Institution: University of Greenwich	

Unit of Assessment: 32 - Art and Design: History, Practice and Theory	

Title of case study: The Internet of Bodies: Shifting future thinking, shaping debate, and transforming practice in the arts, culture, creative industries and corporate sectors, as well as for the general public

Period when the underpinning research was undertaken: Oct 2015 – Dec 2020

Details of staff conducting the underpinning research from the submitting unit:

Name(s): Ghislaine Boddington	Role(s) (e.g. job title): Reader in Digital Immersion	Period(s) employed by submitting HEI: 12/10/2015 – present

Period when the claimed impact occurred: November 2015 – July 2020

Is this case study continued from a case study submitted in 2014? N

1. Summary of the impact

Ghislaine Boddington's research on the 'Internet of Bodies' (IoB) has resulted in cross-sectoral impact, which has been transmitted through installations, large-scale curations, mentorships, public radio, keynotes and industry consultancies. Boddington's practise as research has shifted debates on the living body in the 21st century. Through the integration of embodied technologies, diverse futures and the immersion of the body within data, her work has changed attitudes and behaviours for beneficiaries in the arts and cultural sectors, creative and corporate sectors and, via broadcast media and live events, to the general public. By exploring how the live body can become a living digital interface she has expanded international debates on digital intimacy, identity, inclusivity and connected technological futures, changing attitudes by demystifying the Internet of Bodies into diverse and international audiences.

2. Underpinning research

Boddington has advocated the use of the entire body as a digital interaction canvas since the early 1990's and is recognised internationally as a pioneer in telepresence, immersion experiences and the hyper-enhancement of the body through digital technologies. Working as an artist-researcher, curator and presenter, **Boddington** has explored the consequences of the mass shifts in human-technology interfaces in relation to the globalised need for a wider recognition of diversity and inclusion agendas. The University of Greenwich has provided the context for **Boddington** as a Reader in Digital Immersion, enabling her to interweave her research into her public facing work as Creative Director of the SME BDS Creative Ltd - body>data>space.

The IOB project explored key questions: (i) how forms of the body are created and transmitted through digital tools, changing our relationship to ourselves and to diverse others, (ii) how virtual/physical distributed embodiment can redefine identity to be inclusive in socio-political terms, and (iii) how living and working in virtual space enables and encourages collective intelligence, collaboration, and co-creation **[3.1 – 3.4]**. This research has been heightened during the COVID-19 lockdowns, where telepresence has often been the only mode of socialising, running events or businesses.

Boddington's practise, evolved through her dance background, is central to her academic research. This has enabled her to develop and test methodologies, such as 'The Weave', which examines the relationship between the live body and technologies in situated contexts **[3.1 – 3.4]**. Her collaborative studio-based experiments have integrated dancers, media artists and the public into virtual and hypersensory technological experiences. This method aims to push the boundaries of liveness, collective intelligence and the data self, using co-creation and a plurality of voices **[3.1]**. Findings from these activities have been used to support new approaches to digital intimacy

at the cross section of performance, design, technology, and the creative industries. From user pathways and interactions points, to innovations in virtual/physical blending, the research is used to pattern forward insights into the future human and demystify these technologies for wider public debate **[3.2, 3.3]**.

Her research bridges HEIs with creative and cultural industries, the corporate sector, and wider publics. Recent examples of this include *Collective Reality* (2016) **[3.1]**, a participatory installation premiered at Nesta's *FutureFest16* which expands knowledge into full body digital immersion, using practice-led collaborative research to create embodied insights into real-time immersive environments. As creative director and lead artist **Boddington** explores physical motion, gestural interfaces, collective embodiment and digital intimacy, collaborating with researchers and practitioners from *Bath Spa University*, *Ravensbourne University*, and *d3 technologies*. In contrast to the disembodiment of singular immersion technologies such as VR, Collective Reality visions a future where virtual/physical environments support group immersion and collective participation **[3.1]**.

In 2017 *Collective Reality* was invited to SAT Montreal (360° immersion dome venue) and ran workshops for 84 VR/AR programmers on full physical engagement using collective embodied and spatial intelligence to expand their understanding of the living body active within technological innovation **[3.1]**. Her *FutureFest18* curation, *Alternative You,* has provided insights into how technologies and intelligent machines may support the reinventing and editing of our identities **[3.3]**, while **Boddington's** journal article *The Internet of Bodies* for *AI&Society* expands the core insight threaded through **Boddington's** work, that the body has become the interface. It also contextualises her findings within COVID-19 on how digital remote intimacy could be used when physical proximity is prohibited and gives ethical guidance on the creative industries' use of body data through concepts of data unions, mutualisation schemes and personal data ownership vaults **[3.4**, p. 27**].**

Invited presentations on the IOB have taken place in over 50 conferences and industry gatherings globally, influencing debates about the "liveness" of virtual presence (https://www.internetofbodies.net/presentations). Knowledge sharing with the general public has extended into radio broadcasting, and multiple sectors including VR/gaming/metaverses, performing arts, sci-arts, social tech, creative industries, corporate and future identity politics.

3. References to the research

1. **Boddington, G.** and collaborators, Collective Reality 2016 (Nesta / University of Greenwich / Genelux / d3 technologies / Panasonic) - public installation - an immersive group environment where virtual/ physical space is blended - 4280 public, London (6-7 Sept 2016) and Montreal (31 May - 3 June 2017). See: https://www.internetofbodies.net/collective-reality
    Additional information: http://www.bodydataspace.net/projects/collective-reality/collective-reality-futurefest-2016/
    Indicator of Research Quality: The IX Immersion Experience Visionary Pioneer Award 2017 https://sat.qc.ca/en/nouvelles/visionary-pionneer-award-laureates-recipiendaires-du-prix-pionnier-visionnaire

2. **Boddington, G.** FutureFest 2016 curation (Nesta): Theme: Future Love - 3900 public - Tobacco Docks, London (17-18 Sept 2016). See: https://www.internetofbodies.net/future-love
    Additional information:
    https://web.archive.org/web/20171001001638/https://www.futurefest.org/love
    Programme: https://www.flipsnack.com/futureplayer/futurefest-2016-programme.html

3. **Boddington, G.** FutureFest 2018 curations (Nesta):
3a.   Theme: Alternative You - 4200 public - Tobacco Docks, London (6-7 July 2018).
        See: https://www.internetofbodies.net/alternative-you.

> **Additional information:** https://www.bodydataspace.net/2018/03/futurefest-2018-ghislaine-boddington-co-curation/;
> https://web.archive.org/web/20190202105206/https://www.futurefest.org/;
> Including Bio-Body-Tech 2018 curation (Nesta) -1920 public:
> https://www.internetofbodies.net/bio-body-tech
> **Programme**: https://www.flipsnack.com/futureplayer/futurefest-2018-programme.html

3b.   FutureFest Forward AI and Society debate series 2018 curation (Nesta) - 480 public
- Nesta, London. (19th April, 17th May, 14th June 2018)
See: https://www.internetofbodies.net/futurefest-forward
Additional information: http://www.bodydataspace.net/2018/03/futurefest-forward/
https://www.nesta.org.uk/event/futurefest-forward-ai-and-creativity-futures/
https://www.nesta.org.uk/event/futurefest-forward-ai-and-future-work/

Output 2 & 3: **Curatorial Methodology**: https://www.internetofbodies.net/curatorial-methodology See **Glossary** of key concepts: https://www.internetofbodies.net/glossary

4.   **Boddington, G**., 2021. The Internet of Bodies - alive, connected and collective: the virtual physical future of our bodies and our senses. AI & Society, https://doi.org/10.1007/s00146-020-01137-1 *[REF2 Submission – Identifier 28090]*
The article was received 24th October 2020, accepted for publication on 4th December and published in February 2021. The delay in publishing to beyond 2020 was due to the impact of COVID-19 on AI & Society. They have issued a letter to the university to support this claim. In light of this delay the article was published December 2020 here: https://www.internetofbodies.net/ai-society, and linked to the university repository.

4. Details of the impact

Boddington's research has advocated for the body to be at the centre of technological development since 1991 (https://www.internetofbodies.net/timeline). The last five years, however, have been fundamental in shaping this debate within an increasingly datafied society. The IOB research, practice and her public persona as a futurist have become globally recognised, creating meaningful change by demystifying how the live body is enmeshed with technologies **[5.1,** sec.5, p.23-25**]**. This was highlighted in 2017 when she received the 4th international IX Immersion Experience Visionary Pioneer Award from SAT Montreal **[5.2]**. Her impact is cumulatively felt across a range of sectors:

(i)   Impact on the arts and cultural sectors

Boddington impacted other artists and curators through her facilitation, direction and mentoring in the UK and internationally. Her keynotes on the IOB support interdisciplinary and cross sector exchange on the hypersensory self and collective intelligence e.g. Human Choice and Computers Conference (University of Salford, 2016); Tacit Engagement in the Digital Age (University of Cambridge 2019); and UKRI Beyond (Edinburgh 2019) **[5.1**, sec.3, p.18-20**]**.

Installations and curations: Collective Reality (2016/17); FutureFest's Future Love (2016) and Alternative You (2018); Bio-Body-Tech (2018) and FutureFest Forward (2018) reached audiences of over 14,864 (https://www.internetofbodies.net/projects). **Boddington's** FutureFest curations include: 15 Main Stage speakers,11 Debate Stage panels with 46 speakers, 4 Explore Stage speakers and 12 installations and performances involving over 100 creatives, where her long-standing advocacy for diversity and inclusion resulted in female audiences increasing from 44% in 2015 to 65% in 2018 **[5.2]**. Her curations underscore that innovative futures only emerge from diverse speakers.

"The Internet of Bodies research has influenced the direction of the festival to include ideas of digital intimacy and body data which was key in drawing together diverse audiences … as well as professionals tasked with solving problems from businesses, civil society, governments, charities or academia.... [Organisationally it] helped Nesta's leadership develop an increased awareness

and interest in experimentation and …applications of emergent technology to social innovation." Rebecca Rossini, Head of Events, Nesta **[5.2]**.

This focus on diverse futures is supported through ongoing work with: Deutsche Bank's We In Social Tech, Frequency Festival's The Meet Up and as a Trustee for Stemette Futures (https://stemettes.org/) providing mentorship for CEO Dr Anne-Marie Imafidon MBE and ongoing development for access to digital tools and virtual-physical environments **[5.3**, **5.4]**.

Boddington was invited by Studio Wayne McGregor and Sadler's Wells Theatre to evolve their programme's approach to dance tech collaboration and the future human, shifting participant's attitudes to emerging technologies. As the lead contributor and mentor for the QuestLab Network she has applied her background in dance to enhance 25 professional choreographers' and media artists' understanding of body technologies and virtual physical blending across 2 years. This collective learning has formed the backdrop to dance-tech experimentation during COVID-19, with ongoing mentorship for 6 artists including Tim Murray-Browne's *Sonfied Body*, Zach Walker and Jennifer Irons through *MakeAmplify* and Adrienne Hart's *Prehension Blooms.* Adrienne states Ghislaine's mentorship and IOB research influenced her use of "*tele-operated robots [for] remote audiences"* **[5.5]**.

(ii)   Impact on the creative industries and corporate sectors

Through professional advice, consultancies, and creative direction she is regularly invited to share her future thinking with business and industry experts **[5.1**, sec.1, p.6-9**]**. Her influence can be seen in Plexal, Align Fund Scale, Stylus and other corporates. For Plexal, as creative director, she enriched their tech ecosystem with creative technologies, developing a series of interdisciplinary tech residencies **[5.6]**. For Align Fund Scale IOB research was applied to product decisions for example the "*evolution of organic user pathways and interaction modes, from the physical to the virtual in 3D*" Jeff Jones, Align Fund Scale **[5.6]**. Stylus applied the IOB research through wider dissemination in their July 2018 trend report on FutureFest that provided commercial insight for 300+ global brands and agencies developing insights on The Extended Human "*via the body, rather than a headset*" **[5.2]**.

Boddington creates awareness of the ethical use of data and AI by leading best practices. She states that any company developing "*interfacing technology must place a body expert at the core of its development team… [with] a transparent data ethics governance declaration*" (https://tinyurl.com/3trrjm5s). These insights are presented internationally to thousands of business and industry leaders each year, with main stage presentations at *4YFN Mobile World Congress (Barcelona 2019)*; *Panel, The Pioneers* (Vienna 2019); *TedX* (Vienna 2016); *STRS Simulation Training for Resilience & Safety Symposium* (London 2019) **[5.1**, sec.3, p.18-20**]**.

Over 110 professionals and managers from the STRS Symposium benefited, it *"progressed the thinking in the S&T community and the need to look at the creative sector for innovation... I believe [Ghislaine's] research will have an increasing impact and influence in the S&T community and how best to place the human(s) at the centre of remote training experiences",* Andy Fawkes, STRS, Halldate Group **[5.6]**.

Her position as spokesperson and consultant for the Deutsche Bank/NWES Women Entrepreneurs in Social Tech Accelerator (2018-2020) has also led to **Boddington** advising the development of 85 start-up businesses in this sector, with 10 personal mentees. Her role included *"making sure the project embraced diversity and inclusivity ... through a focus on selecting the cohort but also in programming to make sure the facilitators and mentors came from diverse backgrounds",* Andrew Wilson, Director, NWES **[5.3**, **5.4]**.

She created a collaborative and inclusive environment by using her Weave methodology and ensured professionality by renumerating mentors for their roles. Mentees include Impli, a startup using implantable technology (https://impli.org/about-impli/) who stated that they have applied her "*in-depth knowledge of the cyborg scene globally*" to their work **[5.6]**. This has led to the ongoing

development of guidelines on body data ethics, building a transparent data ethics governance and appointing Ghislaine to their advisory board. Ongoing mentorship for businesses also includes *Art In Flux CIC* on creative growth methodologies and *Virtual Futures* on curatorial practices and their role in FutureFest.

(iii)   Impact on the media and the public

Boddington's commitment to including audiences in the IOB debate on the future human has led to collaboration, most prominently: BBC World Service - Digital Planet weekly radio show (from 2016) and FutureFest and FutureFest Forward curations (2015-2018). She enabled access and dialogue of a wider public through the curation and direction of public events, exhibitions, festivals and performances worldwide **[5.1**, p.26-27 sec.6**]**. In FutureFest, audience feedback through diarists documented how practical applications of the technologies changed their views e.g. "*creating new future-proof policy advice*" **[5.2]**. **Boddington's** role as a team member and studio commentator on BBC World Service English radio, which has a public access of 97 million listeners a week, tackles issues developed within the IOB research through global bi-weekly presentations that are emerging as key themes of strong public interest due to COVID-19, such as *Testing EdTech*, contact tracing apps, *Digital Death* and *COVID-19 makes Tech Events go virtual* (podcast download 25k-30k a week). BBC Digital Planet state that:

"her research has made creative technologies and the future human a core part of BBC Digital Planet… [with audiences] engaging with the content of programme's on social media", Ania J. Lichtarowicz, BBC Radio Science **[5.7**; **5.1**, sec.4, p.21-22**]**.

She also had an impact on the programme's diversity of speakers, helping them to reach BBC internal targets of at least 50% female contributors on air and supported the development of new protocols, shifting broadcasting from studio to home during COVID-19 lockdowns **[5.7]**.

5. Sources to corroborate the impact

1. **Audience / Press / Public – Report**: This report includes data from social media, audience and mentorship data, selected presentations and press, podcasts, public & artist quotes, recent awards and positions.
2. **FutureFest – Curations:** Testimonial from Rebecca Rossini, Head of Events – Nesta (2012 - 2018) / Testimonial from Luke Robert Mason, Director - Virtual Futures, plus pdfs of FutureFest16, FutureFest18, FutureFestForward18, Stylus Report, press release, What Makes Us Human blog and IX Immersion Experience Visionary Pioneer Award.
3. **We In Social Tech, Stemettes, The Meet Up – Diversity and Inclusion:** Testimonial from Andrew Wilson, Director, *NWES*, (We in Social Tech) /Testimonials from Dr Anne-Marie Imafidon MBE - *Stemette Futures* and from Uzma Johal - *The Meet Up, Frequency Festival* 2019, plus images of websites of all.
4. **NWES WIST and Stemettes – Reports:** We in Social Tech Evaluation Nov19 and Dec20, Stemettes Annual Impact 20/21 Report
5. **QuestLab Network – Development and Mentoring:** Testimonials from Jasmine Wilson - Director, *Studio Wayne McGregor* and from artists mentored during QuestLab Network and onwards - Adrienne Hart *Neon Dance*, Tim Murray Browne *Preverbal Studio* and Zach Walker and Jennifer Irons *Make Amplify* - plus image of QuestLab website
6. **AFS, Haldate Group, Plexal, Impli, Flux – Creative Industries/ Business:** Testimonials from Jeff Jones - *Align Fund Scale*, Andy Fawkes - *Halldate Group*, Marcus King - former *Plexal*, Anna Luisa Schaffgotsch and Sybille Lambotte - Directors, *Impli Limited* (Cohort 2, Women Entrepreneurs in Social Tech accelerator), Maria Almena Director - *Art in Flux* CIC, plus image of Plexal website.
7. **BBC World Service, Digital Planet** – Broadcast Media: Testimonial from Ania Lichtarowicz, Producer - *BBC Digital Planet, BBC World Service,* images of the website.