What impact will artificial intelligence have on learning and development?

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Abstract

A new wave of emerging technologies looks set to transform the working world. Of these technologies, Artificial Intelligence (AI) has already had the most significant impact. This trend looks set to continue with more and more companies making it an integral part of their core business strategy. One business function where its impact has not yet been fully realised is Human Resources. This paper seeks to determine this impact specifically in the area of Learning & Development (L&D).

A literature review is used to give an overview of AI, its place in society as well as the business world before delving into the HR discipline, specifically Learning & Development. To build on the current state of the field discussed in this literature review, the methodological approach of a survey is proposed to explore the opinions of the impact of AI on L&D from both current and future HR professionals. The findings of this survey suggest that AI will indeed have an impact on L&D. Data analytics and enhanced AI processes were the most selected option to improve L&D techniques and initiatives such as knowledge sharing and training. Despite the benefits that were noted, there were also some serious concerns that respondents had about AI influencing L&D. Privacy concerns and general job losses were the most serious issues that respondents chose.

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Introduction

Throughout history, technological advancements have paved the way for the transformation of society as a whole. From caveman times to modern times, the term technology has gone from an umbrella term used to describe things such as stone tools to now describing more advanced machinery and electronic equipment. Over the last few decades technology has developed at an unprecedented pace which has led to computer technology in particular drastically changing both our personal and professional lives. This change shows no signs of slowing down with a new type of technology set to further disrupt how we do things – Artificial Intelligence (AI).

For thousands of years, humans have attempted to understand how we perceive, think and predict the world around us. The creation of AI takes this to another level in that it not only attempts to further understand these things but also brings about the creation of an entirely new intelligent entity (Kirchenberger, 2017). There has been extensive research into how AI will change the world as we know it, in both our personal and professional lives. AI is involved with almost everything to do with regards to computers and ranges in complexity from relatively simple database search engines to machines that are truly capable of independent thinking.

The world of work will be no exception to this transformation with there being many studies that show the significance of the impact that AI will have on businesses. Combined with an increasing number of young professionals who grew up with technology entering the workplace, it is imperative that organisations start looking to take advantage of this technology. Technology can also enable the engagement of these employees through ways such as personalised employee dashboards, immediate feedback and gamification of work (Jha, Sareen & Potnuru, 2019).

AI is forecasted to add billions in real gross value added to a multitude of industries by 2035 (Vochozka et al, 2018). This is evidenced by companies, mainly tech giants,

investing between $26 to $39 billion in AI in 2016 (Bughin et al, 2017). These tech giants such as Google, Microsoft and Amazon were just some of the first adopters of these technologies which helped give them significant competitive advantage over their rivals. The time for early adopters to take advantage doesn't look to have passed as despite many businesses having already implemented this technology, its full potential is yet to be realised. Many companies continue to further reshape their strategies with these technologies in mind so they can survive this new age. This is particularly true for many smaller companies who often look to innovators and early adopters to help predict which products/services will be successful (Saaksjarvi & Hellen, 2019). Remaining open to innovations and then shifting the company's business model is one of the major challenges that leaders face (Lee et al, 2019).

Many researchers have aimed to explore how these exciting new technologies will impact different business functions. Not only AI but other technologies such as AR/VR, 3D printing, IoT and general robotics are set to lead the next wave of technological change. They are just some of what people consider will be the "next big thing" (Weber, 2019). AI is predicted to not only provide the foundations for developments in these technologies but also play a larger part in how well they are integrated into organisations. Integrating these technologies is almost essential as it is shown that the use of technology is highly useful for companies that wish to create competitive advantage and compete on a global scale (Puvvada, 2019). Nearly 85% of executives believe AI will allow them to sustain this competitive advantage (Ransbotham et al, 2017).

Integrating technology has already become common in most business areas. Despite this, certain business functions have yet to be truly impacted by this technological transformation. One of these areas that has only seen somewhat limited implementation of emerging technologies is HR. Many companies still take more of a traditional approach to HR in that emphasis is placed more on the human element. This is obviously the most important part of HR, but AI is something that can augment and develop this relationship rather than something that will replace or devalue it. This digital transformation has already improved HR

processes, not only making them more efficient and effective but has also changed the inherent role of HR within the organisation. If implementing these technologies, HR should take more of an active role in ensuring that human capital have the required skills, knowledge and support to meet the technological needs of the organisation in the near future (Fenech, Baguant & Ivanov, 2019).

While AI has been implemented in HR to a certain extent, this is only really the case in certain areas such as basic data analytics and screening of potential employees. There has been a relative lack of research of its impact on other areas of HR. It has potential benefits to all areas of the HR discipline including improving collaboration, employee relations and general administration tasks. Though as of yet, there has been no theoretical breakthrough with regards to the specific relationship between AI and HR (Jatoba et al, 2019). Perhaps one of the lesser researched areas that AI could impact is that of learning and development. Learning and development is one of the cornerstones to long term success of any company and eventually improving employer brand.

This study sets out to fill the gap in this area of the AI/HR field by conducting a survey to find out the opinions of HR professionals/Employees themselves on the potential impact of AI on learning and development.

Literature Review

AI Overview

When examining the impact of a complex, emerging technology such as AI on something as broad as Learning & Development, it is essential to fully understand it before you can truly measure its impact. This involves not only AI's current state but also how it has changed over time to better understand its application and how it could continue to evolve in the future. Without understanding the technology, accurately measuring its impact is impossible.

"Artificial intelligence (AI) is defined by the European Commission (2019) as systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals." The main aim of the technology is to exhibit the characteristics that are commonly associated with intelligence in human behaviour (Tecuci, 2012). This is mostly done through a form of machine learning. Machine learning consists of how capable machines are of learning from information. These systems are designed to accomplish specific tasks by accessing and analysing massive amounts of data in an intelligent manner so that humans are best informed to make the best possible decision and in an efficient manner (Metcalf, Askay & Rosenberg, 2019). There are many varying levels of machine learning. These forms of computer intelligence tend to be grouped under the same term regardless of the levels of complexity. This can often lead to confusion about what is considered AI and what is not.

There are three types of core technologies that are fundamental to AI and would provide the foundation for its use in L&D. These are algorithms, big data and computing power technologies. The algorithms help build the software such as language processing. From there the AI algorithms require massive amounts of data which is where the term 'big data' comes from. It also involves the storage, management and analysis of this data. To make all these applications work, enormous computational power is required for the sheer number of calculations

and processes required every second in AI (Quan & Sanderson, 2018). These AI applications can also range from very simple programs to hugely complex AI systems that almost display intelligence like that of a human being.

These varying levels of AI capabilities were put in simple terms by Haenlein & Kaplan (a) (2019) who proposed three stages of AI. These were narrow, general and super forms of intelligence. Narrow AI is the most basic form of AI which only equals/outperforms humans in specific areas. General AI is a bit more complex and is capable of equal/outperforming humans over several areas while also being capable of autonomous problem solving. Lastly, Super AI theoretically outperforms humans in all areas and can solve problems instantaneously. Super AI is still more the stuff of science fiction whereas narrow and general AI are the most realistic for practical applications. These are the forms of AI that are currently used in most businesses at present and will likely still be the AI of choice in the future if implemented into L&D. As Brock & von Wangenheim (2019) noted, before statements such as "AI taking over everything" become true, more 'realistic AI' will be the most practical option for a long, long time. This 'realistic AI' still has massive potential though, which is shown by Haenlein & Kaplan (b) (2019) who described how AI will become just as much of a part of our lives as the internet did previously. This is perhaps one of the greatest indications of AI's potential as a comparison to the internet would sound ridiculous for many other technologies. Weber (2019) noted how AI will likely become even bigger than the internet even if that is only because at some point it will "*be* the internet".

History of AI

The origins of AI are difficult to nail down exactly, but can probably be traced back to the 1940s where science fiction writer Isaac Asimov wrote a short story about a robot that evolves around the three laws of robotics – a robot may not harm a human, it must obey orders and it must protect its own existence (unless these is in conflict with the first two rules). Asimov's work inspired a generation of computer scientists, one of which was Marvin Minsky who founded MIT's world renowned AI laboratory and later in 1956, together with John McCarthy, held an 8 week workshop at Dartmouth College where the term 'Artificial Intelligence' was

coined for the first time (Haenlein & Kaplan (b), 2019). This term was slow to take off but eventually became part of everyday vernacular within the field and elsewhere.

These developments by McCarthy and co. were not the only ones occurring in the field during the 1940 and 1950s. While they were holding events and workshops in the states, World War II had seen the collaboration of many British scientists from various disciplines to help the war effort. Amongst other things, this level of collaboration brought about one of the first real waves of intelligent machines that provide the foundations for what we have in business today.

Computer scientist Alan Turing, he created a test that could measure the intelligence of a machines against that of genuine human intelligence. It was dubbed the 'Turing Test' and is seen as one of the landmark developments of AI. This test was designed to measure whether a machine is actually intelligent or not. It analysed the responses of these machines to see whether it was truly capable of passing itself off as a human. If it passed this test, it was officially considered to be truly artificially intelligent. To this day many have claimed to have created AI that can pass the Turing test but as of yet no form of AI has officially passed. This is not necessarily a bad thing in certain fields such as HR, as genuinely intelligent or sentient AI could potentially cause several issues & disruption within L&D due to its collection of user data and its overall personal nature.

Despite Turing's progress, the UK and Europe were said to be behind the United States in AI development/research and only started to catch up in the mid-1960's where various machine intelligence workshops were held in the UK (Sandewall, 2014). This helped inspire AI research throughout Europe and saw a lot of progress made within the field. At this time, the concern became less about "learning" and more so breaking through the narrowness of older systems for a more authentic representation of knowledge (Buchanan, 2006). AI flourished during this era as computers were able to store more information while also becoming faster, cheaper and more accessible. AI demonstrations were showing the promise of the technologies as well as the advocacy of leading experts helped convince government agencies for continued funding.

Despite the promise of this era of exciting developments in AI, the 1970's saw an 'AI winter' where there was no significant progression in computing power despite huge amounts of money being invested in it. This led to a serious decline in not only investments but also general interest in the field. This lasted until the early 1980's where more realistic and basic forms of AI were created for commercial reasons (BBC, 2020) which helped create a new wave of intrigue in the technology. One of these was Edward Feihenbaum's 'expert systems' which mimicked the decision making of human experts (Anyoha, 2017). This change in approach would lead the way for the types of systems that are still commonly used in HR/L&D functions today.

The 1990's saw AI scientist Rodney Brooks start a revival of previous, more ambitious approaches to AI where there was a move away from pre-programming a computer towards a machine that interacts with its environment paving the way for true learning (Brooks, 1990). Another landmark for AI was reached in 1997 as an IBM developed AI program defeated chess champion Gary Kasparov. This was one of the first times where AI displayed its true capabilities in a practical setting. AI speech recognition software, like that used in many businesses tools today, was also introduced into Windows operating systems as well as many other functions throughout their organisation.

AI has seen just as much development in more recent times. IBMs supercomputer 'Watson' was introduced in 2011 which is considered to be the most advanced form of AI to date. This supercomputer combines over 3000 networked computers loaded with millions of documents which it can access instantly. Watson even won on the game show 'Jeopardy' where it displayed the capability to understand the games word play and incomplete information by using probabilistic reasoning (Norvig, 2012). While this is something for the future, the applications of AI of this magnitude are clear for any business, not just specifically &D.

AI in Society

The use of AI has not only been used in a professional business/HR setting but has also become prevalent in our personal lives too. The success of a technology in wider society can often be a good indicator of its potential uses in different business functions such as HR. Companies are able to see how people have adopted it and their general reaction when using it. It is commonly used in smartphone apps and social media apps such as Facebook, Instagram and Snapchat. AI assistants such as Siri and Alexa have become household names. These are examples of AI programs that are capable of voice recognition and understanding requests. These use of personal voice assistants can be applied to a L&D context to help relieve the user of routine tasks and to reduce mistakes allowing them to redirect their energy elsewhere (Myers et al, 2007).

Other apps such as google translate are now able to use AI to provide real time translation through the ability to view an object and identify what it says regardless of font size or camera quality. While this is often attributed to augmented reality technologies, it is AI that powers it. Google translates more in a day than all the human translators combined would do in a year using a form of probabilistic reasoning (Norvig, 2012). AI also helps tackle the enormous amount of spam that plagues the online world. Over 90% of all email sent can be considered spam which if, was reflected in the contents of people's inboxes, would render them unusable. AI tackles this using spam filters which require (basic) machine learning in order to identify what's spam and what's not (Norvig, 2012). AI's capability to recognise what is relevant information and what is not could potentially be very important to the area of L&D.

As well as our personal lives the technology is also used in most business settings across a wide array of industries. Implementation of AI has led to many of these adopters seeing an improvement in decision making, costs savings and resource allocation all of which not only apply to a general business setting but also to L&D too. For example, in financial services, AI has enabled a high level of fraud detection. In marketing, AI is enabling the personalisation of the experience as well as determining the content that users most want to see. It is also used in the

health sector to help detect any illness/disease early in order to increase the number of preventative measures as well as even discover new medicine and treatments (OECD, 2019). In terms of specific organisations, it has been used by some of the largest firms in the world to great success. These companies use AI to analyse the massive amount of data they collect. Alibaba and Amazon have used it to predict what products customers might be interested in, Apple have used it in their phones for things such as FaceID and music recommendations. Facebook use it analyse posts and other content to and detect if there is anything inappropriate or against site rules, while Microsoft have used it in all their products such as Skype, Bing and Office 365 (Marr, 2019). While these are firm/industry specific examples, they still have bearing to the type of impact that AI can have on L&D.

AI also has many other uses that are applicable across most industries and professions. An example of this is AI chatbots that have become common throughout many online websites. Chatbots are one of the most basic yet useful features of AI with many online retailers employing some sort of AI chatbot feature. The chatbots are often very basic in that they are not built to be capable of machine learning but rather are there for assessing/answering straightforward queries. This is considered a form of pre-programmed AI in that they are coded to deal with a certain task. In the coming years, these uses of AI within society are likely to be viewed as the early adopters as more and more companies will integrate the technology over time.

Implementing it into Business

It is clear that the business world has already been impacted by the rise of AI with it quickly becoming a core part of many companies across the world. But at the same time, for it to be successful, the right structure needs to be in place. If the technology is not implemented into the business as a whole then it is very unlikely that it will find its way solely into HR, or specifically L&D.

Developing an AI strategy and roadmap is important to understand what the technology can do for your specific organisation rather than just using vague buzzwords. Then it is important to establish AI capabilities and skills in-house and create a dedicated AI team. This dedicated team should be multi-disciplinary and cross functional, representing all areas of the business including L&D activities. It is essential that this work is not done in a silo as AI will impact every part of the organisation (PwC, 2020). This establishing then fits in with the third step of starting small before scaling quickly. This allows for a better indication of the impact of the technology, give it time to become part of the culture of the company and due to the fact, that starting with large scale, complex projects often lead to failure (Schoonhoven, Roelands & Brenna, 2018).

Along with this many business leaders are enthusiastic but often overlook a key factor in the technology's success – people's ability to use it. Companies must shift their focus to upgrade the skills of their employees and build an AI savvy workforce. This can be viewed as a form of developing employees to then help them develop themselves. Some companies tend to view AI as some sort of transformational 'holy grail' that will instantly solve all their issues. In reality, the most effective implementation of the technology is shown to be when its used with other advanced digital technologies as a part of a firms overall digital transformation strategy (Brock & von Wangenheim, 2019). Not only should the right systems be in place, but the organisations should be shaped in a way that they are aligned to take advantage of AI (Hellller, 2019). Along with this, it is important to remember that companies succeed when smart machines are partnered with smart people (Ross, 2018).

Even with the potential it has shown, not everybody is yet on board. According to (O'Neill & Duffy, 2020), most Irish leaders acknowledge that AI is going to change their operations over the next 5 years. Despite this 40% of respondents have no intention to do anything about it over the next 12 months as they do not actually understand the impact AI will have. Once again this shows that there is a big difference between the vision and the execution. It is not just the general public who still view AI as either something for the future or something out of a sci-fi

movie. Even people working in top management roles are lacking in their understanding of the technology.

Even with this lack of vision, implementing the technology will bring about the creation of new innovative roles and cutting-edge opportunities (Vochozka et al, 2018) across many different business functions including accounting, marketing and sales. One of these functions that AI has already had and is predicted to continue to have a significant impact on, is that of Human Resources (HR).

Technology in HR

Like most business functions, HR has already gone through quite a technological transformation in the recent past even before the rise of AI. HR is an information-centred activity which traditionally is focused on silos of functional information. Technology allows for a tremendous opportunity for organisations to manage and develop these information resources (Groe, Pyle & Jamrog, 1996). For example, at IBM technology has played an important role in delivering centralized HR support to over 500,000 IBM past and present employees. These technologies include various employee platforms, applications and HR tracking systems to deliver HR policies, transactions and general data support (Gonzales et al, 1999). The use of technology in general facilitates or supplements many different functions such as HR planning, recruitment and selection, performance management, reward management, employee relations etc. (Fenech, Baguant & Ivanov, 2019). HR is evolving into a more technology-based profession as amongst other things technology can help streamline HR processes, reduce administration costs, compete more efficiently for global talent, improve access to data organisation wide and provide real time information (Johnson & Gueutal, 2011).

AI in HR

While AI has yet to truly transform L&D, its use in general HR functions has already seen substantial growth. Despite this, during its initial introduction, AI faced

numerous challenges from senior HR members across many industries but its benefits to the discipline soon became clear enough that this resistance subsided (Gulliford & Dixon, 2019). While HR will always be a discipline mainly focused on the people, AI has allowed many repetitive tasks and goals to be automated allowing for processes to be completed much more efficiently (Wu, 2016). This can then lead to an increase in productivity as employees can spend their time doing other things rather than waste time on relatively menial tasks (Heller, 2019). AI has the capacity to boost labour productivity in this area by almost 40% by 2035 (Purdy & Daugherty, 2016). It will do this not only through creating new ways of doing things but also augmenting and complementing existing workforces with AI technologies (Szczepanski,2019). Going hand in hand with boosting productivity is that of financial gain as speeding up these monotonous tasks can lead to a significant reduction in cost (Charlier & Kloppenburg, 2017).

This is true across a variety of different HR functions. One example of this was shown by Hmoud & Lazlo (2019) who proposed that AI will have a significant impact on the recruitment and selection of employees. This is done through AI being able to take over time-consuming tasks such as sourcing and screening applicants and instead using algorithms to improve the selection process. AI can also help reduce human error and bias that would normally impact this selection. These things can contribute to a higher quality of recruitment and reduction in costs. While in theory AI should remove bias, it is not always the case. Input can still be bias with AI when the source data itself is bias or lacks certain information. This area of removing bias is also important in terms of L&D. This can be an issue where bias occurs based on the preconceptions of the programmers (Coval, 2018). Expense reports, holidays and pay are other examples of things that are predicted to eventually be managed by AI rather than humans (Britt, 2019). AI can allow HR to more accurately compensate employees. It can do this by better determining their actual skill and contribution rather than simply the compensation level tied to their role in the organisation (Sammer, 2019).

It can be assumed that most companies have already implemented some sort of analytics into their business model. AI will augment this by building upon these

existing structures. It does this by enhancing the description, explanation, prediction and prescription of the analysed data (Andriole, 2019). AI analytics can enable human resources to measure how things such as engagement drives behaviours such as attrition, absence and productivity (Gulliford & Dixon, 2019). Having this information can then lead to management being better informed on the position of the company and its employees so that they can make better decisions. AI uses big data and advanced analytics combined with some form of human interaction to enrich this decision making (Yablonsky, 2019). The promise of data analytics within HR is shown by 96% of learning practitioners believe that data analytics is a priority in terms of development and upskilling needed within organisations (Blackwell, Daly & Lancaster, 2019).

As is evident, AI has already had a significant impact on the HR discipline. Despite this there is one area of HR that has taken somewhat of a backseat regarding the impact of AI – Learning & Development.

Learning & Development

After exploring what exactly AI is and what it does, it is also important to now explore Learning & Development as a discipline before we can truly understand how something as complex as AI could impact it. Learning & development is about "creating the culture and environment for individuals and organisations to learn and grow. It's knowing the current and future capability needs of the organisation, as well as how to create a learning culture that drives engagement in continuous professional development" (CIPD, 2020). This is accomplished using appropriate curriculum and techniques such as coaching, individual and team trainings, and staff assessments. The term 'learning' often applies to immediate teaching, while 'development' has a longer-term connotation.

Learning involves being taught or acquiring knowledge to properly carry out a job or task while development takes learning from being something that happens at the start and moves it towards a more continuous form where you are constantly improving. Organisations who develop the skills and knowledge of their

employees through planned, continuous development see a significantly positive impact on growth, productivity and performance. This applies to all employees even the ones who create the development plan – HR (Blackwell, Daly & Lancaster, 2019). It basically boils down to creating a culture and environment to help both individuals and organisations to learn and grow (CIPD, 2020). It goes beyond benefits to the organisation but also to the employee themselves. Development is aimed at enhancing individual knowledge, self-confidence and career potential while also equipping them with the tools needed to self-actualise in their careers (McGuire, Garavan & Dooley, 2011). This term has replaced 'Training & Development' as it now covers a much wider array of activities.

Learning & Development Process

This process involves "Creating, disseminating and embodying knowledge as it becomes a key strategic resource to be leveraged which holds the key to unlocking an organisations ability to learn faster than its environment is changing" (Beardwell & Thompson, 2014). The importance of this is indicated by how much technologies like AI themselves are changing the environments that these organisations are operating in. This concept of developing and adapting to both industry and global shifts has become more and more focused upon in recent years. It is important to find the right style for the specific organisation relative to industry, technology and other factors as not all training practices will have the same impact on firm performance (Manresa, Bikfalvi & Simon, 2019).

A learning and development strategy outlines "the workforce capabilities, skills and competencies the organisation needs, and how they can be developed to ensure a sustainable, successful organisation" (Hayden, 2020). This strategy should also be aligned with the overall strategy of the organisation. These development initiatives can help develop dynamic capabilities to adapt to the unprecedented rate of change that organisations are facing (Garavan et al, 2016). Despite this, many organisations still view training and development as an operational function rather than a strategic one (McCracken & Wallace, 2000).

The continuous learning that learning and development initiatives bring stimulates employee growth and improves workplace skills and productivity. It also leads to greater employee commitment to learning, increased focus and sense of self-affirmation (Fenwick, 2003). People participating in L&D initiatives were also shown to become more committed to their organisation (Susomrith, Coetzer & Ampofo, 2019). All these L&D activities and outcomes are well established at this stage. What's next is to see how they will be influenced by AI.

AI in Learning & Development

While these points mainly focus around traditional L&D practices, the benefits of AI to learning and development to improve and enhance them are very promising. AI should not be viewed as something to completely replace human involvement in the workplace but rather it should act as a supplement to an already highly capable employee. AI can enhance human capabilities (Hebbar, 2017) and should be one half of a partnership between smart machines and smart employees (Ross, 2018). Companies who understand this and place an emphasis on the understanding of behavioural intelligence will be best equipped to create the right environment for collaboration between people and machines (Scott & Le Lievre, 2020).

More than half of L&D strategies are created from scratch within the organisation rather than adapting existing strategies. This allows for companies to better integrate AI into this strategy (CIPD, 2015). AI can assess a learner's behaviour, cognitive and engagement preferences and align them with a learning and development program (Upadhyay & Khandelwal, 2019). This is applicable across a variety of learning and development methods. Smith, Orlando & Berta (2018) found that implementing learning models in performance management systems enabled continuous learning opportunities through knowledge exchange, greater understanding of practice and performance patterns, relationship building and multi-level feedback amongst others.

Enhancing E-Learning initiatives

One of these methods is simply enhancing existing E-learning initiatives. Online training is an effective tool in helping organisations to meet their workforce development needs, by providing relevant training and improving workers self-efficacy (Brennan et al, 2019). E-learning has many advantages including flexibility, consistency, cost effectiveness and removes the requirements/obstacles of time and space (Jommanop & Mekruksavanich, 2019). This is particularly true in larger organisations as they are more likely to include e-learning initiatives than smaller organisations (CIPD, 2015).

However, these e-learning initiatives have traditionally been experienced as one-way communication processes simply to deliver information, rather than an engaging experience (Yousif, Saini & Uraibi, 2011). Implementing AI into these systems should allow them to become more interactive, provide greater access and allow them to adapt to the changing knowledge requirements of the user (Atolagbe, 2003). AI's ability to imitate human reasoning and decision making should also boost the effectiveness of these e-learning initiatives by adapting learning processes to different user's preferences and strengths (Almohammadi et al, 2017).

Utilising AI powered gamification methods have also been shown to increase engagement in e-learning initiatives. Gamification is the implementation of game design elements in non-game contexts (Deterding et al, 2011). It provides interactive, immersive experiences like real video games by transforming work related learning material into a game. It also provides recognition through in-game badges or points for further engagement. All these things have shown to positively affect learning outcomes (Armstrong & Landers, 2018). These AI powered simulations also let learners experience the effects of various actions in different situations. What once were mainly used by aviation and military industries are now being adopted by businesses too. Simulating these experiences can also allow

managers to take on more of a mentor/coaching role (Ong & Ramachandran, 2003).

Information Processing/Knowledge Sharing

Matiy (2019) found that AI can have a positive impact on the learning and development of employees. This AI technology allows for knowledge and information to be available and seamlessly integrated across the entire organisation. AI can help with the processing of information – what is relevant, who needs this information and how to deliver it to them (Heller, 2019). This is perhaps the most impactful feature of AI for improving L&D throughout the organisation. Getting the right information to the right person at the right time is something that is currently lacking within most organisations. Often it can take a significant amount of time to find the right information, but AI should provide it straight away in a relevant context.

This can improve communication and co-ordination across the organisation at a large scale so people can always get access to information . It can do this by transcribing meetings people could not attend, facilitate communications between people and deliver information through basic chatbots. During presentations/meetings, information will be able to be called up almost instantaneously. If management want certain employees to complete a task then the information will be sent out to them exclusively (Wilson & Daugherty, 2018).

New employees who want to connect with others and find information about the organisation, may not know where to go. HR implementing AI systems that can answer these questions to get them up to speed (EY, 2018). This concept not only applies to new employees but to all employees regardless of how long they have been working there or their position within the company. As the system advances, collects more information and generally becomes more advanced it should be able

to assist and answer any work-related questions/searches that the employees may have regardless of complexity

AI can also help in terms of different types of knowledge. Tacit knowledge has traditionally been difficult to transfer from one person to another as it is something that is gained from personal experience rather than something you can get from books. As AI attempts to replicate human behaviour it can also absorb this knowledge in a way that previously was not possible and in turn quickly develop and get newer employees up to pace with the reality of working in that specific organisation (Sanzogni, Guzman & Busch, 2017).

Collaboration

Leading on from sharing this knowledge between various employees/departments is how AI can also improve/enhance collaboration within the organisation. An example of this was shown by Metcalf, Askay & Rosenberg (2019) who introduced a collaboration technology called Artificial Swarm Intelligence (ASI). This software was used to harness the diverse perspectives of individuals to help amplify the intelligence of human groups while removing the limitations associated with group decision making.

AI can also improve collaboration between different departments. Traditionally different systems from different sources/vendors were used for different tasks in different HR departments. AI can help bring all these together under one system. This should lead to a more standardised approach where different departments can use the system to pool their data and resources to get the most accurate picture possible (Tambe, Cappelli & Yakubovich, 2019). It is important that both individual and organisational learning are occurring together in ways that support the organisation (Herd, Shuck & Githens, 2018).

Training (Personalised)

Along with providing the right information and making collaboration easier, AI can also improve the initial and continuous training of employees. It provides intuitive and adaptable development practices which leads to moving out of more traditional 'classroom' environments. AI can enable more personalised training for each employees' individual through identifying user characteristics. AI can then use this information to provide tailored training programs for new employee's level and do so at a comfortable pace.

Companies can use the technology plan digital training opportunities based on skill-gap assessments and allow both managers and employees to track their progress (EY, 2018). Altemeyer (2019) also found that AI can remove bias not only from recruitment and selection but also from the assessment of current employees. This data collected from these AI based skill gap assessments can then be used to design a training program that can provide a personalised schedule based on a person's behaviour and preferences, analyse the training data and identify weaknesses and then suggest the next steps for improvement. This will be a straightforward process for the organisation as AI enables 'mass personalisation' of training and development, identifying personal needs and offering training solutions personalised to the needs of the employee/group. In this way AI can act as a 'Virtual Personal Mentor' (Matiy, 2019). Benefits of using AI in training also include employees learning at their own pace which then leads to higher retention rates (Upadhyay & Khandelwal, 2019).

It can also provide a base for e-learning by providing intelligent chatbots and relevant information in a real-time manner when necessary to provide continuous training on the job whenever the employee needs it. These AI chatbots can provide a 'conversational' approach to development which allows employees to find relevant information at the right time and at the right cost in a secure manner (EY, 2018). Sometimes in more e-learning environments, learners can begin to feel isolated due to a lack of a human touch. These intelligent chatbots can reduce these feelings of isolation as well as improving the overall learning experience (Wu et al, 2020). These interactions between chatbots and employees can also be another avenue for AI to collect important data (Rajkumar, 2020).

Outcomes for the Organisation

Despite these many benefits and applications for AI in learning and development, AI should not just be an alternative for highly skilled employees but rather it should be one half of a partnership between smart machines and smart employees (Ross, 2018). Having the right employees is still the most valuable asset an organisation can possess.

The successful implementation of these technologies would likely lead to many other benefits for the organisation. This would go beyond just the purpose of the technologies as it would also improve things such as organisational commitment, motivation and job satisfaction levels. AI can have many benefits for businesses such as enhanced product features, better decision making, higher levels of productivity and optimized internal and external processes. (Davenport & Ronanki, 2018). The outcomes of this technology include improving job related skills and competencies to the benefit of both the employee and the organisation.

AI will also free up managers time by reducing the amount of administration work they have to do (Kolbjonsrud, Amico & Thomas, 2016), in turn allowing them to focus more on the human aspect, managing and developing their employees through a more hands on approach. The technology also allows for managers to better predict their ROI for L&D related activities (Gulliford & Dixon, 2019). Organisations significantly investing in AI and the subsequent attraction and retention of top talent can eventually lead to the strengthening of the employer brand of the company and lead to long term success (Charlier & Kloppenburg, 2017)

Obstacles

Despite all these obvious benefits, there are still questions about the reality of artificial intelligence in the workplace. As with every technological change there will always be some sort of obstacle to its success or potential drawbacks to the

technology. Some of these issues won't become apparent until well after the technologies are actually integrated into businesses and society as a whole. These include things such as the complexity of HR/L&D phenomena, organisations not using large enough data sets, fairness and accountability questions as well as other ethical and legal issues (Tambe, Cappelli & Yakubovich, 2019).

Another one of the main concerns for companies is the level of investment required in not only the implementation but also staying up to date with the latest version of the technology and maintaining it. Most companies worry that the technology can advance so rapidly that their current systems can quickly become relatively obsolete (Ahmad, Masri & Chong, 2019). With this level of investment that is required to keep up to date, companies will naturally want to see clear evidence of the potential and examples of success before they invest.

Resistance to Change

A lot of this comes down to the resistance to change within organisations at all levels. This tendency to be resistant to change has been well documented within organisations. Resistance to change is real and a barrier which can stop an organisation reaching its goal. Successfully implementing change requires an understanding of the human response to change (Lewis, Romanaggi & Chapple, 2009) which must be taken into consideration before implementing the technology into L&D. Although while it can be initially hard to launch new technologies in a workplace, employees gradually accepted and adopted it (Basyal & Seo, 2017). One way to combat this is through making smaller incremental changes. This is particularly the case for larger organisations as they are better equipped to cover any costs associated with this type of change. They will also reap greater benefits and increase their competitiveness through continuous incremental technological improvements to enhance L&D compared to smaller firms (McKendrick & Wade, 2010). Continuously helping and teaching employees about these technologies can help them to overcome barriers that arise due to lack of knowledge, trust and resistance to change (Sanchez-Pollo et al, 2019).

Technostress

Even then when these technologies are eventually accepted, there is usually an increased level of 'techno-stress' for a certain period afterwards. This term is used to describe the stress people encounter when using too much or new technologies which leads to them feeling overwhelmed by these technologies whether it be from lack of understanding or just fear. It is most common in older employees or those who have being doing a task in the traditional way for a long time. It was found that these technologies were less likely to improve job satisfaction when technostress (and techno-insecurity) were high. Though this was less likely in the presence of top management support (Florkowski, 2019).

Lacks Human touch

It is argued that AI can be too 'cold' and lack the emotional intelligence of real people which can lead to dissatisfied employees and reduce its impact on L&D in the long run. This idea of emotional intelligence is something that has become more and more important in the last few years. This runs parallel to the idea that one of the areas that AI struggles with the most is emotional intelligence is one of the most difficult types of intelligence for machines to replicate/emulate. While AI could mimic human intelligence in numerous ways, one aspect that the technology severely lacks in is that of common sense and ability to reason (McCarthy, 2007). Such human-focused tasks are all genuine obstacles to the implementation of the technology within HR as it is nigh impossible for AI to provide the human connection/warmth that is often associated with the profession. Despite this, to compensate for the supposed lack of human touch in the age of AI taking on administrative/mundane tasks, managers will now have a greater amount of free time to put more emphasis on the empathetic and emotional side of things (Huang, Rust & Maksimovic, 2019).

Ethics/Privacy

In terms of ethical considerations, AI can be controversial as these programs require an abundance of (user) data. This collection and analysis of data is viewed by many as being an invasion of privacy that they are simply not comfortable with. It also brings up the conversation about the direction the working world is heading in. Some argue that analytical technologies such as AI can also be viewed as further treating employees as statistics and numbers rather than real people. There is a concern not only about the information the system is designed to pick up but also anything else it could collect without the user's consent (Pfeifle, 2018). There are several other ethical questions to be considered. Does AI cross the line between motivation and manipulation, who is liable for machines decisions and who owns the data that is produced – the user or the company? (Sumser, 2017). Renz & Hilbig (2020) also argue that a lack of sovereignty of the data is one of the main reasons that AI has of yet failed to truly take off in a learning environment.

Job Losses

AI can also create conflict by automating tasks that people are used to doing in more traditional ways. While it is a benefit to the managers and productivity levels of the organisation, it can also replace jobs/tasks and lead to resentment within the organisation. This is not only an issue within formal organisations but throughout overall society. AI led automation will lead to the loss of many jobs throughout the world. This is one of the many reasons that people can be wary of the technology as the transition period for this shift will be quite tough for many people and one of the greater challenges that contemporary organisations will face in the near future. While innovation technologies are likely to substitute human work considerably, there is still a lot of space for personnel if organisations begin to examine work in a new way (Deggans et al, 2019). Things such as redefining and creating new roles should help open whole new opportunities for the organisations.

Methodology

Research Question

'What impact will artificial intelligence have on learning and development?'

The main aim of this study is to determine what impact artificial intelligence will have on learning and development. Most previous research has focused on the overall impact of AI on HR or on other specific areas such as recruitment & selection. There appears to be a gap in the HR/AI field with regards to its impact on Learning & Development. This research question is framed around closing this gap.

Aims & Objectives

To fill this gap, this study aims to explore the views of current and future HR professionals on the potential impact of artificial intelligence on learning and development. It will do this through a mostly quantitative approach in that of a survey. While it will take a mostly positivist approach, there is though some room for interpretation in L&D specific questions. This is due to the slightly explorative nature of the study, as it involves seeking new insights and finding out what will happen with regards to a new technology where it's full potential has yet to be realised.

While the main objective of this study is to find out whether AI will have a significant impact on learning and development within organisations, it begins with finding out whether the technology will have an impact on business as well as HR. The justification for this is that if it does not have an impact on business/HR overall, then it is unlikely to be implemented specifically in L&D. Objectives include exploring which area of L&D will receive the greatest benefit, which feature of AI

will prove to have the greatest impact and whether respondents believe there are any obstacles to its implementation

AI/HR Field

There has been an abundance of research within the AI field comprising of various methods and approaches. There are numerous subsets of AI research across various disciplines, not just computer science, such as psychology, philosophy, mathematics and linguistics amongst others. This has led to lots of AI related research being very different from each other even though they fall under the same umbrella term of Artificial Intelligence. One of the main reasons for this is that AI is quite a broad subject that often attracts a lot of confusion. Although it is well established that AI revolves around replicating human intelligence, there are various different research goals that differ from each other when it comes to AI that contribute to this confusion. These include Structure-AI (study of the human brain), Behavioural-AI (study of human psychology), Capability-AI (solutions to applications/problems), Function-AI (study of computer science) and Principle-AI (study of information process in various situations). These five areas of AI related research have led to AI struggling to obtain an overall identity and led to the AI field becoming quite muddled (Wang, 2013). Behavioural-AI and Capability AI would be the areas of research most relevant for the HR discipline.

Previous Research Methods

As shown, past researchers within the AI related field have used multiple types of research methods. Even in HR related AI research, methods have varied drastically. Many researchers have simply proposed theoretical implementations of AI such as (Krisler & Alterman, 2018; Atolagbe, 2002), an overview (benefits or challenges) of AI such as (Tambe, Cappelli & Yakubovich, 2019; Jatoba, 2019) while others introduced conceptual frameworks/models such as (Jommanop & Mekruksavanich, 2019; Armstrong & Landers, 2018).

As well as these approaches, AI HR researchers have also used methods from complex experiments to more straightforward interviews and surveys/questionnaires.

For example, Fenech, Baguant & Ivanov (2019) chose interviews as their methodological approach. They conducted semi-structured interviews with HR professionals in order to explore how HR would change during this era of digital transformation (finding that while there would be a significant impact of digitization on HR, there is less emphasis on HR contributing to digitization strategy throughout the organisation). Interviews were also used by Matiy (2019) where 27 HR professionals were interviewed to explore opportunities and requirements for the successful implementation of AI in training and development practices.

Questionnaires were used by Basyal & Seo (2017) to measure employees' resistance to change and technology acceptance (finding that while it can be initially hard to launch new technologies in a workplace, employees gradually accepted and adopted it).

Rajkumar & Ganapathy (2020) used a combination of several methods. They used modified VARK (visual, auditory, read and write, and kinaesthetic) questionnaires implemented as a chatbot while recording the participants beta brain waves before this information is then validated using machine learning (Their findings suggested that this method improved the classification of users in e-learning initiatives).

This was one example of another commonly used method, where researchers chose to create their own AI program or implement their own model. For example, when discussing the feelings of isolation that come up due to the lack of human-like interactions in e-learning platforms, Wu et al (2020) specifically designed a chatbot to act as an e-learning assistant to the user which included not only course materials but also everyday conversation (their findings suggested that these chatbots would reduce feelings of isolation as well as improve the overall learning experience).

In terms of more straightforward approaches, Cismariu & Gherhes (2019) conducted a survey to discover the perceptions and attitudes of employees towards the emergence of AI. They surveyed 280 online participants who had been in their jobs for at least 6 months (to reduce bias). Their findings indicated that there is a mixed reception from employees with both positive reactions as well as fear of the technology. Florkowski (2019) also used an online survey of 169 firms, targeting HR executives as key informants, to determine whether the stress caused by these new HR technologies such as AI was unavoidable or something that could be solved (The findings of this study suggested that stress from the introduction of technology was less likely to increase once there was sufficient support from top level management)

Research Methods for this Study

Some of these methods are quite complex – creation of chatbots, measuring brainwaves etc. They often require lots of time, funding, equipment and expertise knowledge, none of which are available/applicable for this study. Even other methods that are not so complex such as interviews & very basic experiments are unrealistic due to the current global pandemic that is Covid-19. Due to the national lockdown and restrictions, collecting information through the form of an interview or physical questionnaire is not really feasible.

Due to all these reasons and following on from the methods of past researchers, the methodology proposed for a study of this nature is that of an online survey.

The Survey

Using a survey as a methodological approach allows for the collection of valuable insights about AI in L&D from those involved in HR a concise and consistent manner while still allowing for a relatively larger sample size to be collected. The survey will aim to explore HR professionals experience and opinion of these

technologies in general as well as how they may be implemented, received and adopted in the coming years.

The survey sample will consist of those currently working/studying HR. The exclusion criteria for this survey is based around the idea that current and future HR professionals will be the most knowledgeable about the intricacies of the roles and requirements of HR so will therefore be the best suited for answering the questions. The survey sample was collected by sending out an email containing the survey link and some background information about the study. This was sent out to HR students within NCI and other colleges, as well as to those who are currently working who then shared it amongst their peers. This is a form of convenience/purposive sampling which is not ideal but due to the limitations previously mentioned, it was the most realistic option to gather the necessary number of responses in a relatively short time frame.

SurveyMonkey is then used for this as it allows up to 10 questions, 100 respondents and offers basic statistical results. The survey will consist of mainly closed ended questions with three more open ended questions that will allow participants to give additional information. Two questions will consist of identifiers to find out the age and gender of respondents. The next two questions ask the respondents whether they work or study HR and how familiar they are with the technology itself. These questions seek to define the characteristics of the respondents to help determine how valid their responses are. The remaining questions will consist of those relevant to answering the main aims and objectives of the study based off the aspects of AI and L&D mentioned in the literature review section of this study. These will revolve around finding out the opinion of the intricacies of the technology from those who are knowledgeable about the HR profession. It will seek to find out HR professional's opinions on AI itself, its impact on learning and development, which area of L&D they think it will have the greatest impact on, which area of AI will have the greatest influence and any potential obstacles to the implementation of the technology.

Once respondents decide to answer the survey, they will be directed to the SurveyMonkey website where they will be given a brief explanation of these

technologies before being instructed to answer 10 relatively straightforward questions. This should take no more than 5 minutes and participants are free to exit the survey at any time. Beyond the initial identifying questions of age and gender, no other identifying information is asked of the participants. Their responses will be recorded completely anonymously. A consent pop-up will also be used at the start of the survey informing participants of this information as well as what the survey will entail. Once collected, responses will be stored in accordance with NCI's policy. The authors contact details will also be included so if any of the participants wish to see the results of the study, they will be able to do so.

Data Analysis

Once enough survey responses are collected, SurveyMonkey's built in analysis tool will help give a brief overview of the data for general descriptive purposes. The responses that will be collected will be mainly standardised in the form of ordinal data as it suits the nature of the study and allows for greater ease of comparison. The data will then be converted into an excel file where numerical values will be assigned to each response. After this it will be imported into SPSS where it will be further analysed using statistical methods such as cross-tabulation of certain responses as well as the chi-squared test. This will be done to measure the statistical significance and any correlation that is evident from the data. The results will then be discussed and compared back to the findings of previous researchers to determine the significance with regards to the overall AI, HR and Learning & development research fields.

Analysis & Findings

After collecting enough responses, this analysis sets out to explore the results using the approach stated in the methodology section. These survey results were collected over the course of about one month. There was a total of 100 respondents to the survey, reaching the max limit available through SurveyMonkey. This data was then exported in the form of an excel file before then being opened in SPSS where analysis and several statistical tests, both descriptive and inferential, took place. This information is presented below before going further in-depth in the discussion section of this paper.

Demographics

To begin with the opening questions sought to find out who was answering the survey. The first two questions asked the respondents their age range and gender. This information is shown below.

		What is your age?					
		18-24	25-34	35-44	45-54	55-64	Total
What is your gender?	Female	25	11	17	5	4	62
	Male	17	12	4	5	0	38
Total		42	23	21	10	4	100

From this it is clear that females are the dominant gender in terms of respondents. Females account for 62% of total respondents compared to just 38% for males. This is not very surprising as it is well established that there are traditionally more females than males studying/working in HR. According to Torpey (2017), 74.2% of HR managers in the U.S were female. One demographic being dominant is also true for the age of the respondents with 42% selecting the 18-24 age bracket. The younger age brackets were clearly the most selected with no responses from those age 65+, hence that age bracket being left out. Once again this is not surprising as one of the main methods of data collection was through college channels. This

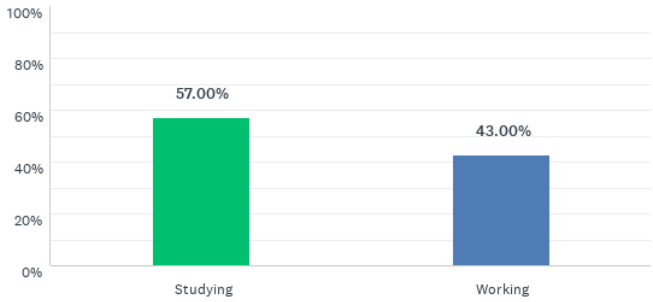
dominance in gender and age is further shown by females aged between 18-24 making up 25% of the total respondents.

Characteristics

As well as gathering the age and gender of respondents, it was also interesting to collect information regarding the respondent's current standing in the HR field as well as their levels of knowledge/familiarity with AI technologies. Learning whether respondents were currently studying or working was a way to explore the difference in views between those from different HR backgrounds.

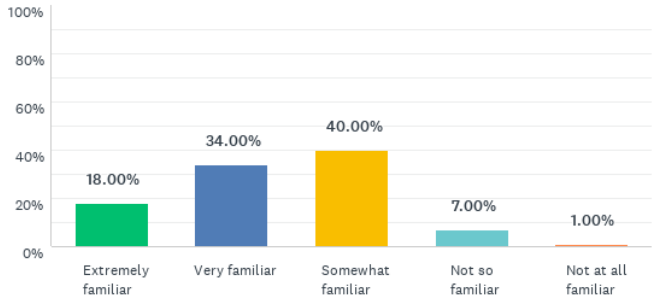
The purpose of finding out the familiarity of respondents with the technology was to assess the validity of their views as well as the level of insight they were able to give. A low level of familiarity with AI technologies could imply that the responses they have given are not particularly insightful.

Q3 Are you currently studying or working in a HR related field?



In terms of current status within the HR field, 57% of respondents were currently studying compared to 43% who said they were working. This is in line with the age demographics where the most common respondent was those between the age of 18-24 and are therefore quite likely to be studying.

Q4 How familiar are you with AI technology?

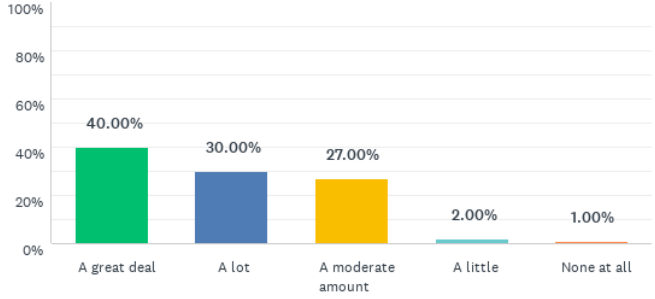


This was an important question to help give support to respondent's answers throughout the rest of the survey. Fortunately, most of the respondents answered that they were at least 'somewhat familiar', coming in at an emphatic 92%. As the overall familiarity was so high there was no substantial difference in terms of age and gender. How accurate this information is remains to be seen, as many people may claim to familiar though their knowledge of AI from movies, popular culture but may not possess any notable insight when applying it to L&D.

Objectives

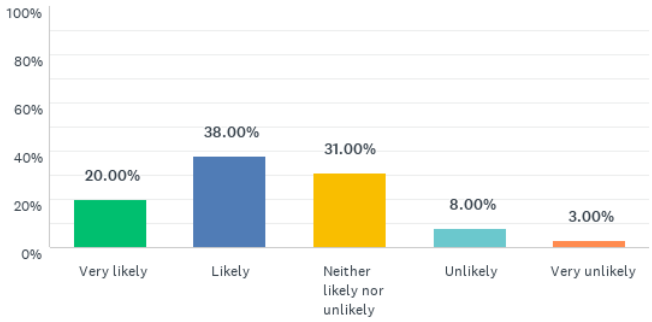
After collecting information about the respondent's demographics and characteristics, the remaining questions were then used to gather the views of HR students and professionals to explore the actual research objective - what impact will artificial intelligence have on learning and development?

Q5 Do you believe the use of AI in business will continue to grow?



The first question of this section sought to explore whether people viewed AI as something that would continue to grow in use and importance in the business world. The justification for this is if people do not believe that AI will have a place in businesses as a whole then it can be argued that it is extremely unlikely to have a place in their HR departments. Fortunately, 40% of respondents believe that the use of AI will continue to grow 'a great deal'. Beyond this almost all (97%) of respondents believe that the use of AI in business will continue to grow at least 'a moderate amount'. The relationship between how familiar people were with AI and whether they believe the use of AI in business will continue to grow was shown to be significant with a p-value of .000. This correlation between how well people know AI and whether it's use in business will continue to grow is promising when you take into account how almost 97% believe that it will continue to grow at least 'a moderate amount' coming from 92% of those who are at least 'somewhat' familiar with the technology. Such a resounding positively response is very promising as if the use of AI failed to continue to grow in the business overall then it would be unlikely to be used in HR.

Q6 Do you think it's likely that AI will be beneficial to HR?



Following on from the last question on whether AI will continue to grow in business, is how well that growth will translate to HR. This question was not as clear, with only 20% selecting the most positive answer of 'very likely'. Despite this 58% of respondents believe that it will be at least 'likely'. Still, the majority expect AI to have at least some impact with only a combined 11% of respondents feeling

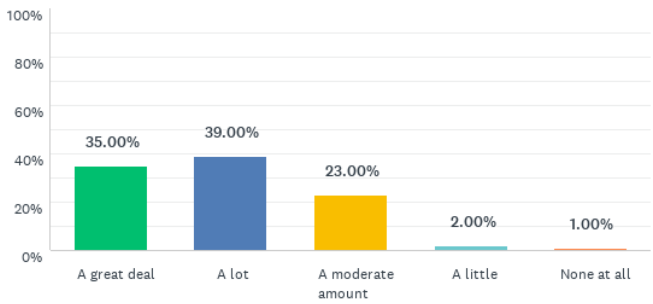
that it would be ‘unlikely’ or ‘very unlikely’ for the technology to not be beneficial to HR.

The relationship between how familiar they were with AI and how likely it was for AI to benefit HR was statistically significant, coming in at a p-value of .005. Similarly to its growth in business, the correlation between how familiar people are with AI and whether it will continue to be beneficial to HR is promising when you take into account how almost 89% believe that it will benefit HR ‘somewhat’ coming from the same group where 92% answered that they were at least ‘somewhat’ familiar with the technology. A statistically significant relationship also exists between whether the use of AI in business will continue to grow and whether it will be beneficial to HR, coming in with a p-value of .005. This suggests that people who believed that AI will continue to grow in business also believe that it will benefit HR.

Learning & Development

Moving on from an overview of the impact AI will have on HR overall, the next step is to narrow down the focus specifically to Learning & Development. The first question of this section looks at the broad level of the impact that AI will have on learning & development.

Q7 Do you think AI will impact learning and development?



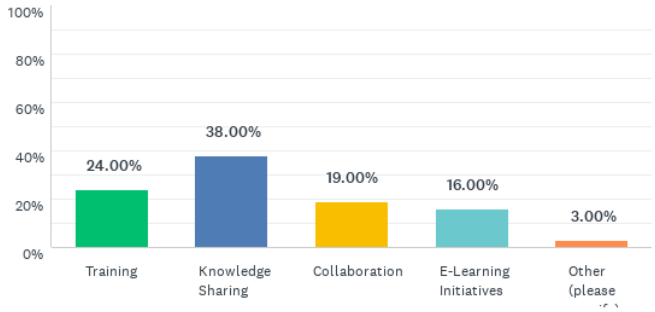
From this we can see that the resounding view of the respondents is that AI will impact learning and development. 97% believe that it will impact learning and

development at least ‘a moderate amount’ with 74% feeling that it will impact at least ‘a lot’. Just 2% of the total respondents believe it will only impact learning and development ‘a little’ while only 1% felt that it will have no impact whatsoever. With such a large percentage of respondents feeling that it will have an impact, there was no significant difference between age and gender.

Once again, the relationship between how familiar people were with AI and whether they believed AI will impact L&D was shown to be statistically significant with a p-value of .000. A statistically significant relationship also exists between whether the use of AI in business will continue to grow and whether AI will impact L&D, coming in with a p-value of .000. This statistically significant relationship also existed between whether respondents felt that AI will be beneficial to HR and whether AI will impact L&D, coming in with a p-value of .000. All these relationships build on from each other and generally suggest that there is a link between how familiar they are with AI and whether it will impact business overall, HR and then L&D.

Next is the specific area of Learning and development which will receive the greatest benefit, the options for which were in line with those mentioned in the literature review.

Q8 Which area of Learning & Development will receive the greatest benefit from AI?



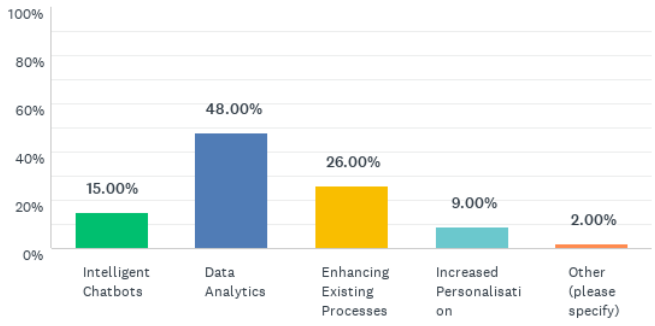
Interestingly, it was found that knowledge sharing was the most selected option coming in at 38%. AI improving training comes in at 24% while Collaboration and E-learning initiatives come in at 19% and 16% respectively. The greatest difference in terms of gender was in relation to ‘E-learning initiatives’ being the second most

picked option after ‘knowledge sharing’ with 22.6% compared to just 5.3% for males. For males, ‘training’ was the second most picked option which suggests that there may be a difference in genders expectations of how L&D will be influenced by AI. The mixed responses to this question could be seen as a promising sign as there is evidence that AI will influence numerous areas of L&D rather than one single area being dominant.

For the ‘other’ option, two respondents stated that were either ‘unsure’ while another respondent stated that not only will AI not have any positive effect on L&D but it will just make people so reliant on technology that it leads to people being becoming “dumber”. While blunt, this is not without merit as AI can also have some unintended consequences such as complacency or the de-skilling of workers. Like many people have declined in basic maths due to phone calculators and how spell check has led to people becoming carless when spelling, AI could also lead to people eventually struggling to do basic tasks (Jarrahi, 2019).

The next question focused on what element of the technology itself will have the biggest impact on L&D.

Q9 Which aspect of AI do you think will have the biggest impact on Learning & Development?

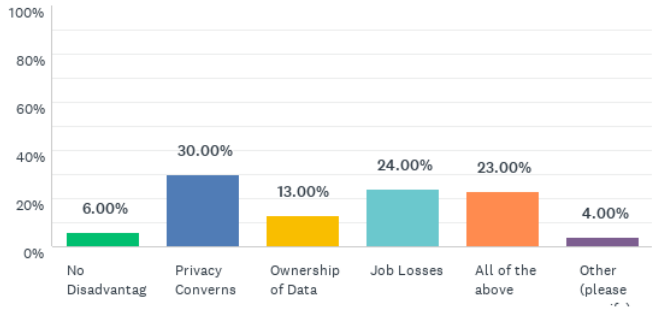


Unsurprisingly data analytics was the popular choice. Whether this was down to it being the one people were most familiar with or whether they truly believe that it is the one with the greatest potential impact is yet to be seen. Simply using AI to enhance existing processes came in at second with 26% while the use of chatbots and increased AI personalization came in at 15% and 9% respectively.

For the ‘other’ option it was again the same respondents who chose this with one of them being ‘unsure’ and the other respondent once again stating that the technology will not have an impact on L&D and instead will lead to people being becoming “dumber”. There was a significant relationship between which area of L&D will receive the greatest benefit and which aspect of AI will have the greatest impact, coming in with again a p-value of .000. This indicates an overlap between which aspect of AI will influence L&D and which area of L&D will be influenced the most by AI. Perhaps data analytics or AI chatbots will have the greatest impact on knowledge sharing or training?

The final question sought to find out whether there would be any disadvantages or negatives from using AI.

Q10 Do you believe there could be any potential disadvantages or negative outcomes from using AI?



This was perhaps one of the most evenly distributed questions in terms of responses. Privacy concerns was the biggest disadvantage with 30%. Next were job losses (24%) and concerns over the ownership of the data that AI collects (13%). Almost a quarter of respondents, 23%, were concerned with all the issues mentioned above. Only 6% believed that there would be no disadvantages or negatives to the technology.

Once again two of the respondents who chose the ‘other’ option were the same as in question 8 & 9 where one respondent was ‘unsure’ while the other believed that the technology would lead to “dumber” people. This time two more people chose this option. One of them raised a view that inherent bias within the algorithms will cause larger problems than anything mentioned above while the

second respondent believed that the technology could potentially become sentient and cause major disruption.

There was a statistically significant relationship between which aspect of AI will have the biggest impact on L&D and whether there would be any potential negatives to the technology, coming in with a p-value of .000. A significant relationship also existed between this question and which area of L&D will receive the greatest benefit from AI with a p-value of .000. This suggests that those who felt that those who felt AI would have numerous applications in L&D also felt that there would be significant issues and obstacles when implementing it.

Discussion

From these results it is clear that most people felt that AI will indeed have a significant impact on L&D. Respondents felt that the use of AI in business would continue to grow (97%) and that this success would also translate to a general HR setting as well as specifically L&D (97%). Using data analytics (48%) and enhanced AI processes (26%) were the most selected option to improve L&D initiatives such as knowledge sharing (38%) and training (24%). Despite the benefits that were noted, there were also some serious concerns that respondents had about AI influencing L&D. Privacy concerns (30%) and general job losses (24%) were the most serious issues that respondents chose. There was a strong relationship between how familiar people were with the technology and how much of an impact it will have on business, HR and specifically L&D. This helped illustrate the knowledge people possess about the technology and the validity of their responses. Overall, while respondents had concerns about potential disadvantages of the technology, they quite clearly felt that AI would indeed impact learning and development in multiple ways.

Overall, the findings of this survey are in line with the findings of past researchers in the field. L&D was always forecasted to have a significant impact as was eluded to in the literature section of this study. Along with this, many researchers previously mentioned have illustrated the positive impact that AI will have on L&D through its various uses and benefits in a HR environment. This goes hand in hand with the practical implications of these findings involving companies integrating this AI technology further into their business, specifically their L&D initiatives. They would do this in a similar manner as proposed throughout the literature review. For instance, Upadhyay & Khandelwal (2019) described how AI can assess a learner's behaviour, cognitive and engagement preferences and align them with a learning and development program. This is done through a form of data analytics to help improve existing processes. Like the respondents of this survey, 96% of learning practitioners believe that data analytics is a priority in terms of development within organisations (Blackwell, Daly & Lancaster, 2019).

We saw how Heller (2019) discussed that AI can help with the processing of information – what is relevant, who needs this information and how to deliver it to them which supports the results of the survey where knowledge sharing was the L&D area that could be most improved by AI. In terms of enhancing existing processes, AI should also boost the effectiveness of these e-learning initiatives by adapting learning processes to different user's preferences and strengths (Almohammadi et al, 2017). This was also true for improving regular training initiatives with AI capable of allowing for 'mass personalisation' of training and development, identifying personal needs and offering training solutions personalised to the needs of the employee/group where AI can almost act as a 'Virtual Personal Mentor' (Matiy, 2019).

Like the results of this survey, privacy concerns and job losses were also some of the biggest obstacles/disadvantages of AI commonly studied by researchers. As Sumser (2017) put it, does AI cross the line between motivation and manipulation, who is liable for machines decisions and who owns the data that is produced are all issues that must be figured out. In terms of job losses being one of the biggest concerns of the survey respondents, it relates back to the findings of Deggans et al (2019) where they described how innovation technologies such as AI are likely to substitute human work considerably.

Despite these finding supporting previous research identified in the literature review, there were also multiple limitations in conducting this study. One of the most obvious was that it was carried out during the midst of the Covid-19 global pandemic. This led to significant limitations in terms of the overall methodological approach chosen. While other methodological approaches may have generated a greater level of insight, they also would have been unrealistic in current times. It also led to further limitations beyond this in that gathering an adequate sample size for the survey became more difficult. This became evident early on as most of the respondents leaned heavily towards one age bracket and gender. Gathering a more representative sample in terms of age and gender would also have given a more insightful understanding of the impact of the technology. Due to this there was no real statistically significant relationship between age or gender with any of

the other questions when using the chi-square test. Once again this was due to a combination of the limitations of the study as well as the large gender imbalance in the HR field. Another methodological limitation included the scale used which was chosen from a list of SurveyMonkey's recommended options. The Cronbach Alpha for this was 0.6 which falls slightly below the recommended 0.7. Despite this due to the nature of the study and research field, this was deemed to be acceptable due to the more exploratory element of the survey in gathering people's experience/impression of a new technology that borders on qualitative data.

Another documented issue is that many of the responses could be seen to be "sitting on the fence", where the respondents picked the middle or neutral option when answering the survey. According to Raaijmakers et al (2000), these midpoints tend to act as undecided votes. This could be due to several factors including the impersonal nature of the survey or just a general lack of knowledge about the subject. While many respondents would be aware of the technologies, many became confused about what constitutes artificial intelligence and what does not as was evident in some of the 'other' responses. They still thought of the technology as futuristic concepts such as self-driving cars, cyborgs etc. rather than the other simple, practical applications that they can already have today. Something such as this could have meant certain responses were inaccurate.

All these issues were magnified by the nature of a master's thesis where a short time period, a lack of funding and specialised equipment also impacted the study.

Conclusion

Overall Findings

Overall, these findings have satisfied the main research objective to a certain extent. From these results it is evident that most people felt that AI will indeed have a significant impact on L&D. Respondents felt that the use of AI in business would continue to grow and that this success would also translate to a general HR setting before specifically impacting L&D. Data analytics and enhanced AI processes were the most popular aspects of AI that people felt would improve some of the more common L&D initiatives such as knowledge sharing and training. Despite the benefits that were noted, there were also some serious concerns that respondents had about AI influencing L&D. Privacy concerns and general job losses were the most serious issues that respondents chose. These findings were in line with the findings of previous researchers in the AI/HR field where the potential uses of AI was made clear. These potential uses are important to bear in mind when discussing the implementation of the technology.

CIPD Recommendations & Implementation

Based off these findings of this study, there are numerous takeaways that could be used to change and improve current practice in the HR discipline. As evident in the findings, AI has the capacity to enhance all areas of HR not just L&D. In modern times, best practice has revolved around the idea that extensive investment in L&D was key to unlocking employee's full potential. HR departments can use AI to enhance areas related to L&D such as training, knowledge sharing, e-learning initiatives and improved collaboration amongst others. What is unique about AI is that it is not something that will replace current practices but will simply make them better.

In terms of the implementation of the technology, it is not quite as challenging as it once was. Over time, the implementation of this technology has gone from being

quite complex and expensive to becoming relatively cheap and straightforward. While there are many levels regarding the complexity of AI, the systems that most companies currently or will potentially use are relatively basic. This basic nature means that is much more realistic for companies to implement it in the first place and easier for users to adapt to it. Once the foundation for AI is laid, organisations can then further develop and build on it in the future. AI not only has current benefits but is reshaping the operational foundations of businesses. AI driven processes are more scalable with greater scope than traditional processes as they can easily connect with other digitized businesses and initiatives [Iansiti & Lakhani, 2020]. This should be relatively easy as most businesses already use some sort of AI within their IT infrastructure.

Unlike other technologies there is no 'vehicle of choice' in that it does not require expensive equipment to run. Most recent tech is suitable for AI software and it can be used across most forms of computer devices, unlike other technologies that require certain equipment (such as VR headsets etc). This is done through AI software which can be installed/downloaded on a wide variety of devices and generally has less of a learning curve compared to other technologies, as in most settings it is an 'enhancer' rather than something stand-alone. While this is the case for a lot of more basic forms of AI, more advanced deep learning AI is a bit more complicated to integrate. If companies do decide to invest in more complex AI, it will likely require a costly overhaul in hardware equipment. For example, while traditional CPU/GPUs have shown some capabilities to run AI systems, many new companies are trying to develop new chips that are more optimised for deep learning and other AI functions (Teich, 2020). These latest chips such as the ones manufactured by intel can run over 10 trillion calculations per second (Quan & Sanderson, 2018).

Aside from the technical implementation. HR must ensure that the employees themselves accept the technology. As is evident from the findings, most HR students/professionals feel that AI will have a significant impact on L&D, but still raise numerous concerns around privacy and ownership of data concerns. It is important to deal with these concerns and any other issues employees may have

around the implementation of this technology. Employees tend to differ in their views of HRD systems, so it is important that organisations create different developmental strategies for different employees/groups around these technologies (Sheikh, 2020). For example, younger generation of employees was found to value things such as interaction and experience in their learning compared to their older peers. Simulation, mentoring and overall blended learning experience together with AI were also beneficial to this development strategy for Generation Y employees (Bohlich & Oleti, 2017). The technology should also be user friendly with an intelligent interface that can allow users with limited skills to use it to a reasonable degree. Regular training of employees is best to stay up to date with any advancements in the technology. This must also be a continuous effort as once a base level of operation skill is achieved, users rarely continue to become truly proficient with these technologies (Krisler & Alterman, 2018).

To successfully implement the technology into the organisation while also getting employees on board, it is essential senior leadership, not just HR, provide the expertise and decision-making authority to support these relatively uncertain long-term investments (Spitsberg et al, 2015).

Limitations & Future Research

As previously mentioned, there were numerous limitations due to the nature of the study that were amplified due to the global pandemic of Covid-19. These limitations could be lifted/rectified in future studies when the world returns to a more normal state and other methodological approaches could be taken. Interviews or more hands-on experiments or trials could all give more of an insight into the impact of the technology on L&D. This would also require a greater budget, more time and realistically more knowledge of the equipment and statistical techniques that would be involved in a project of that scale.

In terms of further exploring the impact of emerging technologies on HR functions, future studies could look at the influence that other emerging technologies could have on the impact of AI on learning and development. How AI could

enhance/improve the integration of technologies such as AR/VR, IoT, Robotics and 3D printing. Combining these technologies can lead to a technology ecosystem within organisations. AI can be used in AR/VR to provide a more personalised and relevant experience. Converging AI with these technologies will create the most value (O'Neill & Duffy, 2020). AI provides the foundations for making these other technologies work.

These technologies go hand in hand in that they will bring the best out of each other. For example, combining AI with AR would allow for a fully immersive, intelligent approach that would provide an excellent solution for employees to view and interact with information to enhance their learning experience. When this is further combined with IoT and 3D printing it can create an intertwined technological eco-system of the future. IoT itself is capable of interconnecting multiple devices through a manner known as massive machine type communications (mMTC) which would be extremely practical at an organisational level to collaborate, share knowledge and generally create an overall technologically augmented work environment (Song et al, 2020). Future studies could look at how a combination of these, not just each technology individually, will impact L&D in the not so distant future.

Personal Learning Statement

To begin with, I am glad that I picked something that I am personally fascinated by (artificial intelligence) and applied it to something that I found the most interesting during my HRM course (learning & development). This made the dissertation less daunting and easier to commit so much time to. I feel that the project would have been much more challenging if I had picked a topic that I wasn't interested in.

If I were to undertake the project again, I would likely do several things differently. The first of these is I would like to improve my time management skills. During the course of the project I felt like I sometimes took too long to do certain tasks that should have been done in a more efficient manner. There were also long gaps between working on the project, particularly during the second semester where I

was busy with work and other course modules. I felt that I somewhat lost momentum during this period which meant my work became disjointed at times.

One specific area that I would try to spend more time improving on is the statistical element of the project as I felt that I was lacking in that area. I was never really sure what was expected of me in this regard and I felt like more of an emphasis should have been put on this area during lectures. I found it all quite complicated and confusing.

I also would try to narrow my focus when writing. Often (particularly during the literature review) I felt that I was spending too much time talking about anything to do with my topic. It led to me cutting out a lot of work and wasted time that I could have dedicated elsewhere if I had been more focused on what I wanted to get out of my project. Along with maintaining focus on the objective of the study, I would try and improve the overall synthesis between sections where sometimes I felt that I struggled to make it clear how certain findings etc were linked back to what I already stated in the literature review.

Despite these things, I still felt that undertaking this project was a great learning experience that I believe will help me in the future if I have to take on projects of a similar scope.

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Appendices

Survey Questions

1. What is your age?
2. What is your gender?
3. Are you currently studying or working in a HR related field?
4. How familiar are you with AI technology?
5. Do you believe the use of AI in business will continue to grow?
6. Do you think it's likely that AI will be beneficial to HR?
7. Do you think AI will impact learning and development?
8. Which area of Learning & Development will receive the greatest benefit from AI?
9. Which aspect of AI do you think will have the biggest impact on Learning & Development?
10. Do you believe there could be any potential disadvantages or negative outcome from using AI?

Consent Notice

This research survey looks to discover the impact of Artificial Intelligence (AI) on Learning & Development from the perspective of both current and future HR professionals. This survey is completely anonymous, so any answers given will not be traced back to any one individual. The survey consists of 10 questions and should take no more than 2 minutes to complete. Surveyor is contactable at stevencarton1@gmail.com.