in the UK is creating uncertainty about which jobs will continue. The disruption to current approaches to skill development and identification of what new skills are

needed requires attention. For people to retain relevance, more attention is needed on those skills that resist automation and technology replacement by the Fourth Industrial Revolution (4IR) package.

In this chapter we seek to answer the question: to what extent do LD practitioners incorporate both the learning of humans and machines within their areas of responsibility? Initially, we consider some of the key ideas relating to 4IR with respect to HRD/LD. We report the findings from a series of interviews with Senior HRD practitioners. We identified five themes: Emerging Awareness; Responding; Division between IT and HRD; Role of HRD; and Ethical Implications that we share and explore. We suggest that ML/AI is still something of a black box for HRD/LD and our enquiry prompted speculation and possibilities with an emerging recognition of the need to be involved and develop a more collaborative response. We argue that HRD/LD can make this happen and is important to the continuity, relevance and survival of the profession.

1. Introduction

The various technologies of artificial intelligence, machine learning, robotics and others together form a package of considerations referred to as the Fourth Industrial Revolution (4IR) (Schwab, 2017). It is claimed that we are in the midst of significant transition period that is bound to bring disruption to our lives (Mason, 2015). For example, there is much talk of the displacement of humans by technologies with Deloitte's (2018) reporting that employment in 44% of occupations in the UK is falling and that this creates uncertainty about which jobs will continue to exist. Brynjolfsson & McAfee (2014) asked the question 'Will humans go the way of horses?' pointing to the way the replacement of people by machines has a long tradition although humans have tended to benefit from this process in terms of real wages and jobs available. The present uncertainty is another manifestation of this. However, the disruption to skill development and learning of those new skills requires attention. As Webster and Ivanov (2019) argue humans will continue to retain key employment abilities concerned with creativity,

interpretation and human interactions but might be less required in the production process. Therefore, for people to retain relevance, there needs to be more attention to those skills that resist automation and technology replacement by the 4IR package. Deloitte's (2018) identified analytic, strategic and communication as 'human skills' that are needed to provide 'resilience' as the transition occurs. A key issue for those involved in human skill development, the Human Resource Development (HRD) or Learning and Development (LD) community, is how far they should proactively take responsibility and get involved in shaping future skill development and human interactions with technology? Or will they, as in the past, retain a passive observer position?

Using the Future and Forecasting approach often used within organizations to stimulate strategic planning, two Futures workshops at UFHRD Conferences in 2017 and 2018 considered the future of HRD creating scenarios that projected the future of HRD. The outcome of these workshops are reported in Gold (2017) and Harrison et al. (2018). One theme within the scenarios is the growth of 4IR technologies. For a profession and discipline that is concerned with organizational and individual learning and the development of human potential (Hamlin & Stewart, 2011) the advance poses a challenge for the future. Harrison et al. (2018) note that there is a shortage of academic research around 4IR from an HRD perspective. They also speculate that LD practitioners may well be ahead of HRD academics in considering the impact of 4IR on the future of HRD practice and research. Based on this speculation, we wish to consider whether this is the case.

Therefore, the question we seek to answer is to what extent do LD practitioners incorporate both the learning of humans and machines within their areas of responsibility? We will report the findings from a series of interviews with such practitioners in order to begin the conversation within the HRD academic community. Firstly, we consider some of the key ideas relating to 4IR with respect to HRD/LD.

Fourth Industrial Revolution and HRD

Until recently, the role of HRD/LD with respect to technology at work could be characterised as enabling people to work effectively with organisational requirements through the acquisition of requisite knowledge, skills and attitudes. The relationship with technology has always been contentious, with the possibility that human skills can be replaced by machines. However, technology has also been employed to enable human learning with the development of teaching machines based on programmed learning underpinned by behaviourist theories (Hills, 2003). More recently with the arrival of the digital age, as well as information and communication technologies, HRD's relation with technology could be characterised in two ways. Firstly, the delivery of learning content, usually referred to as e-learning. Secondly, the management of LD of staff within the workplace as a Learning Management System or LMS. In both cases, delivery makes use of electronic technologies and includes intranets as well as external sources via the internet; the latter usually referred to as Web 2. 0 and then Web 3. 0 as web interaction and storage become more prevalent. Central to such developments are core assumptions that value in organizations are made by bringing people and technology together and that any organisation is reliant on human expertise and learning for sustainability and difference. It is human learning that provides the possibility to improve performance by the utilization of people's abilities and consequent changes in skills and knowledge by humans underpin growth and development. It is the task of HRD/LD to support these possibilities with individual, team and strategic learning policies and practices. However, with the arrival of Machine Learning (ML) and Artificial Intelligence (AI) such assumptions might need reconsideration.

ML and associated technologies such as AI, algorithms and Internet of Things (IoT) are usually referred to as features of the Fourth Industrial Revolution (4IR) (Schwab, 2017) or Industry 4. 0. Such technologies make possible new products and services that increase the efficiency and pleasure of our personal lives. However, in doing so, the technologies are having a profound effect on what is understood as the performance of work and the employment of skill. There are ongoing debates about the extent to which 4IR will replace human skill, complement it or advance it (Fry, 2018). Schwab and Davies (2018) argue that while 4IR has the potential for bringing significant advantages, there is also

the possibility of adverse effects resulting from unfair distribution of benefits, the production of external costs and the disempowering of human beings. To mitigate against these possibilities, they call for the need for collaboration across stakeholders and the embedding of human values within technologies so they can be 'shaped to enhance the common good, environmental stewardship and human dignity' (p. 2).

According to a report from the Royal Society (2017), ML is a 'technology that allows computers that learn directly from examples and experience in the form of data' (p. 19). ML is specifically associated with the acquisition of knowledge, as compared to AI, that also includes the application of knowledge. AI is the study of 'how to train computers so that computers can do things which at present human can do better'. ML involves the use of an algorithm to analyze data from which a pattern may be formed for using in decision-making. An algorithm is 'a set of mathematical instructions or rules that, especially if given to a computer, will help to calculate an answer to a problem' [1], ML seeks to emulate how humans learn by providing an algorithm-driven machine with the data necessary to work against a goal, providing feedback to ensure it is working correctly then allowing the machine to work out the best way to reach the goals. Learning is embedded in ML to create a system, driven by an algorithm to find best way to fulfil its direction. There is a significant degree of obscurity that can surround the way ML actually works suggesting the need for those in LD either to work towards more understanding in Data Science, or forming relationships with those who are already qualified to do so. As a form of 'black box', there is a lot that must be accepted without critique (Lee, Lessler, & Stuart, 2009). Further, this is an area of research and practice that is occurring within organizations and beyond to improve AI and ML through Deep Learning or deep neural networks allowing application to such operations as speech recognition, visual object recognition and object detection (Bengio, 2017) with significant resources being invested (Parloff, 2016).

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[1] https://dictionary. cambridge. org/dictionary/english/instructions

Of course, in many ways, ML has become widespread and is found in a variety of work processes and everyday activities and is the main method for the development in combination with AI for computer vision and speech, picture and pattern recognition, robot control and many other applications (Jordan & Mitchell, 2015). The simulation of how humans might behave as a conversational partner is defined as a chatbot which is a piece of software that designs programmes to conduct conversations via auditory or textual methods (Moore, 2018). Humans have a part to play in ML and formulation of chatbots, both in the writing of algorithms and providing instructions but also in using or being affected by the results provided by its operation for good or ill. Interestingly, the development of ML is a good example of human learning that involves the building of a mathematical representation relating to a particular domain of knowledge, computing the parameters and weights from the representation using testing data, critiquing the model as discrepancies occur and using new knowledge from the discrepancies to think of the patterns that caused them. Eubanks (2019) highlights the benefits of AI to the HR community to offload HR administrative tasks and improve user satisfaction. CIPD (2019) suggest that changes through AI can provide more accurate information for decision making, for example, common applications exist in HR such as filling in forms or exchanging information. This process continues until the model performs – the machine has learned (Colaresi & Mahmood, 2017).

More generally, ML and AI are starting to become accepted as a way of making decisions about people so that performance is improved. Using terms such as HR analytics or workforce analytics, predictive modelling can be used for most HR functions including leaning and development (Mishra, Lama, & Pal, 2016) and is considered to provide the HR profession with a clearer route to strategic participation in decision making and avoiding takeover by the finance and technology functions (Vargas, Yurova, Rupell, Tworoger, & Greenwood, 2018). The danger here is that the HR profession generally and LD practitioners in particular may join the list of workers under threat because they cannot yet work with analytics and ML. As Joh (2017) argued with reference to predictive analytics in the Police, people are 'not simply end users of big data' (p. 289), they also play a part in generating data through the recording of outputs and this can produce distortions such as race, sex, religion and other forms of bias.

Already there are recognized dangers, perhaps exemplified by ML's potential for perverse results and predictions (Naughton, 2018). In his well-known consideration of the place of humans in the future, Harari (2017) points to the danger of the decoupling of intelligence as found in AI and ML from the consciousness of humans such that "non-conscious but highly intelligent algorithms may soon know us better than we know ourselves" (p. 397). One manifestation of this process is the fear that ML is an automating process that threatens the need for human workers including educated professionals such as accountants and lawyers which can also exacerbate wealth disparities (Brynjolfsson & McAfee, 2014).

Another danger is the potential for ML to incorporate bias which it has learned; ML can be become creators of a learned bias (Cheatham, Javanmardian, & Samandari, 2019). For example, Amazon had developed programmes to automate the review of applications made by job seekers. AI was used to rate candidates based on their CVs. However, this process seemed to contain a bias in favour of men based on patterns of CVs over 10 years, which came mainly from men. Another bias was the recommendation of candidates who were unqualified. Amazon postponed this version of the project in 2018 before seeking to develop another to consider diversity more closely (Dastin, 2018). Google has also been critiqued. For example, some searches have been shown to make incorrect, defamatory or bigoted associations for particular people and groups (Diakopoulos, 2016).

An important issue raised by Osoba and Wesler IV (2017) is that ML requires critical attention both in creation but also on the ongoing processes of operation. Just as human decision-making is fallible and subject to bias, the work of ML also needs attention. For example, ML biases are learned during what is termed 'Training', where inputs are used to 'teach' an algorithm to work towards a particular desired state. However, as the Amazon case showed, the training data which provided the inputs produced the learned bias. The training of ML does not yet appear to be considered an HRD/LD issue. An improvement in such data is considered to be important in improving the quality of ML decisions (Fuchs, 2018).

In addition, against the potential for ML to become dangerous, Schwab and Davis (2018) highlight ethical challenges which need to be addressed to ensure fairness and balance. They advocate the need for technical feasibility to be accompanied by environmental, social and human considerations. This reinforces the need for humans to develop a value-led stakeholder approach which we would suggest needs to involve LD practitioners and researchers. Crucially, as argued by Fry (2018) if ML by definition means machines can create new answers to problems using its own route, it can affect performance at work and beyond. Shouldn't HRD/LD take an interest in this process?

Method

Considering our research question concerning the extent to which LD practitioners incorporated both the learning of humans and machines within their areas of responsibility, we felt that a constructivist approach was required based on the assumption that there would be a variety of views constructed in the minds of individual LD practitioners (Hansen, 2004). Our approach sought to allow an interaction between researcher and participants to stimulate questioning and reflection against the object of the investigation concerning 4IR and ML in particular (Ponterotto, 2005).

We developed a set of questions so that we could explore how LD practitioners work with 4IR and ML. Such questions included:

Is 4IR and ML embraced by LD professionals? Is such learning accepted as an LD issue?

Is 4IR and ML seen as a replacement for human skill, or complementary or it might enhance it?

Is there a role for LD people in terms of what you put into algorithms?

Do you have ethical concerns?

Is 4IR and ML informing your work at the moment?

What is the future of the HRD profession, in a future where machines can learn?

We used convenience sampling to identify practitioners from our professional networks and interviewed 9 Senior LD practitioners, from multi-national or large public sector organizations and recorded the results. 7 interviews were conducted face-to-face, one by telephone and one by email. The transcripts of each interaction were analyzed by us (as humans) using a simplified version of inductive thematic analysis (Braun & Clarke, 2006) involving a close re-reading of the text to reveal what appeared to us as over-arching themes that summarized the views of our interviewees.

We identified the participants as:

Table 1: Participants

Job Roles	Business	Code
L&D Manager	**Finance**	**A**
OD Manager	**Health**	**B**
Group L&D Director	**HR Call Centre**	**C**
L&D Manager	**Professional Services**	**D**
Director of OD	**Education**	**E**
L&D Manager	**Public Sector**	**F**
L&D Manager	**Manufacturing**	**G**
L&D Manager	**Public Authority**	**H**
L&D Manager	**Global Retail**	**I**

Findings

Following the analysis, we identified five themes: Emerging Awareness; Responding; Division between IT and HRD; Role of HRD; and Ethical Implications.

Emerging Awareness

While most of the participants demonstrated awareness that ML/AI will be embraced by the majority of the organizations in the future, for many of our participants the 4IR does not impinge on their current working lives and roles. With the exception of one participant who has been directly involved with training bots, it is something that they are generally thinking about but without the need for immediate operational implementation. The questions in the research interviews therefore created an emerging awareness and a space to discuss the potential impact of AI and ML for those who 'know it's coming, [but] are not proactively doing much about it' (F).

Thus, to varying degrees, Senior LD Professional recognize the issue not as an explicit part of their current responsibility and role but as something they needed to consider and form a view on. Issues related to ML/AI were part of the overall context of technological development. For example, automation or robotization (A and B) were being considered generally rather than specifically within their organizations and what they experience outside the ML/AI could apply within their organization. Participants explored their understanding from considering possible impact on themselves personally.

'...an article the other day about being interviewed by machine... I kind of tried to put myself in that situation. Thought how would I feel if interviewed by a robot and then the robot said no to me (Laughing). I would probably think that had I've been sat with a person, and individual, there would've been a lot more interfaces that were taking place...' (C)

'if you think about say checkouts, so we have changed the roles in supermarkets. You can go into and have a consultation with a machine and it will pop out your pills…. So there is the impact on, not just from an HRD/LD perspective or a HRM perspective, this is going to impact on everyone's roles' (B)

All our participants used e-learning to support human development but reported differing perceptions on the timescale for their engagement with the 4IR. For most the 4IR was moving at a quick pace (C) and although the pace was scary (C), ML/AI was recognized as a LD issue that needed to be addressed. For some it was as distant as 'something out of Star Wars' (H).

Responding

Although the use of ML/AI is still an 'emerging piece' and had not 'been addressed in sufficient detail as yet' (A) many LD Professionals could see value in using ML/AI to engage with the 'mundane and processing stuff' particularly in recruitment, reward and payroll (B). LD Professionals could see the possibility of engaging with ML/AI on a more 'interactive and interesting way' (E). Chatbots for instance could be and are already used to answer basic and often asked questions such as 'who do I ask about the appraisal form, the maternity form, what's the right to work check, what's the induction process' (F).

Our participants celebrated the value of such innovations and their potential to enable LD Professionals to concentrate on creativity, adding value and strategic issues (A, B, D). Others observed that such technology would threaten the existing career pathways in HR and LD. The opportunity to enter at a lower level in an administrative role (F) 'then grow into HR advisors' may be curtailed raising questions of how 'you would come into these careers and the skill set needed' (E).

However, as their organisations considered the use of automation and robotics to 'do higher volumes' (A), this did raise awareness relating to 'how people were seen' and valued. Participants reflected on the core role of the LD Professional. 'The role is focused on 'connectedness and presence …. developing people, building relationships, focusing on people skills, complex problems, solving things for the business and people (F). Most participants could not envisage a world where machines replace human judgement and interaction (H). They questioned whether machines would be able to draw on

experience and work empathetically for instance picking up on the verbal clues, body language, disposition and tone of voice (C and F). Participants were convinced that a human presence was and will always be required and that building human relationships was central to the LD role.

'The AI can be used to mitigate any bias, and that standard of quality experience for everybody, but I think you still need a human element as that person has still got to be managed. And that person can't be managed by AI, personally I can't see a place where AI manages. AI can help, but I can't see where it manages. I can't see that far into the world; I think it would be quite a miserable place really. Because some of the stuff you do in training, it's about the discussions. The blue sky thinking. AI is becoming intelligent but is it going to go as far as blue sky thinking' (F)

Nevertheless, participants recognised that LD Professionals could not ignore the growing influence of ML/AI. For one participant, the development of the role by replacing mundane with complexity and adding value was possibly just a 'convenient way of getting [HRD/LD] on board' (A). For another, it was important for HRD/LD to 'figure out what do we do' with the outputs of 'number crunchers' who worked the machines. It was important to hold on to the core values and 'love people and try and fight it out' (D).

Our discussion was helping the interviewees 'think about the possibilities' and the way 'AI could…. give use some useful things to think about' but 'the challenge is that it is only going to be as good as the data we put in it. And the challenge is that it needs a human intervention to choose what to give it' (B), indicating the need for LD Professionals to be involved as early as possible'.

Division between IT and LD

Despite the recognition of the importance of LD being involved in ML/AI it was recognized that currently LD professionals are rarely engaged at the development stage and few LD professionals possess skills to enable them to contribute to the technical development of ML/AI.

Even in the comfort zone of e-learning, LD professionals often present a 'shopping list' (H) to the developers. Where an organization is relatively advanced in the implementation of AI LD professionals are not engaged in the development of AI (G). Few roles are advertised for LD specialists to work in ML/AI. From one participant's perspective:

'You are either a developer, programmer who writes algorithms or you are focused on identification of learning needs… I still think we have a fair way to go to matching the two up… I don't think we're in a place where ML is … taken on by HRD' (C)

There was evidence of LD working with technical project teams, however they were present to understand the learning needs created by the implementation of any new technology rather than 'helping them to think through how they might develop machine learning' (E).

Our participants presented the current dilemma that LD professionals

'need to be involved at the beginning, [however] the implications for us as a profession is that it changes quite a few of the skill sets that are needed (E).

Creatively, participants could see this lack of technical skill enabling them to develop a relationship with technical experts and position LD professionals as a 'companions'. They could be a conduit to enable the organization to better understand the developments within ML/AI so that their organisations could be 'more informed about what could be happening'. They could see the 'evolution' of 'a continuing partnership' and the 'co-creation of solutions' (E). Working with technical expertise to input into the development of ML/AI should be seen as

'A bit of OD as we do need to think about that if we change the system what else gets affected' (E).

Role of LD

Our participants envisaged several vital roles for LD professionals in the Machine Learning Revolution. These clustered around what our participants perceived as their current core focus of building relationships and developing human skill and will draw on existing LD strengths in consultancy, coaching and mentoring and partnering (D). ML/AI was perceived as a change management issue and therefore an HRD issue. It will require working in tandem with colleagues within HR.

Because it's affecting HR too and they need to understand the bigger picture in terms of how as a workforce and a function, they can better understand what makes people embrace it and consider measures, ie LD involvement. Naturally, there will be resistance to anything new – machine learning will be no different so HRD needs to understand this and find factors that will enable employee acceptance of ML (G).

'There is an HR issue as it could be perceived as taking away jobs, so you had got that redundancy, redeployment type issue. People could find it quite threatening. There's a change management issue' *(F).*

The introduction of ML/AI has the potential to reshape 'the future of work' (E), to enhance work and create new jobs. Participants identified a role for LD Professionals to 'look at the best way' to solve the skills shortage' (G)

A connected feature was skills for the future (A), reflecting a need to 'stay relevant'. As more of the workforce are being recruited against digital needs, this was leading to growing contact with 'pockets of the data community' and involvement with projects such as collaborating on arrangement for degree apprenticeship in data science. This had provided a 'prompt to become conscious of what we should do' and that 'it was good be involved at this early stage'.

The 4IR requires LD Professionals to get involved, to advocate, communicate the benefits and promote and embrace the change to facilitate the organization's adoption of ML/AI.

The workforce can work in synergy with machines but it's all around knowing the purpose of it, what the benefits are. Understanding any concerns or fears of job replacement that employees may have so HRD can work to resolve these. Having regular conversations, touch points and reviews of ML performance within HR would prepare the workforce of what is/isn't working and therefore help them to work in synergy). If you're not there at the development stage then we are not going to we are not going to have the end to end knowledge of what needs to go in the to the design (G).

LD can have an influencing role to shape discussions' and be 'in that space'. 'To get employees on board' (G) for example, through leadership programmes which tackle some ML issues through projects such as identity verification for financial services (A). LD could affect 'the direction' of such projects. For ML projects in particular, it was felt the 'we can probably shape some of the stuff to go in there' (A) and will guide the development of logic' (D).

However, there was recognition that 'we wouldn't probably be able to do it ourselves' and that 'we'd need a bolt on informatics person…. a role such as a data guru' (B). Nevertheless, there are resource implications as the time-consuming nature of the role was identified by one participant (C). This is possibly one area that is a problem for LD departments that can be under-resourced.

Ethical implications

If LD can sustain its influence, it could provide a source of critique and ethicality (A/B/D). An important recognition was that 'data was everywhere but we do not want to lost the essence of who we are'. So data-based decisions on what to provide and what to do, had to be combined with 'human touch'. In the

health sector there was a need to consider 'life and death' choices and the vital part played by 'compassion', and other human values and ML would 'make it cold'. A question was posed:

'How do you teach them (ML/AI) ethics, how do you get them to think of ethics from a compassionate point of view?' (B).

If LD can play the companion role as ML develops, they could provide protection against some of the risks of relying on data-based decisions, for example in 'recruitment screening tools (D)'. However, such decisions 'might miss something' that relied on humans using 'gut instinct'. Interviews were aware of possible distortions, biases and 'unintended powers' of ML such as prediction which 'could limit choice and may not fit with our expansive mindset' (A).

Participants argued that LD should be the 'moral conscience' and occupy the space to ask *'what are they doing and how are they tapping into what are the right morally and ethically things. We should be in that position. To say, are we sure this is right. Are we doing the right thing here?' (F)*

LD can set a context for such activity and while they were not expecting to write algorithms, their influence could provide a 'safeguard and check' to build trust in the new system (F); a human overview and monitoring process - testing it, programming it. [and] mitigating the risk' (G). The involvement of those who did write algorithms in organisation-wide leadership programmes meant their exposure to critical thinking skills, emotional intelligence, questioning and assumption surfacing of activities.

Moreover, one participant felt it was almost impossible for algorithms to 'not act in a discriminatory manner' (C). The view was that the act of having to reduce every action into a logical, articulated structure meant that unintentional bias would be present. They expressed concern over the right/wrong nature of the scenario with no room for discussion or a 'difference of opinion'.

Discussion

By general agreement, 4IR provides the basis for a transformation of our economy and society and with it much potential for disruption and displacement of human life at work. Mark Carney, the governor of the Bank of England in 2018, was estimating a displacement of around 10 per cent (Carney, 2018). However, there seem to be little debate about the consequences for disruption and displacement. For example, a report from the House of Lords argued that there was lack of awareness and debate on AI and ML. There was a need to 'actively shape AI's development and utilization or risk passively acquiescing to its many consequences (House of Lords Select Committee on Artificial Intelligence, 2017, p. 7). This gap in involvement and participation could mean that it is left to powerful others to shape the technological future and allowing displacement and disruption to become realities (Morgan, 2019).

This chimes with our findings where LD professionals had emerging awareness of ML/AI but did not see these as features for their full consideration. Rather there was a general understanding of how automation or robots might affect work and home life but there was reticence to incorporate these issue into thinking and learning and development policy. There was evidence that participants could not see how ML/AI might displace humans and doubt that humans could be replaced by machines to work empathetically with other humans. However, in some organisations we have worked with, there is already evidence of the displacement of people as consequence of significant cost-cutting that is considered necessary to advance a digitised offer to customer and clients. One result is a reduction in the LD workforce.

It is important to consider how LD does have a tendency to frame its activities at a level of sustaining or improving activities. However, ML/AI contains the potential to change or replace the activities. Therefore ML/AI must be considered as organisation learning which encompasses discontinuous change with the likelihood of new but not yet developed ideas entailing a restructuring of how action will occur. In Bateson's (2000) terms, ML/AI is Learning II or a change in the process of Learning I

and as Tosey and Mathison (2008) argue, organisation learning 'requires Learning II' by those involved in LD. This, of course, means that LD professionals need to take an organisational view of ML/AI, assuming that digitization is a central feature of strategy and that LD professionals need to find a way for their voices to be considered at this level, assuming that they have something to say. However, it remains to be seen if progress in considering HRD more strategically as Strategic HRD (SHRD) can provide a route for LD to align its direction at the organisation level (Alagaraja, 2013). However, our conversations with LD professionals would suggest that a strategic response is not currently on the horizon.

Moreover, it was interesting to note that our involvement as researchers with LD professionals was prompting not just the need to recognise the influence of ML/AI but also how new possibilities might arise through closer attention with issues relating to the design and implementation of projects. In some respects, we were adopting an evidence-based approach to helping LD professionals become more critically reflective of their positions in a challenging but supportive fashion. This suggests that academic researchers and LD professionals might form collaborative relationship to the mutual benefit of both (Hamlin, 2016).

Previously we noted the possibility of bias, for example, the example of Google and their selection process. Ethics was something that all of our participants expressed concern about, particularly the challenge of including the 'human touch'. This is possibly not surprising and is highlighted by Gov. UK (2019) and researchers, such as, Pavliscak & McStay (2019), researchers who have explored the role of emotion in AI. In their ethical checklist for designers and developers they include the importance of avoiding stereotypes and assumptions about emotion as well as the importance of including a diverse dataset. Our research would suggest that HRD practitioners are 'waking up' to the ethical importance of being involved.

Positively, ML/AI was perceived as a change management issue and therefore an LD issue and this provides a way for LD professionals to involve themselves more fully in ML/AI. At one level, digital

projects become available for LD consideration once the technical aspects have been completed by others. Such projects are prone to create 'black boxes' consisting of algorithms composed of complex mathematical formula which are closed to non-experts. The connection to others comes through digital mediation in the form of a technology such as an app. Certainly this was the case with participant G who was involved in 'teaching' the app how to respond to general HR queries from employees, such as holiday entitlement. However, the use of technology will be subject to a variety of 'technological frames' (Orlikowski & Gash, 1994) allowing differing views of the value of new technology based on knowledge from past efforts to apply technology and stories of success or otherwise of the application. Culture has a strong role to play in the acceptance of usefulness and ease of use of technology (Watt, Boak, Krlick, Wilkinson, & Gold, 2019) and this provides a clear opening for LD professionals as facilitators in culture work. In fulfilling such a role, there can be focus on learning by humans and machines allowing the creation of new products and services. LD can also provide a point of connection between stakeholders in such projects and the embedding of human values within technologies (Schwab & Davies, 2018). SHRD has to embrace the potential for learning to emerge from the practices of working with technologies and for these to become a feature of making strategy (Mintzberg, Ahlstrand, & Lampel, 2008). This enables SHRD alignment between individual and organisational learning (Herd, Shuck, & Githens, 2018).

Nevertheless, as identified none of the LD professionals in our research is involved at the front end and, therefore, there is a need to address a recognised weakness that prevents engagement in the development stage of ML/AI projects. This is not any easy path and has implications for how LD professionals form relationships with non-LD experts but also the evolution of the role of LD. Given the reliance of ML/AI on choice of training data, it is humans that are involved in such choices. LD professionals can be involved in such choices if they can work with others. Collins (2004), for example, has identified the ability to talk expertly about a skill or practice but without being able to practice as interactional knowledge. Importantly, such knowledge is learned through connect and interaction with others in the process of practice and LD professionals become 'interactional experts'. Collins warns that this takes time but as expertise is gained, LD professionals can ask new or critical questions that others have not

asked. This process will advance a hybrid role for LD professionals but could also help academics in HRD to form new relationships across the academic world that could provide the basis for interdisciplinary activities and outcomes. One aspect of how LD influence can grow is their recognition of the ethics of adopting ML/AI. Royakkers, Timmer, Kool and van Est (2018) identify six key ethical issues to considered in digitization – privacy, autonomy, safety and security, balance of power, human dignity and justice. LD professionals and HRD academe need to embrace such issues to ensure that human values are safeguarded and remain relevant.

Conclusion

Based on Futures Workshops at the UFHRD conference, we became interested in the apparent lack of involvement in 4IR by HRD/LD academics and practitioners. We believed that the latter might be ahead of the former, if judged by the number of papers published in HRD journals. We also wondered if the terms ML and AI were in anyway being accommodated in the talk and responsibilities of practitioners. What we found, from a small but influential sample of senior LD professionals was that, in many ways, ML/AI was still something of a black box for HRD/LD and our enquiry was prompting speculation and possibilities rather than giving insight into how practitioners were engaged with ML/AI. There was both 'excitement… and concern (B). ML could do some of the work quickly and 'free the HRD profession to become more strategic'. What was concerning was how to monitor 'the complicated things that AI starts to do' and setting the 'boundaries' based on ethics and humanity. As one of respondents asked:

So does the HRD profession develop ML/AI, like you would a person? (B)

This raises the prospect for the continuity of the LD profession as a people function and people/machine function and a function for ML/AI.

Emerging is a recognition of the need to be involved and develop a more collaborative response. This echoes Schwab and Davis (2018) who recently advocated a multi-stakeholder approach to the 4th

Industrial Revolution that is based on human-centred values. So we would argue that who would be best facilitate such a learning process? Step forward HRD/LD and make the offer.

We would offer the following guidance to HRD/LD practitioners and also those in academe to ensure the continuity and survival of the professions. Firstly, the 4IR has to be recognised as a significant threat but also opportunity. There has to be less reticence by LD professionals in showing interest and involvement and to do this, LD professionals need to take an organisational view of ML/AI. In many organizations, there will be a digitization strategy as part of an effort for agilization (Trost, 2020), and this provides a chance for LD to enhance its involvement. In this process, LD professionals can seek support from academics, potentially setting up collaboration networks, virtual or otherwise, between LD professionals and universities and colleges. Collaboration theory suggests the important of facilitation to accommodate differences of interest (Wood & Gray, 1991). However, as experts in the human dimension of learning, both LD professionals and HRD academics might relish such an opportunity. In addition, at a time of significant disruption and change both within organised activity and society, LD professionals can play a key role if they can learn to work with others and acquire interactional knowledge. This would allow LD professionals to raise key issues of ethics and values as well as find new opportunities for their own development. ML/AI advances the case for LD/HRD to become a hybrid discipline and practice.

References

Alagaraja, M. (2013). Mobilizing organizational alignment through strategic human resource development. *Human Resource Development International, 16*(1), 74-93. doi:https://doi.org/10.1080/13678868.2012.740794

Bateson, G. (2000). *Steps to an Ecology of Mind: Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology*. Chicago: University of Chicago Press.

Bengio, Y. (2017). *Deep Learning*. Cambridge, Mass, United States: MIT Press Ltd.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*. doi:10.1191/1478088706

Brynjolfsson, E., & McAfee, A. (2014). *The Second Machine Age Work, Progress, and Prosperity in a Time of Brilliant Technologies*. London: W W Norton & Company.

Carney, M. (2018). The future of work - speech by Mark Carney. *2018 Whitaker Lecture.* Retrieved from https://www.bankofengland.co.uk/speech/2018/mark-carney-whitaker-lecture

Cheatham, B., Javanmardian, K., & Samandari, H. (2019). *Confronting the risks of artificial intelligence*. McKinsey Quarterly, April

CIPD. (2019). *People and machines: from hype to reality* (7755). Retrieved from London: https://www.cipd.co.uk/Images/people-and-machines-report-1_tcm18-56970.pdf

Colaresi, M., & Mahmood, Z. (2017). Do the robot: Lessons from machine learning to improve conflict forecasting. *Journal of Peace Research, 54*(2), 193-214. doi:https://doi.org/10.1177%2F0022343316682065

Collins, H. (2004). Interactional expertise as a third kind of knowledge. *Phenomenology and the Cognitive Sciences, 3*, 125-143. doi:https://doi.org/10.1023/B:PHEN.0000040824.89221.1a

Dastin, J. (2018). Amazon scraps secret AI recruiting tool that showed bias against women. Retrieved from https://www.reuters.com/article/us-amazon-com-jobs-automation-insight/amazon-scraps-secret-ai-recruiting-tool-that-showed-bias-against-women-idUSKCN1MK08G

Deloitte. (2018). *Power Up: UK skills Boosting transferable skills to achieve inclusive growth and mobility*. Retrieved from London: file:///C:/Users/mgtpharr/Downloads/deloitte-uk-power-up-uk-skills.pdf

Diakopoulos, N. (2016). Accountability in algorithmic decision making. *practice*. doi:https://doi.org/10.1145/2844110

Eubanks, B. (2019). *Artificial Intelligence for HR*. London: Kogan Page.

Fry, H. (2018). *Hello World: How to be Human in the Age of the Machine*. New York: W W Norton & Company.

Fuchs, D. (2018). The Dangers of Human-Like Bias in Machine-Learning Algorithms. *Missouri S&T's Peer to Peer 2, 1*. doi:https://scholarsmine.mst.edu/peer2peer/vol2/iss1/1

Gold, J. (2017). The Future of HRD: Scenarios of Possibility. *International Journal of HRD Practice, Policy and Research, 2*(2), 71-82. doi:10.22324/ijhrdppr.2.117

Gov.UK. (2019). Understanding artificial intelligence ethics and safety. Retrieved from https://www.gov.uk/guidance/understanding-articficial-intelligence-ethics-and-safety

Hamlin, B. (2016). HRD and Organizational Change: Evidence-Based Practice. *International Journal of HRD Practice, Policy and Research, 1*(1), 7-20. doi:10.4018/978-1-5225-6155-2.ch002

Hamlin, B., & Stewart, J. (2011). What is HRD? A definitional review and synthesis of the HRD domain. *Journal of European Industrial Training, 35*(3), 199-220. doi:10.1108/03090591111120377

Hansen, S. (2004). A constructivist approach to project assessment. *European Journal of Engineering Education, 29*(2), 211-220. doi:https://doi.org/10.1080/03043790310001633197

Harari, Y. (2017). *Homo Deus: A Brief History of Tomorrow*. London: Random House.

Harrison, T., Nichol, L., Gatto, M., Chee Wai, M., Cox, A., & Gold, J. (2018). What will be the Surprises for HRD in 2028? A Futures Scenario. *International Journal of HRD Practice, Policy and Research, 3*(2). doi:10.22324/ijhrdppr.3.113

Herd, A., Shuck, B., & Githens, R. (2018). Strategic Human Resource Development Alignment from the Employee's Perspective: Initial Development and Proposition Testing of a Measure. *Performance Improvement Quarterly, 31*(3), 269-291. doi:https://doi.org/10.1002/piq.21266

Hills, H. (2003). *Individual Preferences in e-Learning*: Routledge.

House of Lords Select Committee on Artificial Intelligence. (2017). *AI in the UK: ready, willing and able?* Retrieved from London:

Joh, E. (2017). Feeding the Machine: Policing, Crime Data, & Algorithms. *William & Mary Bill of Rights (2017 Forthcoming)*. doi:Available at SSRN: https://ssrn.com/abstract=3020259

Jordan, M., & Mitchell, T. (2015). Machine learning: Trends, perspectives, and prospects. *Science, 349*(6245), 255-260. doi:10.1126/science.aaa8415

Lee, B., Lessler, J., & Stuart, E. (2009). Improving Propensity Score Weighting Using Machine Learning. *Statistics in medicine, 29*, 337-346. doi:10.1002/sim.3782

Mason, P. (2015). *PostCapitalism: A Guide to Our Future*. London: Penquin.

Mintzberg, H., Ahlstrand, B., & Lampel, J. (2008). *Strategy Safari: The complete guide through the wilds of strategic management* (2nd ed.). London: Prentice Hall.

Mishra, S., Lama, D., & Pal, Y. (2016). Human Resource Predictive Analytics (HRPA) For HR Management In Organizations. *International Journal of Scientific & Technology Research, 5*(5).

Moore, S. (2018). Gartner Says 25 Percent of Customer Service Operations Will Use Virtual Customer Assistants by 2020. Retrieved from https://www.gartner.com/en/newsroom/press-releases/2018-02-19-gartner-says-25-percent-of-customer-service-operations-will-use-virtual-customer-assistants-by-2020

Morgan, J. (2019). Will we work in twenty-first century capitalism? A critique of the fourth industrial revolution literature. *Economy and Society*. doi:https://doi.org/10.1080/03085147.2019.1620027

Naughton, J. (2018). If tech experts worry about artificial intelligence, shouldn't you? Retrieved from https://www.theguardian.com/commentisfree/2018/dec/16/tech-experts-worried-about-artificial-intelligence-pew-research-center

Orlikowski, W., & Gash, D. (1994). Technological frames: making sense of information technology in organizations. *ACM Transactions on Information Systems, 12*(2). doi:https://doi.org/10.1145/196734.196745

Osoba, O., & Welser IV, W. (2017). *An Intelligence in Our Image The Risks of Bias and Errors in Artificial Intelligence*.

Parloff, R. (2016). The AI Revolution: Why Deep Learning Is Suddenly Changing Your Life. Retrieved from http://deeplearning.lipingyang.org/2016/11/15/the-ai-revolution-why-deep-learning-is-suddenly-changing-your-life/

Pavliscak, P., & McStay, A. (2019). Ethical Guidelines for Artificial Emotional Intelligence. Retrieved from https://pamela.is/ethical-guidelines-for-artificial-emotional-intelligence

Ponterotto, J. (2005). Qualitative research in counseling psychology: A primer on research paradigms and philosophy of science. *Journal of Counseling Psychology, 52*(2), 126-136. doi: https://doi.org/10.1037/0022-0167.52.2.126

Royakkers, L., Timmer, J., Kool, L., & van Est, R. (2018). Societal and ethical issues of digitization. *Ethics and Information Technology, 20*(2), 127-142. doi:10.1007/s10676-018-9452-x

Schwab, K. (2017). *The Fourth Industrial Revolution*. Switzerland: World Economic Forum.

Schwab, K., & Davis, N. (2018). *Shaping the Future of the Fourth Industrial Revolution*. New York: Portfolio Penguin.

The Royal Society. (2017). *Machine learning: the power and promise of computers that learn by example*. Retrieved from London:

Tosey, P., & Mathison, J. (2008). Do Organizations Learn? Some Implications for HRD of Bateson's Levels of Learning. *Human Resource Development Review, 7*(1), 13-31. doi:https://doi.org/10.1177/1534484307312524

Trost, A. (2020). *Human Resource Strategies Balancing Stability and Agility in Times of Digitization*. Switzerland: Springer Nature.

Vargas, R., Yurova, Y., Rupell, C., Tworoger, L., & Greenwood, R. (2018). Individual adoption of HR analytics: a fine grained view of the early stages leading to adoption. *The International Journal of Human Resource Management*. doi: 10.1080/09585192.2018.1446181

Watt, P., Boak, P., Krlick, M., Wilkinson, D., & Gold, J. (2019). Introducing Predictive Policing Technologies (PPT): An Action Research Oriented Approach for EBOCD initiatives. In B. Hamlin, A. Ellinger, & J. Jones (Eds.), *Evidence-Based Initiatives for Organizational Change and Development,* (pp. 472-482).

Webster, C., & Ivanov, S. (2019). Robotics, Artificial Intelligence, and the Evolving Nature of Work. In *Digital Transformation in Business and Society Theory and Cases* (pp. 127-143): Palgrave Macmillan.

Wood, D., & Gray, B. (1991). Toward a Comprehensive Theory of Collaboration. *The Journal of Applied Behavioral Science, 27*, 2. doi:https://doi.org/10.1177/0021886391272001