Queering Realities:
Design Workflows and Interfaces for a more-than-human virtual Fashion Production

Subtheme: Technology

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Abstract

This paper discusses virtual fashion norms through the lens of queer ecology, a theoretical framework recognizing human diversity and proposing nuanced ways of being, loving, and expressing (Muir, 2022).

As artists and designers currently explore expansions of the human body and meander the fine line between creature and avatar, they intentionally or unintentionally are moving beyond binary thought patterns, dissolving normative human representation in virtual realms.

Through research-based practice, the paper situates professional methods and techniques of designing bodies and fashion for the experience age and highlights opportunities and challenges that arise from working in virtual realities through a comparison with the multimodal and tactile origins of fashion. As a set of parameters different from common fashion making workflows arises, the paper will in a first step convey observations, learnings and performance-studies from a workshop series titled 'Queering Reality', bringing together XR designers, staff and students. It then will go on to draw attention to the 'tool-aesthetic' (Surman, 2024) inherent to the use of certain software and platforms of virtual production and its homogenising characteristics. Although often classed fundamentally different to the traditional fashion experience, the bridging and knowledge of both worlds is demanded from practitioners in any fashion discipline today, bringing about the question of specialism and skilled production and the scrutiny needed to craft fashion experiences that consider the philosophical and technical context of both worlds. By giving insight into the production, development and planning of a fashion experience with focus on audience interaction and participation, the paper will contribute to the understanding and value of developing and exhibiting fashion in a digitally expanded and enhanced format and examine how cultural meaning is crafted through new technologies, shared with and made accessible to audiences.

Key Words: virtual embodiment, representation, more-than-human, post-human, expanded fashion practice.

INTRODUCTION

The concept of digital fashion has produced questions about fundamental traits of a fashion designer's future skill sets. Seeing how related fields such as media theory have moved to describe 'post-digital' practices starting around 20 years ago (Bishop et al., 2016), we produce a parallel line of inquiry looking at post-digital fashion in this moment in time where technosphere and ecosphere become inseparable, indistinguishable almost. As research-based practitioners with backgrounds ranging from traditional textile and garment making to interaction design and virtual production, the findings stem from lived experiences and methods developed when producing fashion for physical and virtual formats: Queering Realities is a design probe that aims to produce a more nuanced study of the changing workflow of the design-make process when meandering digital and physical making processes and outlines how educators and practitioners start to develop an awareness around issues that come with virtual representation in the context of queer theories. Grounded in a series of practice-based observations and explorations of designing skins rather than garments, creatures rather than avatars, and motions rather than walk-cycles, we question how the digital currently represents bodies and materials. By forming a critique, the design probe aims to inform conversations on emerging virtual fashion experiences. It further asks how we can use this space to form future fashion-practice supporting a more-than-human worldview and develop a workflow to transition our design processes aligning with the theory of queer ecology.

As educators and academics teaching and researching within the field of digital fashion, our role often seems limited to being users or instructors mainly concerned with its functional use. Instead, the paper stipulates a focus on the ethics and critique of the wider field of digital fashion, contributing to related discourse by questioning, speculating and monitoring the impact of the assets and narratives developed in this expanded fashion field.

1. LITERATURE REVIEW

1.1 Beyond Fashion Design - crafting worlds and bodies alongside garments

The full paper Media and culture theorist Bernhard Siegert suggested that "Kafka moves the mythic origin of language (and of culture) from the anthropological domain

to that of the nonhuman, where the distinctions between language and noise, animals and humans are abolished." when he discusses protagonist K listening to the hum of the telephone line in 'The Castle'. (Bishop et al., 2016).

Similarly, the semiotics of fashion have moved into a post-human space with the continued use of new technologies: practitioners in the virtual world go beyond designing bodies that have a resemblance to humans yet meander towards creature-esc or animalistic bodies. The recently released exhibition catalogue Worldbuilding curated by Hans Ulrich Obrist lists a series of examples (Julia Stoschek Foundation, 2024), featuring amongst others 'a hyper-bodied, hybrid-gendered Orc character wearing a bikini' (Pastoral Game, 2019). Video games develop an ecosphere within the technosphere that manifests beyond the screen and takes hold of other creative expressions - including fashion. Here, creatives of all genres design and modify the avatar-body and its garments, but they also design the virtual environment that informs and holds it. As a result, these three entities - digital body, garment, environment - coalesce and fold into one another.

Today's fashion designers delve into digital culture, and a series of well-known digital artists such as Harriet Davey design digital creatures for big fashion houses such as Margiela (AW 2020). Their worlds of alternative bodies come with their own intentions: Davey states that through the exploration of gender non-conforming virtual avatars, she restores and reclaims the bodies extorted by a male dominated gaming industry (Arndt, kubaparis.com, 2023). These tendencies to move beyond the human body and to use the virtual realm as a place to relieve ourselves from patriarchal systems reaches back to the beginning of the cyberfeminist movement of the early 90ies (Plant, 1994).

Davey also have recently co-produced work with their collective SBLMTN Studio where we can see them craft hybrid worlds that exit the screen and reach into physical realms alongside fashion and textile designers (Instagram: @sblmtnstudio, 2024).

1.2 Post-digital bodies

If we contextualise the above discussed work as post-digital fashion formats, the concept of post-digital bodies emerges. It has been argued that human interaction in cyberspace has led to a decoupling of the body from its virtual counterpart, yet its critics argue, we need to accept virtual space as a continuation of the physical realm to fully grasp and value the impact it undoubtedly has on the individual as much as on the idea of a community (Schilling, 2004). In a similar vein it seems evident to arrive at the conclusion that digital formats of fashion and the body inform its physical originator, highlighting the technological loop established in media-theory through works such as Nam June Paik's TV Buddha (Paik, 1974).

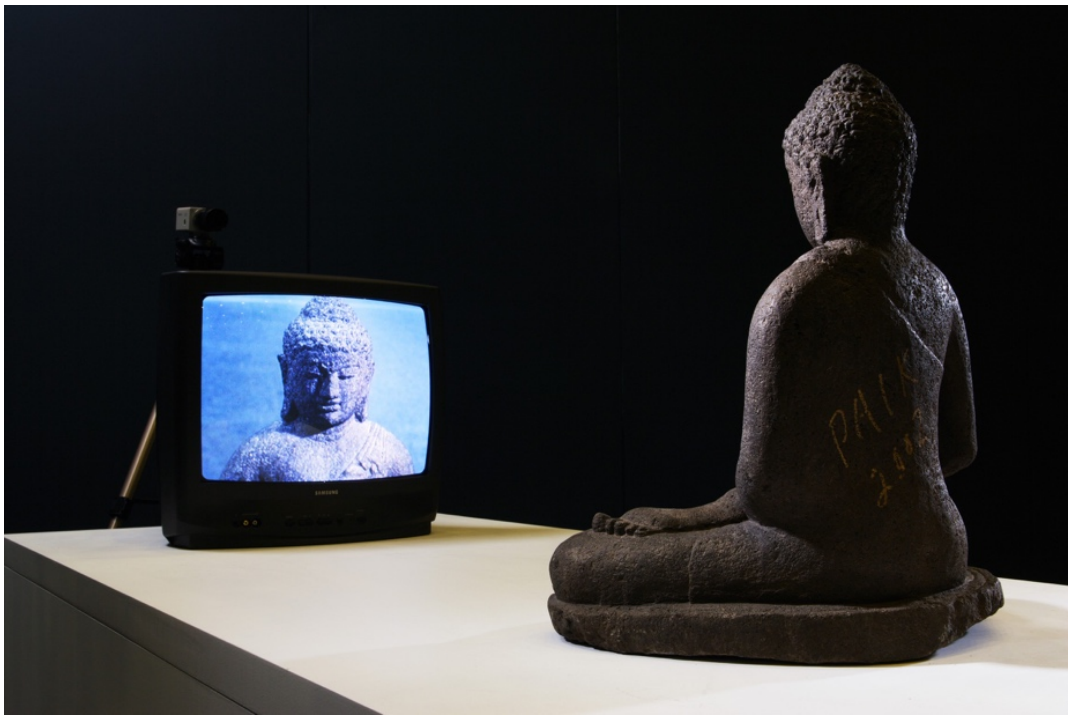

Figure 1 Nam June Paik's TV Buddha (Paik, 1974)

The relating philosophy of posthumanism dissolves the binary thought-pattern of human/nonhuman that has largely been shaped by a euro-centric school of thought (Simon, 2021), but it also moves us beyond the duality of physical/digital and related 'othering' principles such as racism, sexism or speciesism (Ferrando, 2021). By taking queer ecology as a starting point, our design probe promotes the coexistence of all beings, responding to Donna J. Haraway's Chthulucene, which emphasizes planetary multispecies assemblages (2016). But it further resonates with the idea that we have lived in a posthuman condition all along

(Hayles,1999). Queer Ecology recognizes human diversity, proposing nuanced ways of being, loving, and expressing (Muir, 2022) and seeks to counteract the worldview produced by heteronormative forms of sexual reproduction that caused the construction of gender and birthed inequalities through the principle of othering (Mortimer-Sandilands et al, 2010). Designers and educators are poised to develop methods of teaching that avoid the continuation of such norms in digital realms - a place that has been considered to be challenging the same since the birth of cyberspace in the 90's (Plant, 1994).

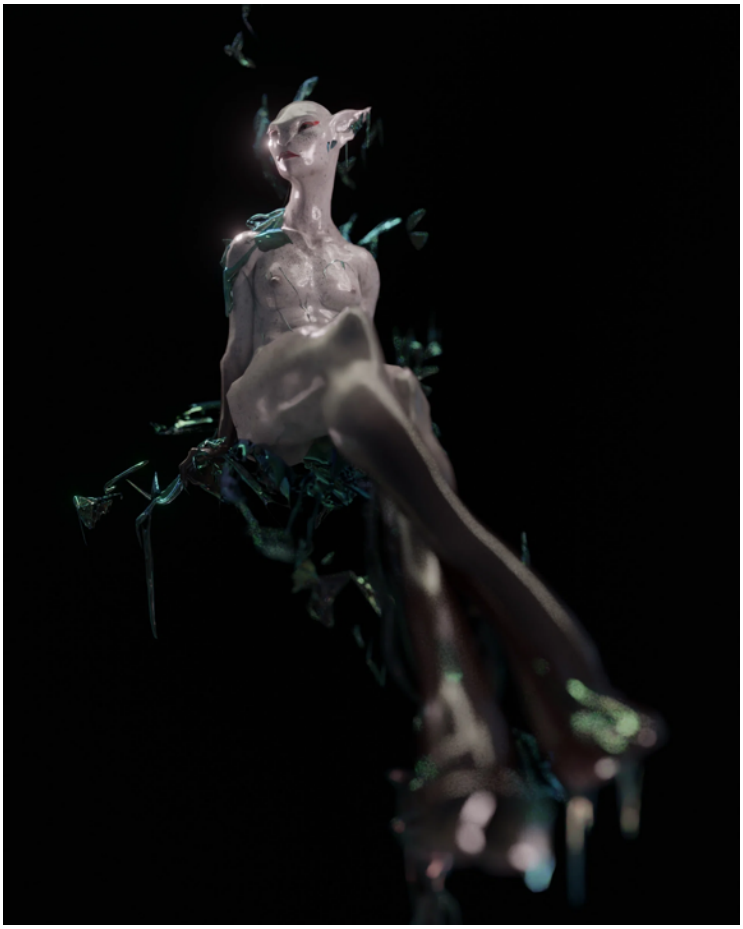

Figure 2 Maison Margiela Wet Look Triptych (Copyright © Harriet Davey, 2020)

Alongside Harriet Davey, creatives such as Fecal Matter - allies and collaborators to fashion-designer Rick Owens - use their own bodies and digital modifications as well as garments and makeup to disrupt and question the binary and normative worlds of fashion (Satenstein, vogue.com, 2018). The success of such image-making techniques however is highly dependent on the soft- and hardware presets used to achieve them which we will talk about more in the following section.

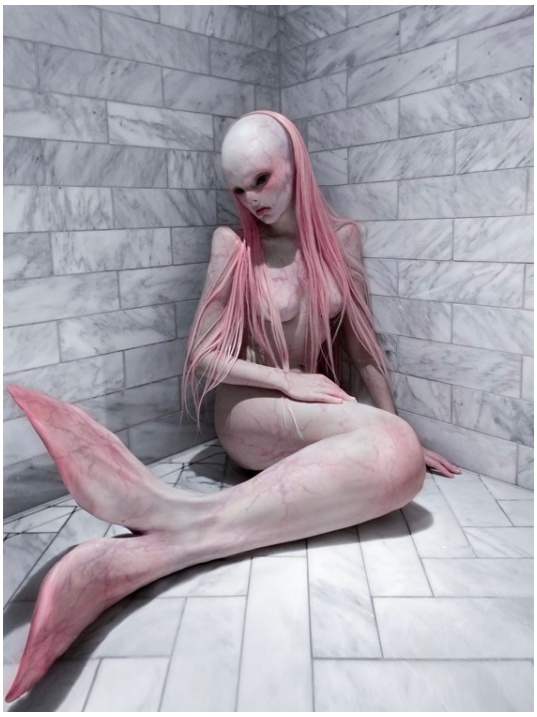

Figure 3 Pink Mermaid, Fecal Matters

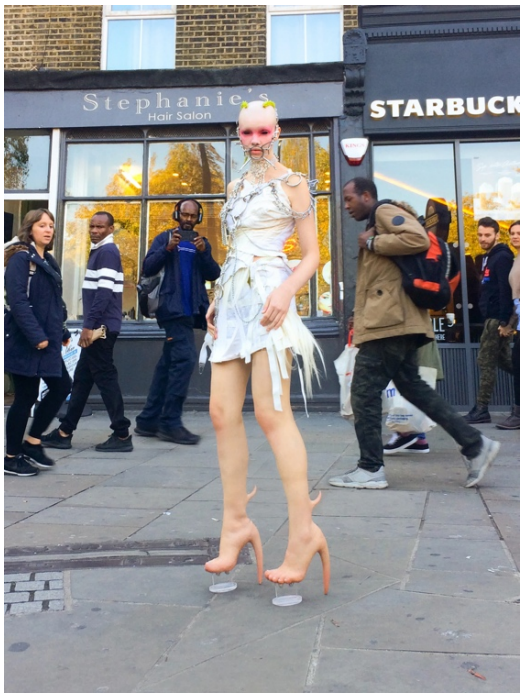

Figure 4 Courtesy of Fecal Matter / @matieresfecales

1.3 Tool Aesthetic - virtual parameters and their influence on fashion making

The cultural impact of digital tools in virtual fashion production necessitates a closer examination of how software like CLO3D, Blender, Unreal Engine, and motion capture technology shapes, enables, and constrains the creative process. These tools open new creative possibilities and introduce limitations that influence aesthetic choices and cultural expressions. The rise of digital fashion has fostered reliance on specific visual conventions shaped not only by societal trends but also by the inherent properties of the tools themselves.

Aesthetic tropes such as glossy surfaces, metallic finishes, and idealized body proportions have become ubiquitous in digital spaces (e.g. Hajime Sorayama, The Fabricant, Frederik Heyman), reflecting what Jean Baudrillard describes as "hyperreality," where the simulation supersedes and becomes indistinguishable from reality (Baudrillard, 1994, as cited in Chiu, 2013). These trends often overshadow organic imperfections, creating a homogeneous virtual landscape. As theorist Karen Barad suggests, the very design of digital tools participates in shaping these outcomes, with materiality not being passive but actively co-constructing new forms. The current aesthetics are not solely a reflection of cultural biases but of the tools themselves and the limits they have (Barad, 2003).

While digital tools empower artists to explore new visual territories, they often impose visual conventions that shape the outcomes. Features like fluid, glossy textures, sleek proportions, and surreal lighting effects contribute to the homogenisation of digital works. Even artists like Harriet Davey and Fecal Matters, who subvert traditional notions of beauty and human form, are not exempt from these digital aesthetics. Davey's exaggerated, distorted avatars and Fecal Matter's grotesque designs challenge beauty norms but remain tied to digital tools like Blender, which inherently push outputs toward a polished, hyperreal finish. Their works navigate alien and non-human forms within the technological confines of these tools, illustrating how digital aesthetics simultaneously disrupt and reinforce established visual codes.

In fashion imagery, for instance, specific positions or forms of representation are "heavily occupied" while others rarely occur (Van der Laan and Kuipers, 2016). This reflects a bias in design tools, where certain representations—idealised body types or symmetrical features—are more easily achievable. Diverse or unconventional representations often require additional effort or alternative tools, reinforcing exclusionary tendencies.

Moreover, the reliance on pre-built assets, shaders, and displacement maps in platforms like CLO3D, Blender, and Unreal Engine standardises design outputs further. Even customisable tools like Unreal Engine's MetaHuman Creator tend to reflect conventional beauty standards, emphasizing symmetry, proportionality, and smooth, anthropocentric

features (Fang, Cai, Wang, 2021; Alcántara, Tasic, & Cano, 2024). These elements highlight how digital tools, while expansive, can also constrain creativity by embedding visual biases into their frameworks. Similarly, CLO3D's default avatars reinforce narrow standards of beauty, offering limited diversity in body types and movement. While recent updates have introduced greater flexibility in avatar size customisation, these defaults still heavily influence the designer's workflow. Breaking away from these established norms, particularly when exploring experimental aesthetics, remains a challenge due to the constraints embedded within the tool's design.

The widespread reliance on open-source libraries and tool presets often results in a visual sameness across digital projects. For instance, Unreal Engine's MetaHuman Creator provides a starting point with realistic human models that, while highly customisable, often adhere to Western beauty ideals—symmetrical faces, smooth skin, and proportionate body shapes aligned with conventional standards. Similarly, tools like Ray Tracing in Unreal emphasize photorealistic lighting and shaders, reinforcing polished, idealised representations of human figures.

This aesthetic is pervasive in many AAA games, where diversity in body types and non-Western features is often secondary (for example - Cyberpunk 2077, The Sims 4, and Afro Hair Library were created to address the lack of diversity). Even in non-human character creation, the reliance on humanoid rigs and anthropomorphic templates steers creators toward bipedal, human-adjacent designs. Unreal's sophisticated facial and body rigs, for example, do not readily support non-humanoid forms such as multi-limbed or amorphous creatures, while its material presets and shaders favour clean, hyper-realistic surfaces, limiting textural experimentation.

The introduction of tools like XSens and Mixamo highlights a growing reliance on pre-built, anthropocentric frameworks, which define the aesthetics of motion capture and rigging systems in virtual environments. Both XSens and Mixamo prioritize human-like motion, capturing and applying movements based on standardized, bipedal humanoid rigs. XSens, a high-end motion capture system used in industry workshops, specializes in realistic human movement capture, often used to animate human figures in digital spaces. Similarly, Mixamo, a widely used tool for automated rigging and animation, offers pre-rigged models that predominantly align with human anatomy and symmetrical features. While enabling creators to animate lifelike characters efficiently, they contribute to a homogenisation of digital aesthetics, steering outputs toward polished, anthropomorphic standards.

These constraints align with insights from Transmission of Media Effects, where rigging is described as both enabling and limiting movement within structured microworlds (Possible Bodies, 2022). Much like the concept of the "phantom limb," where absence shapes perception, XSens and Mixamo impose rigid frameworks that subtly guide creativity toward anthropocentric norms, even in projects seeking alien or unconventional forms. The reliance on standardised rigs and human-centric presets mirrors a disintegrative effect—fracturing the potential for true creative diversity while enabling efficient yet limited representations. Overcoming these embedded limitations requires active resistance to the constraints of these tools, illustrating the dynamic interplay between technology, aesthetic conventions, and artistic intent.

As explored above, our inquiry into the production of virtual worlds reveals how they often perpetuate binary normatives, aligning with Michel Foucault's concept of biopower from The History of Sexuality (1976). Foucault's discourse on sexuality as a scientific object linked to racialization, sexualization, and societal anxieties underscores the project's aim to critique societal fears of otherness, and to examine how expanded forms of fashion found in virtual realms may help subvert such powers. Yet a critical inquiry into this 'movement' is needed in order to not fall ill to the cultural tropes that may come with this production.

2. AIMS AND OBJECTIVES

Malcolm Ferdinand's (2021) notion of "altéricide"—the denial of coexistence with the other— frames our objectives, urging society to transcend fear and foster spaces that embrace diversity. Queering Realities was therefore conceived to challenge our participants, our students and ourselves to understand what the body in digital realms is composed of what it represents and what influence it may have on its physical origins.

The design outputs therefore were developed along a set of terms that challenge future practice to include more inter-species thinking, embracing queer theory as a worldview and as norm rather than alternative:

We set out to design bodies that represent the spectrum of a more-than-human world - and to use digital tools not to repeat physical representations, but to enlarge our understanding of the human in the context of being inextricably linked to nature and becoming one with it.

A further objective we set ourselves was to abstain from designing garments in order to indulge and test the idea of designing bodies, and their role in constructing identities. Instead, we use the digital as a space that allows for a fluid form of representation. Our intention was to explore Haraway's idea of multi-species assemblages through embodiment

and motion-capture: by avoiding default motions available through platforms such as Mixamo, we hoped to circumvent the above discussed pitfalls of using readily available assets which often are guided by heteronormative and mostly ableist, human-centric representations.

Another important aspect of the work continues in the physical realm: to dissolve the binary input embedded in technological interfaces, we aspired to craft physical artefacts and to use the haptic quality of tangible woven textiles to allow the audience-user to interact with our creatures through sensory exchanges. We set out to replace common tools such as mouse, keyboard or controller through a set of haptic interfaces - conductive textiles that can be pushed, crumbled, folded to interact with the virtual environment.

As designers, researchers and educators, we set the participants and ourselves the aim to transgress common social constructs that are currently reproduced by virtual production to better understand what may be needed going forward. Marie Helena Pereira (2020) calls for embracing hybridity's complexities, a notion integral to Queering Realities. Based on these theoretical frameworks, our intention was to develop a workflow and a method of virtual production that combines virtual and physical making processes and offers a fashion-experience that embraces their dependence on one another.

3. METHODOLOGY

We frame Queering Realities as a design probe - a method to interrogate a subject with the help of a wider audience by engaging them through participation and response to a particular topic or query. Developed by Gaver, Dunne and Pacenti (1999) this is a practice-based form of enquiry producing empirical and qualitative data often found in user experience and human-computer interaction. Whilst comprising a series of workshops around the newly emerging workflows within the digital, we further found the work to be akin to speculative and critical design methods, as it was developed out of the need to reflect on the socio-cultural influence the use of technological interfaces brings to prevailing systems.

Working with digital and embodied experiences, the design probe was conducted as a knowledge exchange project in collaboration with Peut-Porter, an SME producing interactive and virtual fashion experiences for the public realm who gave insight into their investigative fashion practice. Central to their exploration is the concept of a Gesamtkunstwerk, encouraging the synthesis of artistic disciplines to create immersive, participatory experiences. A Gesamtkunstwerk is a German term that translates to "total work of art" or

"universal artwork." It is applied broadly to describe projects or experiences that integrate diverse mediums and disciplines to achieve a synergistic and immersive outcome.

Worldbuilding, a method borrowed from gaming, became central to this exploration. This approach frames fashion not merely as clothing but as a cultural artefact intertwined with its environment, beliefs, and identities. Rather than replicating the physical, worldbuilding encouraged participants to explore narratives that transcend traditional fashion-making processes and posed the opportunity to use digital tools to construct the worlds we prefer and want to see represented. These 'design fictions' are a method of speculative design that align to the social construct that underpins fairy tales, as they imbue moral value in the work. (Dunne&Raby, 2014).

4. DISCUSSION: Alternative workflows for a haptic and embodied virtual fashion experience

4.1 Design Probe Part 1 - developing an alternative workflow for virtual fashion production

The first part of the probe exemplifies a reimagining of fashion-making: conventional workflows in fashion education emphasise processes like research, sketching, material selection, pattern cutting, prototyping, and iterative refinement, blending traditional craftsmanship with digital tools.

We invited a total of 25 participants from a fashion background from the University of applied Arts Pforzheim, Germany and London College of Fashion, UK, to shift their design process:

Workflow Step A: Narrative & Worldbuilding

As a starting point, participants constructed speculative narratives that challenged traditional binary and anthropocentric assumptions. Here, they started designing for quadrupeds or entities with multiple limbs, rethinking how bodies, materials, and textures could intersect and become less binary. The design-focus intentionally shifted from garment to the conceptualisation of a world for which to develop bodies, sometimes more close to a creature, sometimes more aligned with a human figure, taking their habitat and character-traits into account. To guide this exercise, we took inspiration from Gender-swapped Fairytales (2022) and used ChatGPT to ease participants into crafting their narrative.

Workflow Step B: Movement

Movement became an essential ingredient in these explorations. Through collaborating with a performer or by devising motions for themselves, participants mapped embodied motions using Deep Motion and xSense software for avatar rigging. Movement can be conceptualised as a material and can become an active element in the design process, shaping the experience and perception of an object (2012). In fashion and textiles, movement animates surfaces, creating a dynamic relationship between the wearer, the textile, and the environment. Texturally, it manifests in shifting folds, flowing drapery, or the interplay of light and shadow on moving surfaces, evoking tactile impressions even in digital contexts. But the digital often relies heavily on walk-cycles which embed gender-typical gait, yet through embodying a creature these notions were easily overcome. Participants were encouraged to understand the body itself as a material and the starting point for fashion, identity and the way we perceive and view ourselves, others and the world as a whole (2012).

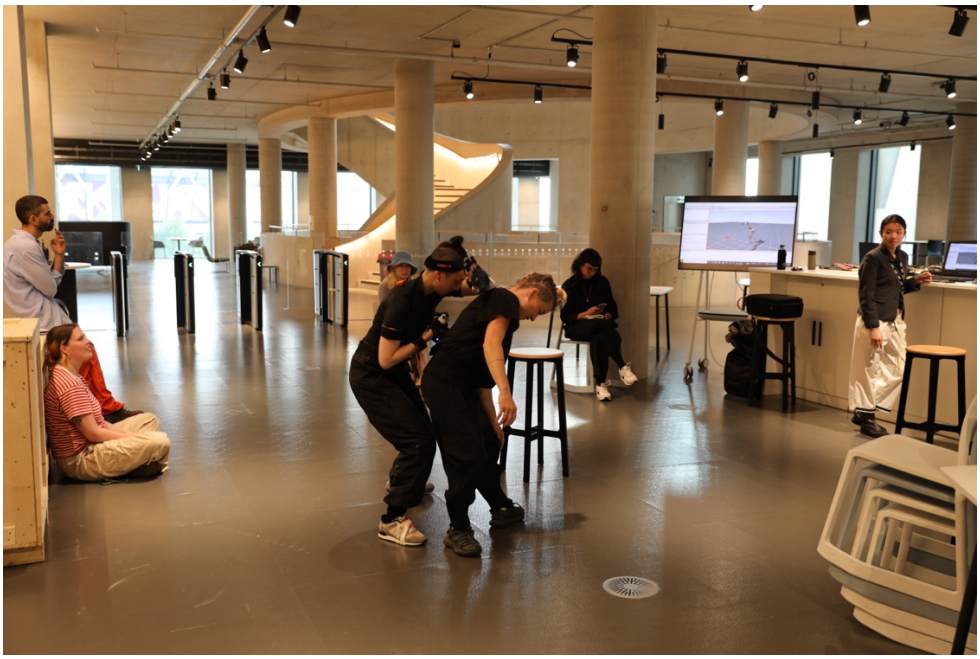

Figure 5 Workshop at London College of Fashion - exploring movement and motion capture

Workflow Step C: Physical Clay Modelling to digital model making

Participants then crafted physical clay models of hybrid bodies, translating them into digital through 3D scanning to develop multispecies avatars. This tactile-digital hybrid approach blended speculative concepts of becoming hybrid with hands-on exploration, fostering critical reflections on identity and materiality.

When scanned, these creatures informed the first shapes and figurative parameters of our creatures:

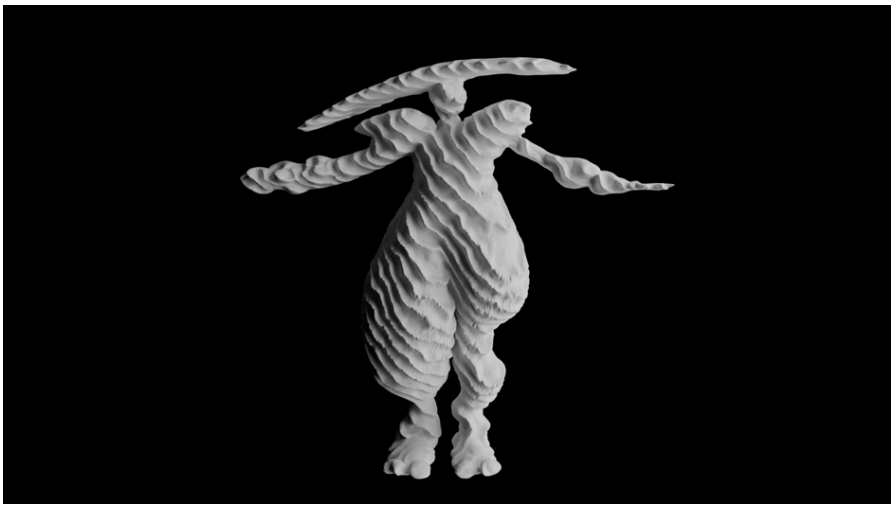

Figure 6 Mushroom Character developed in Blender

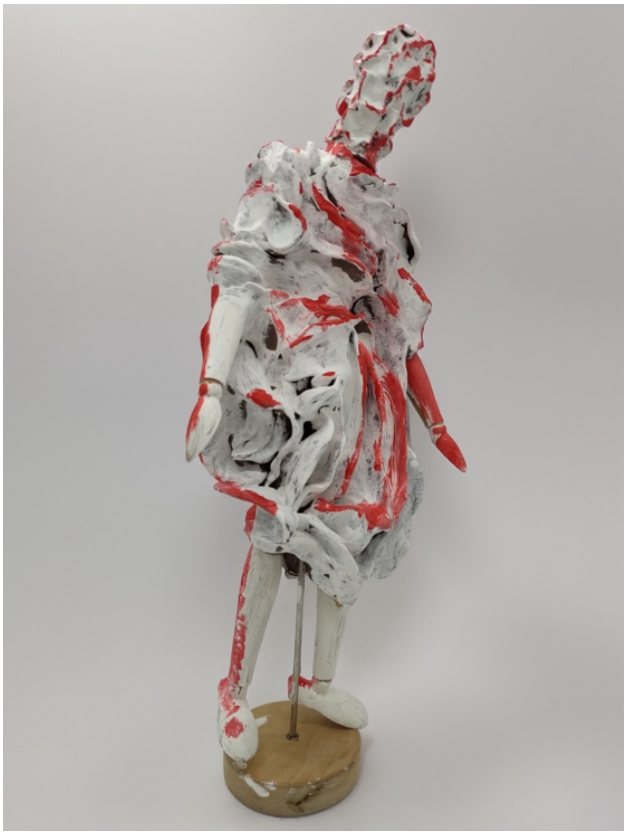

Figure 7 Mushroom character clay model

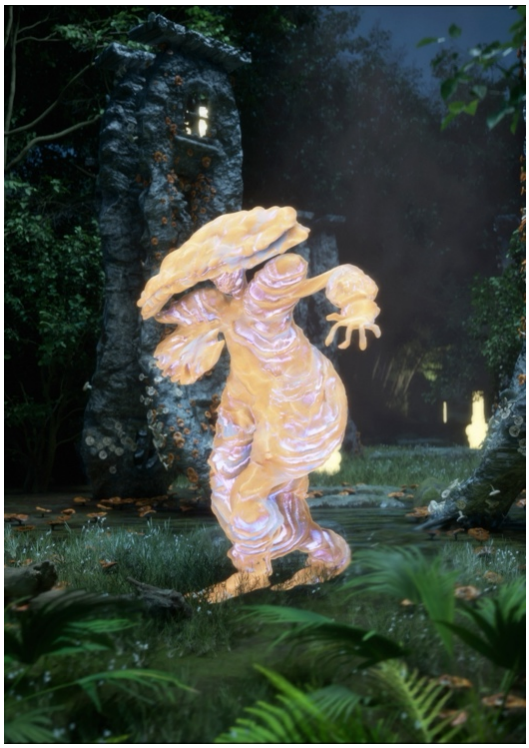

Figure 8 Mushroom character in forest environment

The resulting creature-avatars directly reference queer nature examples to help us embody and communicate non-binarism through their scientific underpinning: Figure 6, 7 and 8 references mushrooms, of which certain species have upwards of 20,000 sexes, (Science Friday, n.d.). Other creatures were e.g. inspired by the Mexican whiptail lizard, who has been found to have a female-only population reproducing asexually - as do over 70 species of vertebrae (education.nationalgeographic.org, n.d.).

Workflow Step D: Crafting interactive & embodied fashion experiences

In a last step, participatory design techniques were introduced that helped participants move beyond conventional fashion displays to craft inclusive audience journeys. Through further bodystorming methods, participants reimagined interactive, sensory experiences that prioritised accessibility and engagement.

4.2 Design Probe Part 2 - textile interfaces for an embodied public engagement

The first part of the design probe was a means to dissect and interrogate the virtual production of fashion, the body and materiality aiming to avoid the continuation of norms and exclusionary standards within these digital fashion territories. The second part expanded into

the physical space by reworking the normative and binary system of human-computer interaction.

Historically, the ergonomic principles of interaction design favour the linear, and binary format: most interfaces are designed in relationship to the user's body, starting from a seated position (in front of a desk and screen), using merely our digits to input. In comparison, the ergonomics of being seated in front of a sewing machine are already more nuanced than clicking a mouse or a keypad, as they take into account the pressure of the foot in relation to the speed of the needle: resulting in a more embodied relationship with the technology of sewing altogether.

To translate these less heteronomous interactions to the way we interact with the virtual and to highlight the importance the sensory qualities of fashion and textile making could have in this HCI (Human Computer Interaction) context, we constructed haptic interfaces using smart textiles that would influence the virtual creature if stroked, pushed or folded. The interactions where non-binary as they did not follow the usual on/off input/output formula of HCI and are highly dependent on the pressure applied by the interacting individual, resulting in a nearly personalised experience: the longer or harder the haptic interface - in this instant a carpet - was manipulated through bodyweight and movement, the more reaction was perceived on screen as the creatures start to shapeshift from being human into being an ecological entity - in this first prototype a biped-mushroom.

These interactions were tested in situ when the outcomes of the design probe saw a live sharing and discussion of the work in the form of an open studio at YKK Showroom in London during Digital Fashion Week and London Design Festival in September 2024. Audiences had a chance to test our haptic interfaces:

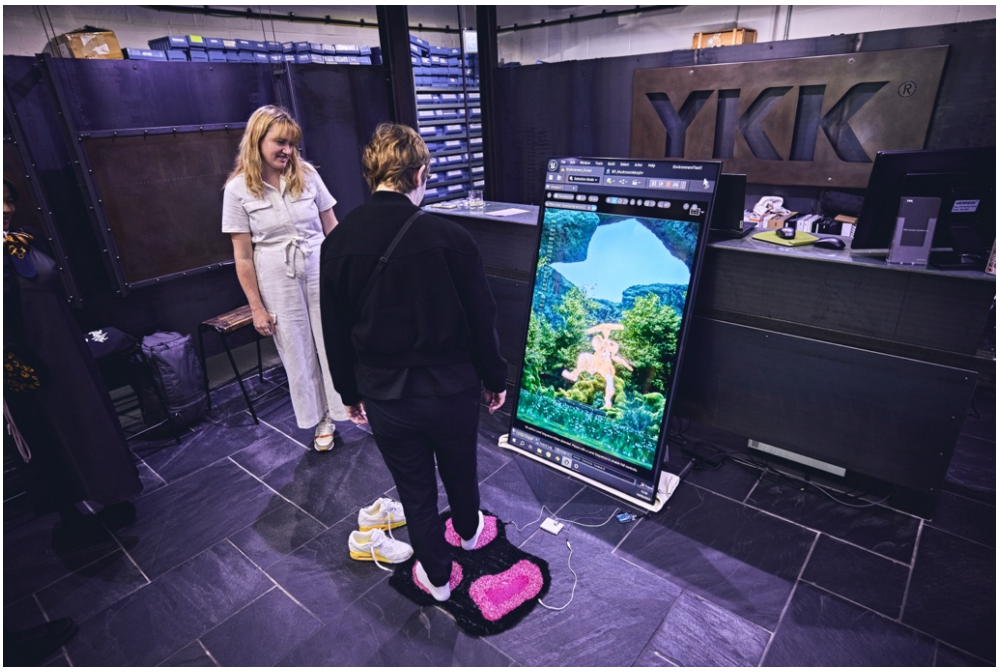

Figure 9 Audience interacting and changing mushroom inspired creature through textile pressure sensor

If we compare these haptic interfaces with traditional controllers, they offer a more nuanced way of engaging and perceiving the virtual space, introducing a spectrum to virtual spaces typically dominated by audiovisual elements (Vallgårda et al., 2015). Drawing from Haraway's concept of the cyborg, this study positions textiles as technologies formed through mutual interaction between humans and their environment (Haraway, 1985). By transcending dualistic thinking, such as physical versus digital, we explore pluralistic approaches to textile creation and embed them into the digital environment. Our digital procedural materials dynamically change based on user input e.g. pressure of a body, enabling participants to engage in investigative play.

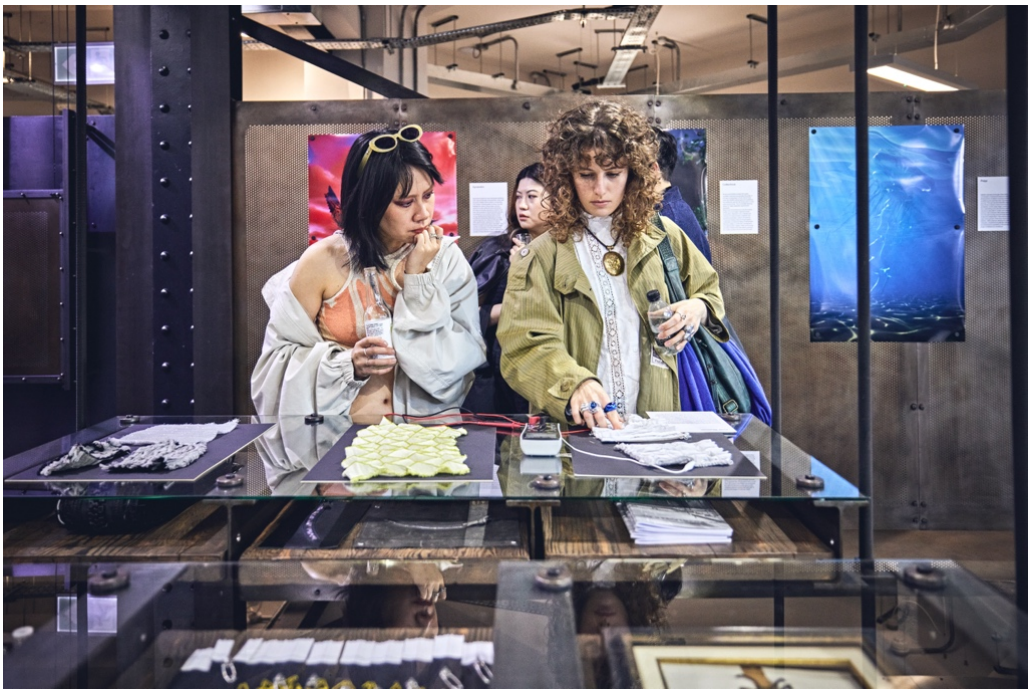

Figure 10 Audiences interacting at YKK showroom with conductive textiles and observing resistance change

The rise of screens and digital surfaces has reduced tactile experiences, limiting our sense of touch (Meiklejohn et al., 2023). However, the sensory qualities of textiles, both physical and digital, offer opportunities for enhanced interaction. The central challenge lies in fabricating the sensor within the textile construction using conductive yarns. The objective is to craft a sensor that changes its resistance on interaction. By focusing on shape-changing, dimensional, and structurally complex textiles, we developed conductive soft artefacts that challenge and 'queer' traditional notions of HCI. Such an approach transforms textiles from static objects into interactive, evolving mediums that bridge the gap between tangible and digital experiences (Edelkoort, 2012).

Figure 11 Performer moving through the space, highlighting the idea of a fluid stage

People were able to move freely within the space and engage with the display. Claire Bishop highlights the transformative potential of participatory art, suggesting it rehumanises a society rendered numb and fragmented by the repressive instrumentality of capitalist production (2012). The display introduced our experimentations of queer nature inspired avatars in conjunction with haptic interfaces and clay-derived models. These elements were supported by the live embodiment of the creatures through a performer, enabling audiences to witness the motion capture process in real-time. This interplay between physical and digital realms facilitated the unfolding of the creature's narratives, brought to life through explorative movement and performative storytelling.

Movement functioned here as both a medium and a conceptual tool, bridging materiality and spatial design across physical and virtual contexts. Textures, materials, and their interplay within the designed space were explored as integral components of narrative-making, guided by prompts derived from queer ecology. These embodied explorations allowed the creatures to morph and become, challenging conventional notions of identity and representation of bodies in the digital.

The response to the work was led through a series of open-ended discussions, participants, ranging from those with professional expertise in fashion to casual passers-by, engaged with themes of virtual representation and identity. This dialogue provided valuable insights into how individuals navigate and interpret these hybridised spaces of representation.

Questions about the inclusivity of the exhibition space itself emerged, prompting a reimagining of such environments as exploratory and accessible domains. The open approach supported freedom of movement and interaction, encouraging visitors to engage in their own terms with materiality and space.

RESULTS AND DISCUSSIONS

The overall design probe crafted sensory encounters that expanded fashion's boundaries, offering participants and audiences opportunities to engage with the discipline both physically and virtually.

Part 4.1 demonstrated a shift from theoretical discourse to practical, hands-on interventions. By experimenting with physical materials like clay to explore digital realms, participants embraced the alternative workflow and interrogated the construction of the digital body.

This facilitated an evaluation of wider digital practices and how they transformed the potential of design (Rawsthorn, 2022). An openness and lightness in discussing topics often limited through current discourse on the correct language was observed as participants physically engaged with materials, opening a safe space to engage with queer theory. The design probe underscored that technology, when approached through tactile, collaborative practices can encourage a rethinking of the role of bodies in fashion.

Part 4.2 showed that the integration of haptic interfaces challenges traditional boundaries of fashion, craft, and digital design. By merging haptic exploration with procedural materiality, textiles become platforms for interactive dialogue and foster embodied engagements with virtual spaces, ultimately transforming how we experience and interpret virtual material interactions. Observing our participants interacting with textiles demonstrated a range of embodied habits and interactions like stroking, pressing, and twisting highlight the emotional and embodied reactions that sensory textiles can provoke (Barati et al., 2017). This dynamic interplay between textiles and users fosters a deeper understanding of how physical and digital realms can converge (Meiklejohn et al., 2023).

We arrived on a set of recommendations which can pose as a basis for conversations around the use and teaching within digital and virtual production for fashion and textile disciplines:

1. A key challenge for fashion designers is to engage critically with the technologies and tools they use, questioning the constraints and biases embedded within the software, and exploring new ways to overcome these limitations. By embracing procedural design, dynamic interaction, and hybrid body representations, digital fashion can support a move towards a more-than-human worldview and resist the homogenisation of bodies.
2. The digital representation of the queer body needs addressing not only in the final render but in the tools that are used in the process of making them: using the Xsense software, the default avatar propelled body-proportions that would possibly affect participants who may suffer from body-dysphoria and related mental health issues.
3. We need to empower designers and students to be able to reconstruct digital tools for a particular purpose. Relying on pre-made software, hardware, interfaces and assets will perpetuate a limited amount of freedom and result in greater heteronormativity.
4. The shift from designing garments to designing avatars and environments redefines the role of skins, walk cycles, and textiles, and can extend beyond traditional virtual fashion production to embrace a more holistic consideration of the interconnectedness of fashion ecologies.

CONCLUSION

With dissolving boundaries between physical and digital design spheres and disciplines, new possibilities emerge. Empirical and philosophical observations on how mass-media shapes the cultural texture and behaviour of our social fabric are abundant, and virtual fashion production is no less capable of doing so. Queering Realities therefore is - although an exploratory and practice-based inquiry at first, a design probe into alternative and expanded expressions of fashion and a means to highlight a workflow that consciously considers the many spheres and worlds we are designing alongside garments in this realm. As we situate emerging virtual fashion in context of queer theory and cyberfeminist thought, we uncover

pitfalls and its currently missing directive - but we also see a possibility to embrace this space as a means for a more nuanced and balanced conversation that allows to overcome dualisms of physical / digital working methods and binaries imbued in designing for the human body. We pledge for a strategy of teaching and making fashion in the virtual realm that includes a consideration of its philosophical and cultural ramifications and have highlighted in this paper an approach whereby the various ingredients are considered in more depth and as individual parameters, critiquing and highlighting the work that seemingly lies ahead in defining and exploring this exciting yet daunting new space.

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FIGURES

Figure 1 Nam June Paik's TV Buddha (Paik, 1974)

https://publicdelivery.org/nam-june-paik-tv-buddha/

Figure 2 Maison Margiela Wet Look Triptych (Copyright © Harriet Davey, 2020)

https://www.itsnicethat.com/articles/harriet-davey-digital-131020

Figure 3 Pink Mermaid, Fecal Matters

https://gatamagazine.com/articles/art/an-interview-with-fecalmatter

Figure 4 Courtesy of Fecal Matter / @matieresfecales

https://www.vogue.com/article/fecal-matter-releases-photoshopped-skin-heels-for-real-life

Figure 12 Workshop at London College of Fashion - exploring movement and motion capture, Image taken by researcher, 2024

Figure 13 Mushroom Character developed in Blender, Screenshot by researcher, 2024

Figure 14 Mushroom character clay model, Image taken by researcher, 2024

Figure 8 Mushroom character in forest environment, Screenshot by researcher, 2024

Figure 15 Audience interacting and changing mushroom inspired creature through textile pressure sensor, YKK showroom, Images taken by David Holbrook, 2024

Figure 16 Audiences interacting at YKK showroom with conductive textiles and observing resistance change, Images taken by David Holbrook, 2024

Figure 17 Performer moving through the space, highlighting the idea of a fluid stage, Images taken by David Holbrook, 2024

Software Programme Links:
CLO3D
Blender
Unreal Engine
Meta Human Creator
Hajime Sorayama The fabricant
Cyberpunk 2077, The Sims 4, and Afro Hair Library
Mixamo