The Fourth Industrial Revolution: Cyberpsychology & Well-being

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The Fourth Industrial Revolution: Cyberpsychology & Well-being

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About the Author

Rani Sheilagh Dunn is a cyberpsychologist, a people and technology enthusiast, and a holistic health and wellness expert. She has over 15+ years of experience with a proven track record advising and working with clients in Ireland, Europe and the USA across technology, arts, mental health, holistic health, media, education, non-profit and entrepreneurial sectors. Rani is anchored in a mission to facilitate making a positive impact through cyberpsychology, communication, research and driving insights that empower individuals, leaders, teams and organisations to thrive. Her expertise and areas of interest focus on balancing our human experiences and digital experiences; working with understanding people, technology and behaviour and as an advocate of holistic health, food empowerment and mental, physical and spiritual wellbeing.

About the Contributors

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Rethabile Tsephe is a mental health consultant using expressive writing, and emotional intelligence key competencies as a human resource tool to improve the mental health and wellbeing of people. In collaboration with a massage therapist and sports coach, she has created relevant innovative interventions to influence positive attitudes and well-being. Rethabile has a Diploma in Adult Education and Training from the University of South Africa, and is a YALI (Young African leaders initiative) alumni in civic leadership and spearheaded a mental health stream for TEN empowerment network. She is currently pursuing a diploma in sociology to expand her knowledge of human behavior and mental health in support of her research work. At GFCyber she explores research in areas of cyber mental health, cyberpsychology and cyber disorders.

About GFCyber

Global Foundation for Cyber Studies and Research is an independent, non-profit and non-partisan policy research think tank for Cybersecurity studies, located in the Washington D.C, USA.

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Synopsis and Introduction

Technology is all around us. We are living in an ever-increasing connected world where the lines between man and machine have merged into a shared global cyberspace.

POPULATION	MOBILE	INTERNET	SOCIAL MEDIA
7.83 billion	5.22 billion	4.66 billon	4.20 billon

o   At the start of 2021, the global population was 7.83 billion.
o   5.22 billion people, or 66.6 percent of the world's population, use a mobile phone.
o   4.66 billion people around the world use the internet, with global internet penetration now at 59.5 percent.
o   4.20 billion social media users around the world. The number of social media users is now equivalent to more than 53 percent of the world's total population (Kemp, 2021).

How we interact using technology, how behaviour is influenced by technology, how technology can be developed to best suit our needs, and how our mental, as well as physical, states can be affected by technologies has impacts on us not only as individuals, but also as societies, as cultures and within the wider global community.

In response to this interconnected world, where technology is all around as, cyberpsychology has emerged as a new and rapidly growing field of research.

Cyberpsychology is a broad scientific field, within applied psychology, that encompasses the examination of the many areas relating to how technologies impact and influence the way we live today (Kirwan, 2016).

This paper will help us to understand the field of cyberpsychology, its relevance globally and specifically in relation to digital well-being, its application to ensuring the implementation of successful cyber initiatives and present potential solutions.

PART 1: UNDERSTANDING CYBERPSYCHOLOGY & DIGITAL WELL-BEING

Cyberpsychology Defined

The field of cyberpsychology is interdisciplinary and integrative in nature with research drawing from engineering, computer science, social sciences and human-computer interaction within an applied psychological framework. Its impacts are relevant to an expanding range of areas such as education, healthcare, workforce, psychological practice and cybersecurity (Ancis, 2020). Therefore, although research on the affective, cognitive, and behavioural implications of cyberspace on individuals is still developing, principles of cyberpsychology are becoming widely applied and recognised as relevant globally.

Digital Well-Being

The term well-being is often used somewhat ubiquitously and in varied contexts referring to physical, mental and emotional health, as well as in reference to broader aspects of life such as happiness. The World Health Organisation's (WHO) definition does not distinguish between the terms health and well-being; however the WHO definition of health explicitly links health with well-being; defining health as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (WHO, 1948). The American Psychological Association (APA) definition of well-being provides a broader, more inclusive definition of the many aspects of well-being; stating well-being is "a state of happiness and contentment, with low levels of distress, overall good physical and mental health and outlook, or good quality of life" (https://dictionary.apa.org).

Research suggests that well-being has multiple domains, and is a multifaceted construct (Forgeard et al., 2011; Diener, 2009).

Over the past few years, the term digital well-being has emerged and functioned as the practice of achieving a holistic sense of health and well-being within the digital age. Digital well-being is distinct from general well-being as it considers and tries to find solutions for specific challenges emerging from an interconnected world (e.g., interconnectedness, "always on") to achieve general well-being (Dadischeck, 2021). Frequently considered issues in this context are technology invasion and technostress, referring to technology invading into all areas of our lives, from work, to relationships, to the way and times we sleep making it ever harder for individuals to detach and practice mindfulness (Gaudioso, Turel, & Galimberti, 2017). Building on that, digital well-being aims to achieve guidelines and best practices for individuals, professionals and organisations to overcome digital challenges for psychological functioning, hence, educating and training individuals on achieving healthy and mindful relationships with technology (Dadischeck, 2021; Monge Roffarello, & De Russis, 2019).

As such, digital well-being, or the state of wellbeing experienced through the healthy use of technology has multiple domains. It considers the impact of technologies, digital services and cyberspaces on mental, physical and emotional health. Cyberpsychology examines these impacts identifying challenges, opportunities and benefits through assessing how we interact with others using technology, how we can develop technology to best fit our requirements and desires and how our behaviour and psychological states can be affected by technologies (Connolly. Palmer., Barton, et al., 2016).

With this emerging area, there is an increase in the global awareness of digital wellbeing, with demand for digital wellbeing programmes across companies, schools, governments and health agencies. Additionally, as knowledge and experience of cyber expands many individuals are now choosing to self-regulate their own use of technology; adoption of digital well-being is becoming widely accepted and actively promoted.

In a 2019, 1 in 3 Americans reported they had taken steps to improve their digital well-being in the past year, with over 80% finding it had a positive impact on their overall sense of well-being. In another report surveying over 9,000 people across six countries revealed people think technology has a neutral or positive impact on their well-being, and that this sense was influenced by their perception of the impacts of individual cyber activities on their well-being (think by google, 2019).

Individual digital well-being engagement points to the need for businesses to create digital environments that encourage employee wellbeing and therefore support efficiency. The Chartered Institute for Personnel and Development found that 74% of human resources professionals see the positives of technology for the flexibility it provides employees. However, 87% of employees said that this technology has also created an environment where they struggle to switch off (2018).

Expanding on this, digital workplace well-being was addressed in France with the government passing the right to disconnect which ensured employees can take control of their use of technology outside of office hours. In 2018, in Ireland, an employee was awarded €7,500 in a court case based on company demands on them to use email outside of office hours. Moreso, there is also a growing trend for many technology companies to introduce digital well-being features within their products to encourage such things as managing time and taking breaks (Monge & De Russis 2019).

However, while the acceptance of digital well-being is on the rise, its applications are as multi-faceted as technology itself. Validated data and research on digital well-being initiatives are still emerging in this new and expanding area within the broader field of cyberpsychology.

Digital well-being brings a perspective to health and well-being that is holistic, blending physiological well-being with mental well-being. Therefore, calls to action for digital well-being are currently perhaps best informed though looking at cyberpsychology based case studies and research that addresses specific aspects of wellbeing within specific sectors with the potential for broader application.

Key Cyberpsychology Research Areas

Within the increasing body of cyberpsychology research over the past two decades, five major areas have emerged; virtual gaming and gambling, telepsychology, virtual reality, artificial intelligence (AI), internet, technology and social network system (SNS) use, and online behaviour and personality factors. In this section,

we will focus on the domains of internet, technology and social network system use and their links to psychological functioning.

In relation to internet and SNS use, it is crucial to distinguish between mindful and purpose-driven use of digital communication technologies and problematic use. Mindful and purpose driven use is typically related and fostered by the previously introduced concept of digital well-being. It involves using the internet and SNS to research (job-)relevant information, stay connected and receive as well as provide online support (see, e.g., Ancis, 2020). In contrast to that, problematic use is associated with excessive, uncontrolled, compulsive or unconscious use of digital media.

Within the problematic use domain, there has been a surge in research over the past few years reflecting concerns about a potential negative impact of SNS and internet use on psychological functioning. Indeed, there is a growing body of evidence suggesting associations between problematic use of technologies and a range of mental health outcomes such as depression, anxiety, burnout and sleep deprivation (Elhai, Dvorak, Levine, & Hall 2017). There have also been studies on performance-oriented variables such as productivity, job performance and academic performance (Dadischeck & Ono, 2020; Duke & Montag, 2017, Samaha & Hawi, 2016). There is an argument that initial research findings are currently gaining strength through longitudinal studies and randomised controlled trials witnessing a causal impact of problematic technology use on depression and anxiety (Hunt, Marx, Lipson, & Young, 2018; Wiles, Mulligan, Peters, et al., 2012).

However, it is important to be aware that research can frequently have the tendency to treat all technology use as equal and has a priority and bias which focuses on the negative impacts of technology and stresses the need to reduce overall technology usage for well-being. The media has also reflected and reinforced this resistance to digital technology echoing a long standing popular tradition of resistance to new technology as seen in the past, similar media backlash against the telephone, film and television (Syvertsen & Enli, 2019). Contrary to this, there is a new emerging wave of cyberpsychology research suggesting that new technologies also offer a variety of new possibilities to improve both physical and mental health and well-being (Ellis & Piwek, 2018). A more recent empirical study looking at large-scale social datasets rigorously examined correlational evidence for the effects of digital technology and found that there was no significant negative association between well-being and digital technology use. The study also suggested adopting a broader view of human behaviour to understand negative, positive and neutral impacts of digital technology use on well-being (Orben & Przybylski, 2019). This supports an opposing scientific perspective that is emerging in contrast to the majority of other research which, to date, has primarily focused on technology as a problem rather than something which supports everyday activities (Shaw, Ellis & Ziegler, 2018) and as such is part of healthy lifestyle and well-being.

It can therefore be said that technology use is viewed from different perspectives within cyberpsychology, hence, creating a comprehensive investigation on how technology affects humans functioning in affective, cognitive, psychological and physiological domains. Generally, business management and IT engineering rooted studies can tend to emphasise positive impacts created by technology, whereas psychology and especially the clinical psychology related domains, are by nature more critical and sophisticated in their investigations on human functioning. There is a movement to acknowledge and combine differing endeavours within the field, citing synergies between technical and humanistic scholars to design health promoting digital technologies that aid in patient care and health diagnostics such as testing the embedment of digital phenotyping in clinical settings (Cohen, Schwartz, Cowan, et al., 2021).

PART 2: DIGITAL WELL-BEING APPLIED

Case Study: Safer Internet Day (SID) 2021, Ireland / EU

Safer Internet Day (SID) is an EU initiative with a mission to make the Internet a better place for children and young people. It comprises a partnership of four leading organisations under the coordination of the Department of Justice in Ireland. It is promoted by the Webwise internet safety initiative of the Professional Development Service for Teachers (PDST), part of the Department of Education, and aims to educate and raise awareness about protecting children online, so that they can responsibly enjoy the benefits of the internet, without compromising their safety and privacy.

Children represent over 25% of the world's population and being online is an important part of their lives. It is estimated that approximately one billion children were using the internet in 2018 (UNICEF 2018) and this number has surged during the COVID pandemic. A sampled report from the anti-bullying centre, 28% of children have

been the target of cyberbullying, while half of the children sampled reported to have seen others being cyberbullied. Irish figures are one of the highest in Europe, followed by Germany and Italy (2021).

From cyberbullying to social networking to digital identity, each year Safer Internet Day aims to raise awareness of emerging online issues and current concerns.

"With technology being such a prominent part of everyday life, helping children and young people develop skills to navigate the online world safely and to manage their wellbeing in this regard, has never been more important. The focus for Safer Internet Day this year is to highlight key online safety resources and advice available to schools, teachers, parents and young people via webwise.ie." Ciara O'Donnell, National Director of the Department's Professional Development for Teachers (PDST), Ireland.

The theme for Safer Internet Day (SID) 2021 was "Together for a Better Internet" and focused on educating on online wellbeing and digital resilience. SID activities, under COVID restrictions, saw events delivered both locally while observing social distancing and virtually including 'be kind online' webinars hosted by cyberpsychologists and colleagues looking at Empowering Healthy Online Behaviour in Younger Children, Empowering Healthy Online Behaviour in Teenagers, and Empowering Students to Build Digital Resilience and Manage their Online Wellbeing.

Results & Implications

Safer Internet Day (SID) 2021 was a huge success with almost 100,000 students, teachers and parents in Ireland participating.

Cyberpsychologists are hopeful this will result in data showing positive impacts with findings from the next studies expected to be released later this year.

The SID programme case study represents one suite of cyber solutions and approaches appropriate for this specific domain. However, the demand, support and engagement it received is a call to companies, agencies and organisations to take action in implementing digital wellbeing and resilience programmes that address the challenges and concerns within their specific sectors.

PART 3: GLOBAL DEVELOPMENT

As tech merges with life, recognised experts in cyberpsychology are emerging. The need for this is visible within the higher educational sector with the first cyberpsychology stand-alone degree programmes developed in Ireland in 2007 at Dún Laoghaire Institute of Art, Design + Technology (IADT) and now with the other cyberpsychology specific programmes available in many countries.

However, development of the field to date has been in western countries resulting in a potential for bias in research, data and limiting engagement. There is a need to promote cyberpsychology across countries, cultures and states to ensure a more authentic global voice is represented and research studies are inclusive and benefit a wider knowledge base.

o   In 2019, it was estimated that 86.7 percent of people living in developed countries used the internet, compared to 44.4 percent of individuals living in developing markets. The global online access rate was 51.4 percent (statista.com)

Assessment of cyber challenges and opportunities as well as proposals for solutions and recommendations must take in account the unique aspects, and well as shared commonalities, of each nation and region. The following, though far from exhaustive, further highlights cyberpsychology and the need for global proactive cyber engagement.

Africa

Africa is one of the most diverse continents in the world. However, commentators assert that people of African often encounter similar challenges and therefore point to the need for integrated approaches to realise the full benefits.

This paper spotlights Africa, addressing it as a neglected region in relation to cyberpsychology where cyber education, initiatives and solutions should be implemented to support a shift to proactive diplomacy, the utilisation of cyber to build new connections with vital emerging markets and a key aspect of creating a sustainable infrastructure for individual nations.

Spotlight on Lesotho

Lesotho is a country in the southern part of the African continent. In Lesotho, Internet penetration stands at 44 percent of the total population, with 946,300 internet users in 2020. This showed an increase of 84,000 thousand or +9.8% between 2O19 and 2O2O (datareportal.com).

However, while digital penetration is on the rise, there is almost no knowledge of cyberpsychology, nor are there implementation of digital well-being or cyber education programmes in Lethoso.

Sadly, as a result, cybercrime is thriving. The digital landscape in Lesotho is suffering and as such opportunities are potentially limited. Violation of human rights, including crimes against children, woman and men of extreme acts of violence, bullying, rape and abuse circulate on social media. Victims are further traumatised in these digital spaces and trauma spreads to anyone who has intentionally or unintentionally viewed these disturbing images online. There are also ongoing incidents of cyberbullying, cyberstalking and scams.

Unfortunately, due to limited resources and lack of cyber education and infrastructure these issues remain unaddressed. Moreso, with the absence of cyberpsychology studies and research in Lesotho data related to these activities is minimal and inconclusive. As a result, police task teams and the national security services are unable to carry out extensive investigations to identify perpetrators of these crimes. Additionally, no appropriate framework yet exists to provide protection, support or treatment. Reports of unethical digital use and unaddressed cyber challenges in Lesotho is a serious call for concern.

Additionally, due to lack of awareness, on a policy level there is widespread misunderstanding of how the cybersecurity and cybercrime bill should be enforced. There are also worrying data and privacy violations.

The Lesotho government actioned what is popularly known as the "draconian snooping law." This is essentially a government approved prying regulation that gives authority to access and monitor the mobile phone communication data of all citizens, including any foreigners visiting Lesotho. This encroaching regulation requires mobile phone users to have their sim cards, handsets, addresses and user biometric data registered and stored in a central database which security agencies are permitted to access at any time. This privacy and data violation was exposed in the Lesotho Times, one of the country's biggest newspapers in June 2O21.

The USA in Lesotho has expressed concern over the intrusive nature of the regulation recently put in place by the government. In a statement to the Lesotho Times, the US embassy stated it was still analysing the 'nuances' of these regulations but was nonetheless concerned by the apparent intrusion into the lives of subscribers and wider implications to data privacy.

The lack of technological cognizance of the Lesotho government to implement a effective cybersecurity and cybercrime bill with buy in from all stakeholders appears incompetent on the global stage and has left its citizens, residents and vistors especially vulnerable on social media and cyber platforms.

However, to successfully address cyber challenges, Lesotho has a wealth of organizational capabilities and is experienced through its fight against the HIV/AIDS pandemic. Government policy and operational mandates successfully used four domains to create a national response to act; prevention, treatment, care and support.

The insights and skills gained from meeting these past challenges can be harnessed, along with the adoption of cyberpsychology actions and the promotion of digital well-being, to rapidly achieve a cyber competent society in Lesotho and has applications across the entire continent of Africa, as well as making meaningful contributions to cyber knowledge within the wider global community.

Europe

Europe as a continent is grouped under one geographical region, however it is culturally diverse with different languages, national traditions, histories and identities.

Cyberpsychology has emerged as an established field of expertise and there is a growing amount of cyber research and knowledge within Europe; and although not all countries within Europe are members of the European Union (EU) there are general movements to create compatible cyber policy, initiatives and regulation across the region.

The European Union
The EU commission is determined to make this Europe's "Digital Decade". Europe aims to strengthen its digital sovereignty and lead the way in setting standards with a clear focus on data, technology, and infrastructure. EU president Ursula von der Leyen stressed the need to lead the transition to a healthy planet and a new digital world. In that context, she kick-started the debate on ethical Artificial Intelligence and the use of big data to create wealth for societies and businesses.The Digital Education Action Plan (2021-2027) is a renewed European Union (EU) policy initiative to support the sustainable and effective adaptation of the education and training systems of EU Member States to the digital age (Official website of European Union, 2021).

Highlighting Ireland
The field of cyberpsychology has early roots in Ireland. This no doubt has influenced the position of Ireland as one of the leaders in cyber policy and cyber educational initiatives within the EU and globally.

The Harassment, Harmful Communications and Related Offences Bill passed in Ireland Dec 2020. The Bill, also known as Coco's Law after Nicole Fox who died by suicide following years of online bullying, was first brought to government in 2017. It introduces two new offences to deal with the non-consensual distribution of intimate images with a penalty of an unlimited fine and/or up to seven years imprisonment. This positive move in cyber policy includes separate Irish legislation to include provision for an online safety commissioner which was proposed earlier in 2020 by the Department of Communications, Climate Action and the Environment.

Addressing the need for cyber education in Ireland, Webwise is the Irish Internet Safety Awareness Centre co-funded by the Department of Education and Skills and co-financed by the European Union's Connecting Europe Facility. Webwise promotes the autonomous, effective, and safer use of the internet by young people through a sustained information and awareness strategy targeting parents, teachers, and children themselves with consistent and relevant messages. They develop and disseminate resources that help teachers integrate internet safety into teaching and learning in their schools. Webwise also provides information, advice, and tools to parents to support their engagement in their children's online lives, and with the help of the Webwise Youth Advisory Panel they develop youth oriented awareness raising resources and campaigns that address topics such as cyber bullying."

Asia

East Asia is one of the leading geographic sectors when it comes to research on, diagnostics and treatment of problematic technology use. This has resulted in the majority of research on problematic smartphone use utilising the Smartphone Addiction Scale developed by the Korean researchers Kwon, Lee, Won, Park, Min, Hahn, Gu, Choi and Kim (2013). To date, this scale has been validated in numerous languages including Spanish, Turkish, Estonian, Malay, Malay and Japanese. It is therefore not surprising that the first official clinics treating individuals, especially young adults, with social media and smartphone addiction have been established in Korea. In addition to Korea, it is particularly Chinese scholars who have significantly contributed to the development of the literature on technology use and its impact on human functioning.

Beyond that, the Digital Media and Society Lab founded in 2017 by Robert Thomson from Hokusei Gakuen University in Japan organises a Japan-based research team to promote cross-cultural research on cyberpsychology and digital media.

Korean and Chinese scholars also account for a significant proportion of publications on digital health studies. This includes recent advances in using digital phenotyping to predict health-related outcomes and to improve treatment accuracy and diagnostics based on machine learning analyses of human sensory data (see Kim, Yang,

Ahn, & Choi, 2021, for an example of a recent randomised controlled trial).

However as Asia is the world's largest and most populous continent, it varies greatly across and within its regions with regard to ethnic groups, cultures, environments, economics, historical ties and government systems. As such, Asia has experienced a significant technological transformation over the past decade which presents the potential for more opportunities and for cyber to contribute to quality of life and well-being if the region successfully addresses gaps in core cyber capabilities and challenges.

In South Asia, in India, there are three pending reform measures under consideration that are likely to affect India's growth trajectory in digital services for years to come; the Personal Data Protection Bill (PDPB), the e-commerce policy, and the Information Technology Act Amendments. These regulatory reform efforts emphasise a focus on protecting the domestic market for domestic companies and prioritising government access to data and may be difficult to reconcile these approaches with India's strong interest in promoting data privacy and protecting its democratic institutions. There is uncertainty about when these changes will be completed and implemented and they will play a key part in encouraging India's wish to position themselves as a global leader in information technology.

Already established as a leading digital hub, Singapore has their own cybersecurity framework. The Cyber Security Agency of Singapore (CSA) was formed in 2015 and has been given the task of protecting Singapore's cyberspace. As the national agency CSA oversees cybersecurity strategy, operation, education, outreach, and ecosystem development. Singapore has also taken steps towards cooperation with other states on cyber-issues (Ang, 2021).

China, another active cyberspace player in the Asia-Pacific, is developing cyber capacities in pursuit of its economic, political, and strategic objectives. This has seen Beijing actively supporting indigenous innovation of emerging technologies to give China new cyberspace capabilities (Segal et al., 2020).

Despite active engagement, there is still a need for more emphasis on cyberpsychology throughout all of Asia. Cyberpsychology initiatives in Asian countries, many of which are notably technologically progressive, will play a key role in leading the way.

Looking to more developing countries within Asia, we see people gaining rapid access to new digital technologies. This access further indicates the need for training and education on how to use and utilise them in a mindful and purposeful way.

There is a call for more practical and research-based work on how technology can be used in developing countries to improve accessibility to healthcare, jobs and connection between individuals while addressing challenges and preventing undesired outcomes such as technology invasion, addiction and overload.

As such, cyberpsychology frameworks and programmes for digital wellbeing will play a key role in providing successful, scalable and sustainable solutions in the region.

America

In America, there are people working in the area of cyberpsychology in the USA. However, this is primarily on an individual basis rather than as part of any formal programme. This is changing with recent efforts resulting in a Master's programme in cyberpsychology at Norfolk State University being launched in the autumn of 2019 as the first standalone degree program in the field in the USA.

Previous to this there has been a significant contribution to cyberpsychology based knowledge in America. This is no doubt influenced by the number of technology companies that have started and are headquartered in Silicon Valley, a region in the south San Francisco Bay area.

The Center for Humane Technology, based in San Francisco, California, has been playing a key role since 2013 in educating people and organisations across the globe on how to use technology for a more humane purpose and supporting the collective well-being, democracy and shared information environment. Stemming from Tristan Harris' work on how to minimize distraction and restore attention, the Center now works with key stakeholders on guidelines for ethical design of digital technologies which peaked in their contribution to the Netflix documentary 'The Social Dilemma' which has reached more than 100 million people around the world. Their

work has influenced global technology players including Apple, Google, and Facebook to include digital wellness features including making users aware of time spent on screens.

The United States also plays an important role in international discussions on data protection and has begun to address data privacy and data flows in free trade agreements, including in the U.S.-Mexico-Canada Agreement.

Additionally, in November 2020, the Canadian government proposed the Digital Charter Implementation Act, 2020, which would modernize the framework for the protection of personal information in the private sector.

With no multilateral rules on cross-border data flows, the General Data Protection Regulation (GDPR) in the EU may determine new global data privacy standards, as firms and organizations strive for compliance to avoid being shut out of the EU market or penalized, and as other countries seek to introduce rules modelled on the GDPR (Jordan, 2020).

Cyber developments across America point to the benefit of and need to create globally connected and complimentary cyber solutions.

PART 4: FUTURE DIRECTIONS

Core Research and Industry Guidelines
One key direction towards this, is considering core guidelines for research and industry when it comes to accessing and utilizing personal data from social media. Laudable attempts such as the guidelines for internet-mediated research (IMR) published by the British Psychological Society in the UK could act as a starting point for other policy makers to work out best practices for ethical handling of data from social media. This is especially critical when looking at artificial intelligence and federal guidelines regulating the access of personal data through social media by automated algorithms.

Recognising Potential Bias in Predictive Technologies
Originally derived from predictive technologies in the manufacturing area where machine data is used to predict future production quality and incoming maintenance cases of production machinery, we now see predictive technologies applied to human behaviour. Whilst some may acknowledge the use of personal data to predict and ideally prevent the occurrence of mental health issues such as burnout and depression, the way organisations deal with sensitive personal data lacks transparency and regulation. When considering potential sources of bias underlying machine generated predictions of human behaviour certain individuals are disadvantaged and there is inaccuracy to entire ethnic groups in the past which has seen the misidentification of low-risk black defendants as high risk (Ancis, 2020; Angwin et al., 2016).

Issues of autonomy, privacy, dignity and scientific integrity are crucial components to consider when continuing to utilise personal data for algorithm-based predictions of human behaviour, and predictive policing. This is particularly relevant to ensure validity when forecasting the likelihood of criminal and deviant behaviour based on personal data.

Interconnectedness and Inclusion
Another issue worth-considering comes from our increasing interconnectedness, there is an increasing concern about severe technology dependence which potentially goes beyond concerns of personal autonomy. This specifically applies to the extent to which we are able to live healthy and successfully in the digital age which has been seen to be strongly related to our ability to interact with technology (Ancis, 2020). This raises questions around the inclusion of elderly and disabled people. There is a substantial body of evidence highlighting that impaired psychological and physical functioning, which increases with age impairs the ability and motivation to use digital technologies (Smith, 2014).

Over the past two years within the Covid-crisis, it almost became mandatory to use and engage in digital services to participate in everyday life. Whether to book an appointment at your doctor, get a slot for shopping in the supermarket or opt-in for the Covid vaccine. Disabled people and elderly people, especially those who did not have technically savvy people to support them, were partially excluded and unable to cope with the sudden flood of digital demands. This resulted in the inability to fulfil requirements to participate in everyday life. This indicates that as the population ages, we must consider ways to include the elderly as well as people with disabilities into

our cyber community. This also raises the need for discussion of alternatives to the almost mandatory requirement to be connected and the assumption that it may be a matter of course that everyone is always able and willing to use technology to participate in daily life activities.

Awareness of these cyber challenges and concerns mirrors wider concerns from Dr Tedros Adhanom Ghebreyesus, Director-General of the World Health Organization, who states the impact of the pandemic on people's health is already extremely concerning and they must be treated as a core element of response to and recovery from the COVID-19 pandemic.

PART 5: CALLS FOR ACTION & SOLUTIONS

Cyberpsychology and digital well-being are critical to creating and maintaining a healthy, effective global cyber ecosystem. Our individual and social well-being is intimately connected with the digital technologies that mediate our interactions and access to information. This raises both ethical questions and challenges concerning the impact of digital technologies on our well-being (Burr, Taddeo & Floridi, 2020; Floridi, 2014). This paper presents cyberpsychology driven recommendations for key calls for actions.

Promote Collaboration and Common Goals
Effective cyber solutions require collaboration with a wide variety of actors, including governments, the private sector, NGOs, and academia or any variation of these players.
As a multidisciplinary and multidimensional field, cyberpsychology plays a key role in addressing digital well-being, as well as many wider cyber issues.

A key solution for leaders is to develop a shared vision toward, or common goal, in which all actors can concentrate their efforts and to avoid a list of unlinked, separate activities in the digital sphere. Strong leadership, diplomacy and cyberpsychology guidance is needed to bring together individuals from the many areas of expertise required for successful, sustainable cyber initiatives.

Technology for Well-being
Recent cyberpsychology research in technology for well-being offers possible directions to guide the design of future solutions, applications and services in this area. Virtual/augmented reality, biosensors, smartphones and video games can be used for promoting positive change and the range of technologies that can be used for well-being is steadily growing. Future applications may extend to robotics, artificial intelligence, and neurotechnologies (Gaggioli, et al., 2019).

One specific example addressing disability is demonstrated in a recent publication by Goodman, Liu, Jai, McDonnel, Froehlich and Findlater (2021) which tested how automated sound recognition tools can aid deaf and hard of hearing individuals in their daily communication and environmental awareness. Their investigations present a positive example of how human sensory data can be used to augment human sensory abilities to enable deaf and hard of hearing individuals to better cope with daily demands and inclusively participate in societal life.

Another key call for action is to prioritise utilising technologies for well-being across all sectors as part of a wider strategic solution to promote innovative development of technology for good applications.

A Cyberpsychology Framework and Holistic Approaches
For key actions and sustainable cyber strategies to be successful, it is vital to provide the necessary infrastructure to support a robust, agile cyberpsychology framework in the most scientific and ethical way possible.

By engaging with cyberpsychologists and working with multidisciplinary teams, evidence-based solutions can be implemented to support positive cyberspace environments.

Additionally, cyberpsychology based digital well-being initiatives in combination with more holistic care approaches have shown to be effective in supporting whole well-being (Rich, et al., 2020). As such cyberpsychology frameworks benefit from the inclusion of a multimodal approach that incorporates holistics.

CONCLUSION

Cyberpsychology offers potential, evidence-based solutions to support digital well-being for individuals, communities, organisations, digital designers, policy-makers, industry and governments.

The digital spaces we inhabit offer the opportunity to bring out the best or the worst in humanity, the same tools that are often a concern can also act as powerful tools that play a key part in making our lives better. Moral panic often emerges in addressing technology, however technology isn't inherently good or bad, it is the way we choose to use it.

The expanding field of knowledge in cyberpsychology confirms how vital it is to build global cyber foundations and create cyberpsychology frameworks based on evidence-based scientific research to foster critical thinking and promote agile solutions.

This represents not only a scientific, but also a cultural opportunity to promote a more human-centered view on the global development of our digital future.

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