XR + CREATIVITY

SYMPOSIUM REPORT

‘TRANSFORMATIVE TECHNOLOGIES FOR GOOD’

1-2 October 2020



FASTLab
School of Creative Industries
University of Newcastle

XR + CREATIVITY

SYMPOSIUM | 2020

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About FASTLab

At FASTLab our research focuses on human-centred interactions. By harnessing human imagination, empathy, cooperation, co-design, design thinking, visualisation, playfulness and creativity, we offer insights, analysis and tools to help tackle the most pressing issues at the intersection of art, science and technology.

FASTLab is a gateway to the University of Newcastle's internationally recognised research centres, the expertise of researchers and industry partners, and world-leading equipment and facilities. Our transdisciplinary team pursues a broad range of projects, from exhibitions and installations, performances and prototypes, to cooperation with the private sector, NGO's and research institutions.

FASTLab sits within the School of Creative Industries, University of Newcastle, where we conduct research and deliver innovative experiences across design, filmmaking, animation, music, journalism, dance, drama, games design and art.

FASTLAB

THE UNIVERSITY OF NEWCASTLE AUSTRALIA

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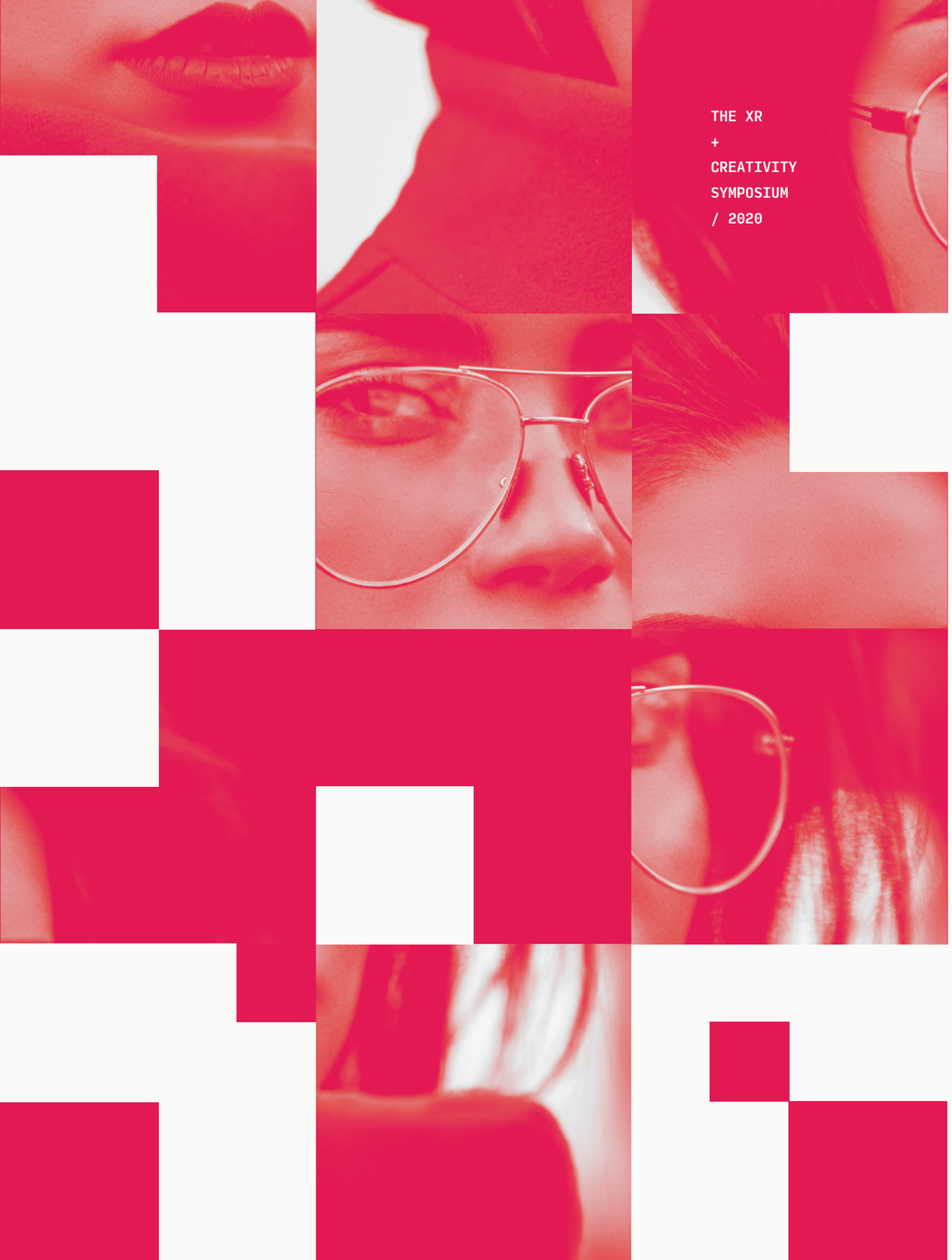
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THE XR
+
CREATIVITY
SYMPOSIUM
/ 2020

THE XR AND CREATIVITY SYMPOSIUM GATHERED TOGETHER FIVE WORLD LEADERS, ESTABLISHED SCHOLARS THROUGH TO EARLY CAREER RESEARCHERS (ECRS) AND POSTGRADUATE STUDENTS TO EXPLORE THE APPLICATION OF EXTENDED REALITY (XR) TECHNOLOGIES TO REAL-WORLD PROBLEMS. THE EVENT WAS HOSTED ONLINE BY THE SCHOOL OF CREATIVE INDUSTRIES AND THE FASTLAB AT THE UNIVERSITY OF NEWCASTLE (UON), AUSTRALIA ON 1-2 OCTOBER 2020 UNDER THE THEME OF 'TRANSFORMATIVE TECHNOLOGIES FOR GOOD'.

INTRODUCTION

Over the course of two days, attendees gained insights through keynote presentations from pioneers in creative and applied fields, heard about a number of exciting current and emerging projects from ECRs in a Fast Forward Session, and participated in a Co-Creation Session contributing to dialogue about the application of transformative technologies for social good.

A primary aim of the forum was to inspire a transdisciplinary research network to support emerging researchers innovating creative, applied and clinical applications of cutting edge XR technologies: this effort represents a UON-led collaboration of scholars from diverse specialised knowledge fields.

Scholars and industry partners from diverse backgrounds must innovate to find creative solutions to social and technical barriers to transformative technologies.

The transformative effects of XR have great potential to generate social good in a range of contexts.

The resulting XR + Creativity network's mission is to conduct applied research that cuts across disciplinary boundaries and draws on emerging technology to solve human problems. We aim to explore novel and innovative applications of virtual reality (VR), augmented reality (AR) and XR technology for social good.

Our work adopts the principles of inclusive design and employs participatory research methods, aiming to benefit people from diverse and vulnerable communities and address contemporary challenges in creative industries, health sciences, psychology, medicine, remote collaboration, digital heritage, digital humanities, education and training and beyond.

The goals of the network are high-quality research outputs including tier-one publications and international conference presentations, and the generation of scholarly knowledge through development and evaluation of conceptual models, proofs of concept (POC), and commercially viable applications that can be translated for use in a broad range of fields.

This report captures key learnings from the symposium and serves as an invitation - please contact us with any questions, thoughts or opportunities to further the mission described here. We hope you are inspired, challenged and stimulated by our findings.

Dr Benjamin Matthews | Dr Zi Siang See
Symposium organisers



KEY LEARNINGS

THE XR + CREATIVITY SYMPOSIUM produced a number of insights into the future contribution of XR technologies to positive social transformation. While contributors invariably spoke from specific disciplinary contexts, the broad interest and relevance of the points discussed indicates the emergence of an exciting transdisciplinary fusion of methodologies. The overarching theme of 'Transformative Technologies for Good' provided a shared vision, no matter how diverse participant knowledge, level of experience or chosen methods were.

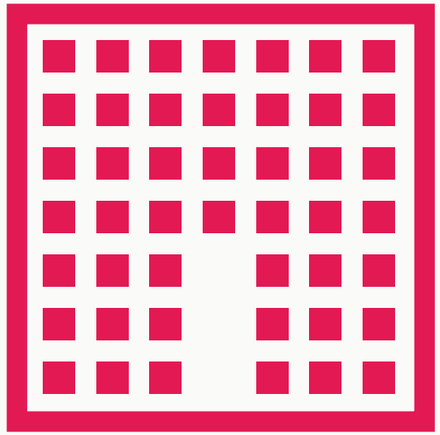
DEEPER THAN GLOSS

Cutting-edge, socially-driven XR may not be highly polished or the latest tech.



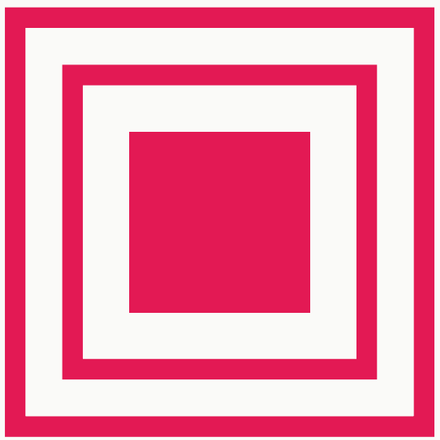
TECH: A MEANS, NOT AN END

Resist unfettered technological progress in favour of a human-centred approach.



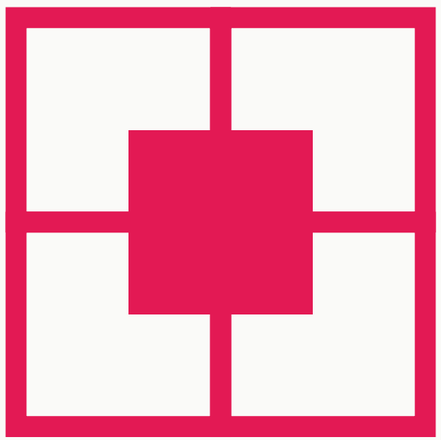
EMPATHY AND ETHICS

Let XR research be guided by a duty of care for a better, more just future.



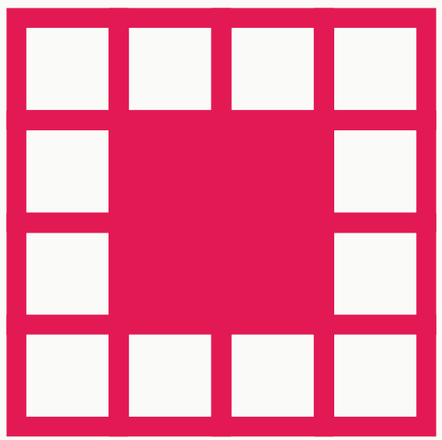
REVOLUTION IN METHOD

Build inclusive, participatory and transdisciplinary practices to disrupt power dynamics.



OPEN DISTRIBUTION

Re-direct outcomes and profits from social elites to the wider good.



Dr JACQUELYN MORIE has dedicated more than 30 years to research into and creation of meaningful VR experiences. Her work combines multi-sensory, perceptual techniques that 'predictably elicit emotional responses from participants'. Her company All These Worlds has produced innovations in the areas of social VR, mindfulness, storytelling, stress-relief and immersive education and training. In 2016 Morie completed the ANSIBLE project for NASA, a virtual world ecosystem designed to prepare astronauts for long periods of isolation on missions to Mars. ANSIBLE was tested in HI-SEAS, Hawaii, where a team of six scientists was sequestered for a full year to simulate deep-space conditions, including long communications delays. Morie also investigates how personal avatars affect our human selves. Her achievements include a novel scent release device, called RemniScent, to aid in the evocative power of VR experiences.

REFLECTIONS ON HUMANITY'S FUTURE OF EXPANDED REALITIES

Reflecting on aeons of breakthroughs that changed the way humans exist in the world, Dr Morie imagined how today's XR technologies will transform our perception of what it means to be human.

What we know today is not what reality has always been.

Morie situated the advent of XR in a long history of technological and cultural innovation. Visiting several episodes of human evolution - written language, high-speed travel and communication, data expansion and the bio-science revolution - Morie argued that human perception is profoundly shaped by innovations in technology and cultural practice. In doing so, she sought to answer how XR technologies reframe our understanding of reality.

Drawing on the thoughts of Jesuit scholar Pierre Teilhard de Chardin, Morie agreed that humanity is on the path to existing in a unified global thinking layer, a super-consciousness.[1] This next stage of human evolution is characterised by increasing biological and cognitive complexity, whereby the internal thoughts of isolated individuals are externalised and shared. Such a vision places future humans in an interconnected web of thought, inspired in the ecological connections we participate in, playing a vital role in the biosphere.

While Morie conceded it is difficult to predict how widespread adoption of XR will influence perception, bodies and relationships, we are already in the process of making such change a reality. Every line of code written today, every 3D model that is built and textured, every volume scanned and intelligence captured is helping construct a framework and future we can barely imagine.

Immersive technologies will reframe our understanding of reality.

You are all building the start of this reality. Build well so others will live fully in that future you are creating!



Dr JACQUELYN MORIE

[1]For an introduction to Pierre Teilhard de Chardin, see https://www.wired.com/1995/06/teilhard/.

HERITAGE SCIENCE IN THE POST-DIGITAL ERA

PROF. HAROLD THWAITES holds degrees in Communication Arts and Educational Technology in addition to having a 10-year professional background as Associate Producer in children's television at the Canadian Broadcasting Corporation. Over a career spanning more than four decades, he has held academic posts at Concordia University, Multimedia University, Malaya University and Sunway University in the fields of arts, communication studies, creative multimedia, and creative content and digital innovation. He is now Head of the Centre for Research-Creation in Digital Media (CRCDM) at the same institution.

In this keynote presentation, Prof. Thwaites explored the impact of digital media on the practice of archival scholarship and content creation. Thwaites holds that computation will remain integral to humanistic research-creation projects in coming decades. His areas of expertise, heritage science and digital humanities, are two prime examples of both present use and future potential of computational tools and methods to humanist fields of study.

Thwaites described how the CRCDM works at fostering transdisciplinary connections to inspire new research approaches, while also leveraging digital media technologies for content creation and dissemination to a wide variety of publics.

Capturing well is critical. You can never get enough – but you can't capture everything.

During the intervention, Thwaites visited landmark CRCDM projects that aim to strengthen, preserve and disseminate threatened cultural practices. Digital media, he posits, is an effective way of preserving and even invigorating culture that may otherwise be in danger of disappearing.

The presentation provided an overview of the information design process applied to the digital preservation and re-presentation of cultural heritage. Thwaites illustrated a process in which principles of heritage science are employed to create a matrix of cultural heritage content. He asserts that thinking and design at the cutting edge of digital heritage is today invested in answering how to best digitally codify culture for the future.

Central to Thwaites' work is the concept of the 'cultural imaginary'; in other words, the intangible culture that resides in the minds and hearts of its practitioners and is passed from generation to generation. Within this context of legacy, transmission and transformation, he emphasised the notion of 'performing heritage' across digital and traditional platforms. His overview of selected projects showcased the materiality of the digital, its embodiment, agency, performativity and resulting impacts on audiences they seek to inform.



PROF. HAROLD THWAITES





How can we ensure that digital mental health programs work and are effectively integrated in routine care?



DR SONJA MARCH

Dr SONJA MARCH is Research Program Director at the Centre for Health Research, managing the Innovative Mental Health Solutions research program. Her research interests include eHealth, youth mental health and methods for improving health service delivery and access, especially in regional areas. Also Professor in the School of Psychology and Counselling at University of Southern Queensland, March received her PhD in Clinical Psychology from University of Queensland in 2009, where she has since completed a postdoctoral fellowship.

DIGITAL TOOLS FOR CHILDHOOD MENTAL HEALTH: THE THREE D'S – DESIGNING, DEVELOPING AND DISSEMINATING

March addressed recent enthusiasm for digital mental health services, insisting the trend must be viewed with a critical eye. The goals, she argued, should be evidence-based outcomes to ensure digital tools for child and adolescent mental health are effective and lasting, and not simply a short-lived trend.

In her keynote presentation, Dr March described children and adolescents as a 'connected' generation, being highly skilled in the use of digital technologies. These digital natives use the internet regularly for the purposes of education, social connection, health and relaxation. March emphasised the comfort young people feel at seeking help and mental health information online. This, she reasoned, means that digital technologies hold great promise as a way of addressing mental health in children and teenagers. Furthermore, the potential of digital mental health services has never been so apparent as now, with shifts in service delivery arising from the consequences of the COVID-19 pandemic.

Too many projects go unused. People will only use your tools if there's a reason to.

Her presentation explored the *'three D's of digital tools'* for child and adolescent mental health: design (especially co-design), development (and re-development) and dissemination (taking digital tools to scale). Importantly, March demonstrated how children are not simply 'little adults'; the three D's of digital tools must be developmentally appropriate. She stressed that we must find unique ways of accounting for the lack of therapist contact and should build strong and creative co-design elements into the process.

March showed examples from three platforms:

- **Interactive Child Distress Screener**, an animated tool for identification of emotional and behavioural difficulties;
- **Coping Coach**, a gaming-based prevention program for childhood medical trauma and injury, and;
- **BRAVE-Online**, a suite of internet-delivered cognitive behaviour therapy (ICBT) programs for youth anxiety.

The talk concluded with a discussion of the challenges and opportunities in using digital tools in routine care, drawing from the results of large-scale community dissemination and clinical service trials.

PROF. MARK BILLINGHURST is Director of the Empathic Computing Laboratory at the University of South Australia and the University of Auckland. A pioneer in the field of XR, Billinghurst has researched AR and VR for over 25 years, publishing more than 550 research articles on topics ranging from collaborative AR and VR, multimodal interfaces and mobile AR, to empathic computing. In 2013 he was elected Fellow of the Royal Society of New Zealand and in 2019 was recognised with the ISMAR Career Impact Award for a lifetime contribution to AR research and commercialisation.

NEXT-GENERATION COLLABORATIVE TECHNOLOGIES

In this presentation Prof. Billinghurst reviewed next-generation technologies for collaboration in a post-COVID world, exploring profound challenges faced by creators of collaborative technologies. These have been highlighted as unprecedented numbers of people work from home, making new demands on technology and its users. Recent findings on the effects of long-term use of video conferencing and other collaborative tools has shown the limitations of current technology and human cognitive endurance _ popularly dubbed 'Zoom fatigue'.[2] Billinghurst reviewed some key lessons from this growing body of research into the physical, cognitive and social challenges of the new post-pandemic workspace.

Billinghurst discussed how new approaches to collaboration using AR and VR could overcome some of the limitations of desktop tools. In particular, he declared, the use of these technologies can enable more fluid channels of remote collaboration. These include a more natural relationship between the 'task space' and 'communication space' shared by remote collaborators, with the aim of expanding the 'shared sphere' through situational awareness. Many of these solutions centre on 'embodiment', or the idea of bringing the body back into virtual environments. Specific functions being explored by Billinghurst's team include ways of knowing where your collaborator is looking, changes in body scale and shared views.

The 'shared sphere', fundamental for empathic computing, improves with situational awareness.

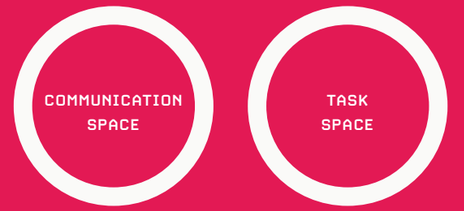
Empathic computing especially attracts a considerable amount of Billinghurst's efforts. It is here that he located the future of human-computer interaction. It is only now, Billinghurst confirmed, that empathic computing is becoming plausible, thanks to our abilities to capture (and share) live experiences, faster network speeds and the implicit understanding that sensor technologies offer of human physiology and emotion. By detecting and measuring gaze direction, pupillometry, facial topography and heart rate, intelligent wearables can elicit sensations of emotional proximity. These affordances, Billinghurst predicted, will help transform the new normal of remote work as well as the future of computing generally.

We want to bring back the body to the video conference experience.

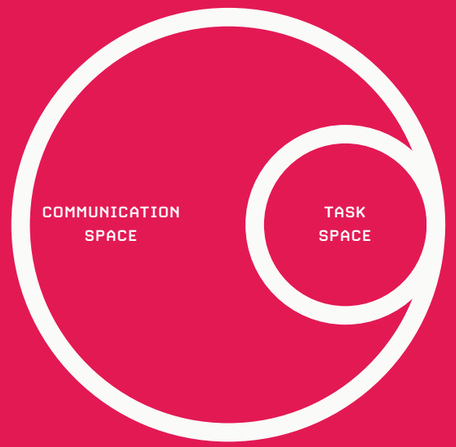


PROF. MARK BILLINGHURST

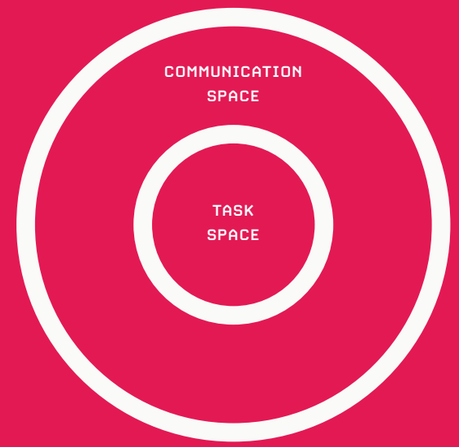




Existing technologies cause problems by separating the spaces.



In-person collaboration naturally locates 'task space' inside the 'communication space.'



AR can facilitate remote collaboration by echoing the in-person workspace.

[2] Foslien, L & Duffy, MW 2020, 'How to combat Zoom fatigue', Harvard Business Review, viewed 29 October 2020, https://hbr.org/2020/04/how-to-combat-zoom-fatigue.

With over 20 years' experience in arts and new technologies, Dr DENISE DOYLE researches the impact of emerging technologies on artistic practice. In 2019 she was awarded £85,000 to identify successful science, technology and arts (STARTS) methodologies as part of the STARTS Prize initiative. Doyle has published widely and edited the artist-led book *New Opportunities for Artistic Practice in Virtual Worlds* (2015). She is Principal Editor of the *Journal of Virtual Creativity* (Intellect) and sits on the editorial boards of leading journals. She is currently writing a monograph on digital embodiment to be published by Intellect in 2021. She holds academic posts at the University of Wolverhampton and Ontario College of Art and Design University.

DIGITAL EMBODIMENT AND TRANSFORMATIVE TECHNOLOGIES

'I' without 'us' is inconceivable … feeling others' emotion is the same as feeling our own.

In her keynote lecture Dr Doyle discussed her long-time fascination with the concept of 'digital embodiment' in the examples of digital avatars and immersive VR. She focused in particular on the transformative potential of these two embodiment practices as seen in several artistic projects, notably Joseph DeLappe's recreation of Gandhi's Salt March on Second Life, Catarina Carneiro de Sousa's work on shared avatar creation in *Meta_Body*, and the mixed-reality durational performance *Becoming Dragon* by Micah Cárdenas.[3] Doyle highlighted in particular the work of Barcelona-based art collective BeAnotherLab as an example of how immersive technologies can create powerful empathy-driven experiences for audiences.[4] By incorporating real human touch between performers and participants the project *Library of Ourselves* challenges strict separations between virtual and embodied spaces and points to the coexistence of digital and tangible experience. Doyle's interest at heart lies in how the virtual brings us closer to understanding the real, to ourselves and each other. Drawing on neurophysiologist Giacomo Rizzolatti's thinking, Doyle affirmed that XR has great potential for deepening self-awareness and human connection.[5]

A second focus of Doyle's talk was interdisciplinary practice in arts, science and technology, which she illustrated with a recent research project tasked with 'identifying successful STARTS methodologies' co-ordinated by the University of Wolverhampton in collaboration with Ars Electronica and the European Commission. Doyle drew attention to the incredible acknowledgement that the STARTS initiative makes of artists' contributions and their capacity for generating ideas and seeing differently. These projects typically take an 'anti-disciplinary' approach, eschewing traditional hierarchies between subject areas and levels of expertise.



DR DENISE DOYLE

We need an anti-disciplinary space where arts and science can work together.

[3]DeLappe's work is recorded at http://www.delappe.net/game-art/mgandhis-march-to-dandi-in-second-life/; find an archive of Cárdenas' project here: https://secondloop.wordpress.com/

[4]Find BeAnotherLab at http://beanotherlab.org/

[5]Rizzolatti, G & Craighero, L 2004, 'The Mirror-Neuron System', Annual Review of Neuroscience, vol. 24, pp. 169-192, viewed 29 October 2020, https://doi.org/10.1146/annurev.neuro.27.070203.144230

FAST FORWARD

The Fast Forward Session showcased 12 shorter presentations of current and emerging projects by ECRs and interdisciplinary teams. The diversity of topics covered reflects the broad application of XR to multiple facets of life. Presenters explored the nexus between XR and art, communication, education, animation, live music, digital heritage and psychology.

A conceptually playful creative work centred on park benches was described by Prof. Matthew Sansom in work realised in conjunction with Dr Zi Siang See. The researchers, working from a concern for health and wellbeing and drawing on principles of mindfulness, asked how we might stop, reflect and be witness to lived experience in our technologically determined lives.

Sharing an interest in therapeutic applications, Richard Thorpe introduced PsyFlex-VR, an immersive application to support the development of psychological flexibility for wellbeing. The project investigates the design aspects of adapting psychological flexibility exercises for use in a VR environment.

Kenneth Feinstein interrogated the nature of experience and interaction in media from a media theory perspective. Starting from the idea that a mediated experience can be as formative as a lived one, Feinstein asks how a medium's form might contribute to a more resonant and personal experience.

Informed by experience of a sensory kind, Jack McGrath examined the relationship that exists between the miniature, viewer and the animated space, presenting artistic work with strong links to neurology, optics and stereo-vision technique. Through experimentation, McGrath and his collaborators introduce binocular rivalry through lighting and compositional differences between the eyes.

From the visual to the aural, Adam Manning, Dr Zi Siang See, Prof. Paul Egglestone and Danielo Pati's contribution explored the implications and ramifications of creating and streaming VR 360 live music content for social platforms, with a focus on community engagement and social impact. The authors argued that these digital performance spaces – whose growth has been stimulated by the COVID-19 pandemic – require novel performance practices and technologies.

In the face of a palpable bias in VR research towards the audio-visual, Priscilla Koukoui insisted in her talk on the necessity of the chemical senses (smell and taste) for maximum impact and engagement. She showed preliminary research into how multisensory VR experience leads to more efficient message delivery, and can be used to drive virtuous behaviours.

Seeking similarly positive outcomes in the VR user, Dr Human Esmaelli and Prof. Harold Thwaites tackled the issue of environmental degradation. Esmaelli described a series of experiences visualising ecological destruction, which hopes to improve on traditional awareness programs by fabricating scenarios in which individuals are faced with accelerated consequences of their actions.

Multisensory experience delivers messages more effectively.

A mediated experience can be as formative as a lived one.

Destruction of a cultural kind was addressed by Delas Santano and Dr Human Esmaelli, who presented two applications of immersive technologies in the field of digital heritage. The first, in collaboration with Prof. Matthew Sansom, preserves the memory of Goh Boon Kong, a traditional boatbuilder of Pangkor Island, where large-scale boatbuilding process were managed by hand without detailed plans or blueprints. Moving from book format to AR the team drew on ethnographic fieldwork to enrich the viewer's experience. The second project involves an ongoing process of digitisation of the cultural practices of the Mah Meri, an indigenous Malaysian tribe. Special emphasis was placed on documenting the carved wooden artefacts used in ritual. Both projects aim to preserve these cultural ecologies against extinction.

With an emphasis on person-to-person exchange, Mairi Gunn's intervention supported the view that XR can facilitate intercultural connection. Using XR and 3D volumetric technique as the tools for encounter, Gunn seeks through her work to re-educate racist attitudes in the participant. Her work has so far brought people of New Zealand Māori and migrant identities around virtual tables representing domestic spaces.

Urban space, on the other hand, was the chosen site for A/Prof. Xia Sheng Lee, Dr Zi Siang See, Dr Chai Chang Saar, Dr Su-Ling Fan and Emmanuel Essah's investigations, which seek to integrate building information modelling (BIM) and VR to work on a barrier-free built environment development workflow. The approach they presented drew on concepts of empathy and universal design principles to address the needs of disadvantaged groups and mitigate unintentional discrimination against people with disability.

Taking secondary education as its focus, Jay Fairweather's talk further explored pedagogy through student-led VR content creation. Virtual settings in WWII trenches and emergency response scenarios illustrated how schools can work with VR in ways that are consistent with curricular requirements, safe work practices and ethical IP ownership.



CO-CREATION

INVITING DISCOURSE about present and future developments in the rapidly changing field of XR, the Co-Creation Session brought together participants from divergent disciplines. Participants were briefed on the session format and rules of engagement. These consisted of three key questions to be discussed in small groups and answered via digital ‘post-its’, written responses, photos and drawing. Given the online format and the desire for a participatory dynamic, a combination of digital tools was chosen. Video conferencing was conducted through Zoom, making use of the break-out room and share screen functions, while Google Slides was chosen as an interactive and collaborative task space. Contributors were divided into two groups of four to five people. These were Dr Andrew Burrell, Dr Jamin Day, Susan Marie Effenberger, Mairi Gunn, Dr Benjamin Matthews (co-moderator), Nikolas Orr (moderator), Christos Petrou, Dr Zi Siang See (moderator) and Divya Seengal. Below is a distillation of the insights that arose from the session.

1. WHAT SPECIAL SKILLSETS OR EXPERTISE ARE REQUIRED FOR EFFECTIVE XR-BASED TRANSDISCIPLINARY RESEARCH?

Several knowledge and skill categories emerged in the course of discussion. Most notable was the strong emphasis not on technical expertise, as might be expected, but on people, attitudes and traits. A far cry from ‘innovation for innovation’s sake’, discussion arrived at a broad consensus on the value of soft skills and cultural awareness in teams and individuals responsible for designing, developing and disseminating XR technologies. While today’s AR and VR creators will likely be well-versed in Unity and the latest hardware, technological change and consumerist-fuelled growth convert latest versions into legacy at dizzying rates. Rather, the co-creators contended that more slowly evolving transversal knowledge bases are better ground to build on, being more stable and sustainable.

2. WHAT PUBLISHING VENUES/CONTEXTS ARE SUITABLE FOR THIS RESEARCH?

Discussion began with a conceptual division between traditional academic venues and more public-facing contexts. The ensuing conversation acknowledged the importance of both, listing a provisional list of academic and industry conferences and journals, while also stressing that the network’s stated aims of diffusion, openness, inclusion and participation necessarily steer publishing strategies towards non-traditional modes.

It was the group’s position that the speed of change and resulting knowledge obsolescence can be addressed, at least partly, by facilitating the free transmission of research. It was pointed out that pay walls on academic publications impede equitable access and knowledge growth. Open source, publicly available and public-facing content is a natural partner to fast moving technologies, whereas traditional research with long turnarounds and strict protocols struggle to produce viable, scalable solutions to real-world problems in real time.

Promote open-source software, democracy and wide adoption.

3. WHAT LIES AHEAD FOR THE FIELD?

Contributors concluded the session by speculating on the future of XR technologies. While massive growth was agreed upon unanimously, participants were cautiously optimistic about the field’s contribution to social good. From the vantage of the Symposium the capacity of XR technologies for generating increased social control and inequality appeared as great, if not greater, than their transformative potential. In response, the group insisted that the concerns raised in Questions 1 and 2 must be addressed if XR is to contribute – or even lead – positive social transformation. Foremost among the group’s recommendations were inclusive research methods, democratic distribution of knowledge and access, and robust responses to corporate secrecy and ownership. In a moment of speculative optimism, participants imagined a future in which XR technologies might indeed provide a direct line to governance, and form a space for democratic decision-making. As a whole, however, legal frameworks and state-based regulations were left unaddressed in favour of decentralised initiatives and communities of concerned practitioners. It is this juncture – between policy and industry engagement and more disruptive practices – that the XR + Creativity network is poised to interrogate.

Idiomatic language can exclude or isolate investigators.

CONCLUSION

THROUGHOUT THE EVENT the concepts of positive transformation and social good were visited repeatedly. While participants had little doubt that XR will reshape humanity - Dr Jacquelyn Morie narrated how several key technologies have done so previously - concerns surfaced as to whether this transformation will have a positive impact on the critical issues we are facing: world health, social inequality, cultural and ecological destruction, democracy and civil unrest. Indeed, the symposium highlighted that the assumption that XR technologies are necessarily liberating, affirming or healing is deserving of critical reflection, not least because these notions are often proposed and marketed by the very social groups set to gain in wealth and power by their propagation - notably technology firms and, arguably, research groups. Such lofty claims echo those beginning two decades earlier of social media, which purportedly 'provides greater amounts of user agency, removes structural impediments for social dialog, and promotes an egalitarian exchange within the global sphere', an account since disputed as a 'product of the narrative structure of classical liberalism'.[6] XR research, then, is embedded in the political and economic settings in which it is practised. This suggests that, to be transformative, the methods and practices adopted must re-direct the profits and power centred in social elites into the wider good.

XR is in danger of collapsing into or being co-opted as part of these discourses of centralising control and wealth.

: Co-Creation Session

By placing 'social good' as the primary objective of research efforts, the focus of debate moved from technology for its own sake to a human-centred approach, exemplified in Prof. Mark Billinghurst's work on making technologies more liveable, improving our relationships, capacity for work and empathic connection. While the technical toolbox and theoretical paradigm of XR is central to the practices showcased in the Symposium, participants adopted a characteristically sceptical posture in response to the exaggerated hopes placed on immersive technologies and the conflation of high technology with social progress. Prof. Harold Thwaites established that cutting-edge socially-driven XR practice may not be highly polished. Similarly, Dr Sonja March challenged practitioners to resist the exhilaration of unfettered technological progress and make an honest appraisal of why we are making something, whether it will benefit end users and whether they are likely to adopt it.

Central to the aims of positive change and human-centredness is the question of agency and outcome: Who develops and uses these technologies? Whose creativity, health, wellbeing, wealth, power and status is enhanced by them? A number of projects with clear social benefits for specific minority groups were articulated by Dr Denise Doyle. Principles of inclusion, universal design, accessibility and co-creation were found to disrupt entrenched power dynamics in research practice and outcomes. 'Social good' acts as a self-reflexive touchstone for researchers, developers and users aimed at building an equitable, sustainable future characterised by wellbeing, creativity and peace.

Immersive technologies are already changing us; how we view ourselves, our bodies, relationships and the world. However radically XR changes our ideas of reality, perception and embodiment, as long as empathy and ethics are the guiding lights for research practice, we have good reason to place in these technologies our hopes for a better, more just future.

Embrace the suck! Work with what's at hand. A spirit of design that is about getting on with iterations rather than careful experiments.

: Co-Creation Session

Cutting edge does not equal latest tech.

: Co-Creation Session

[6] Myers, C & Hamilton, JF 2014, 'Social Media as Primary Source', Media History, vol. 20, no. 4, pp. 431-44, viewed 30 October 2020, https://doi.org/10.1080/13688804.2014.950639.

XR + CREATIVITY

SYMPOSIUM

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