# EMBRACING THE THIRD DIMENSION, EXPLORING 'PHYGITAL' CONNECTIONS BY HONOURING TECHNOLOGY AND TRADITION

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## Keywords

Treasure, Education, Technology, Phygital, Fashion Design

## Lines to the Past, Present, Future

> *He tāoka tuku iho: The treasures passed down to us from the ancestors, those tried and true wisdoms of old.*
>
> What and who grounds us in our practice?
>
> How does the past inform the future in the context of the fashion industry? How can technology ensure that fashion remains relevant in the future?

## Abstract

### *Context & Gap*

Most fashion students will learn their craft engaging in traditional notions of fashion education passed down from tutor to student over many years—our treasured knowledge. Two dimensional (2D) design and pattern cutting technologies have become a tradition bringing a continuum of knowledge and wisdom through 'professional ancestry.' Faerm (2012, p. 212) states that "Contemporary fashion design education is centred on building practical skills and creativity that prepare students for entry into the practice" and continues that "emphasis is placed on building the skills such as pattern making, garment construction and designing fashion."

During 2020, the expeditious shift to blended learning initiated in response to the global pandemic created challenges, but also opportunities to accelerate, reflects quickly and experiments with a novel pedagogical framework, underpinned by our traditional practices.

This study offers insights into how a hybrid approach to learning and teaching, encompassing two elements through a 'phygital' framework: (1) our known treasured wisdom, and (2) the interplay of virtual three dimensional (3D) digital prototyping, our new treasure, using *Clo3D* with artefactual sampling.

Prior to, and coinciding with the pandemic, technology (artificial intelligence) within the fashion industry was gathering momentum, most notably *Clo3D*. *Clo3D Fashion Design* software was the preferred package to interface with our existing 2D digital pattern-making software, *Gerber Technology*, within our curriculum.

***Results, originality***

This study sets out challenges and opportunities affecting how our traditional notions of treasured knowledge transitioned to digital simulations. Through necessity, we were able to reach students in isolated conditions via virtual technologies. However, this experience also saw the emergence of a hybrid learning environment that prompted change of our tried-and-true treasured teaching practices.

This paper concludes by discussing how the hybrid learning framework has been embedded into our curriculum enabling students who engage with both old and new treasured learning and teaching practices develop a deep understanding of garment design and construction that lead to innovative and meaningful outcomes. Chipangura and Aldridge, (2019) suggest "students who were frequently exposed to multimedia report more learning goal orientations, task value, self-efficacy and self-regulation than their counterparts who were not." Blending our treasured knowledge, old and new, has permitted the prominence of new wisdoms whilst grounding us in our treasured fashion practices. This is explored through the reflections of academics implementing digital 3D and brings fresh dialogue to the hypothesis that by embracing 3D digital with equal perspective and acknowledging values of both tradition and newness can reduce tensions between digital and non-digital practices.

## Introduction

This paper explores insights of tried-and-true wisdoms through reflections of learning and teaching in the context of a case study of a Fashion Product Design unit of study for a cohort of second year BA(Hons) Fashion Design Technology (FDT) students. Set during and post COVID-19, the study responds to challenges and opportunities encountered by students and teaching staff at Manchester Fashion Institute, Manchester Metropolitan University, in the United Kingdom, whereby notions of treasured methods, unanticipated engagement with craft-based techniques intermingled with contemporary 3D digital simulation, are discussed. The outcome offers a proposed hybrid learning framework encompassing traditional notions of treasured knowledge whilst embracing 'phygital' modes of practice in equal measure.

'Phygital' is a term with its origins in marketing and retail, applied to describe the concept of merging physical (in store) and consumer facing digital experiences, (Banik, 2021, pp. 1-3). In the context of this study, Phygital represents the essence of fashion design practice encompassing a merging of traditional and more nascent (especially 3D digital) tools, craftsmanship through student outcomes and staff reflections.

Practice-based fashion is used as a term to over-arch the processes of researching, developing and realisation of fashion products through the skills and techniques of design, pattern cutting, manufacture, and communicating technical literacy.

The scope of this paper is limited to that of the authors' and colleagues' reflections of their own commitment to a continuum of learning and teaching of practice-based fashion, underpinned by over 50 years of practice in Higher Educational environments, acknowledged now as a form of professional ancestry. By taking an opportunity to pause, to jointly consider how responses to the global situation provoked critical discourse and active debate, it was recognised that individual and collective professional ancestry offered an opportunity to foster a lens of emerging wisdoms. Contemplation of what practices and approaches could, or should, be treasured, academics explored what grounds practice and how tensions arise and are resolved. Although teaching plans were disrupted and modified, the underlying threads of tried-and-true learning and teaching practice remain a constant.

## An Overview of the learning journey – Recognising Professional Ancestry

Learning starts from the day we are born. The Reading Foundation states that infants are learning ‘every waking moment’ and through ‘imitation and gentle repetition’ ‘indispensable academic, social and cognitive skills’ are learnt (Gopnik and Wellman, 2012, pp. 1-4).

This may be in our home environments as we learn to eat, play, walk, speak, read, to learning about our ancestorial culture from our grandparents, parents, siblings or care givers, “in a safe, supportive environment with people we love and trust” (Snow, 2022, p. 1), via “imitation and informal pedagogy” (LaRue and Kelly, 2015, chapter 1), to learning subjects taught in educational environments where a professional safe and trusting environment is fostered, this mode could be termed as creating professional ancestry. The lifelong learning approach is an educational phenomenon that includes all life processes from birth to death and all activities that aim to develop individuals' knowledge, skills and competencies (Lengrand et al., (1989) as cited in Kaplan, 2016, p44).

With this in mind, we consider the Higher Education learning environment, and the fostering of an ethos of lifelong learning; it is anticipated that the principals of imitation and repetition as a pedagogic strategy for learning and teaching will be practised in a safe and trusting learning environment (Goodaire, 2022, p. 1-2). Furthermore, if we consider Faerm's (2012) statement whereby the focus of contemporary fashion design education centers on building practical skills and fostering creativity to prepare students for entry into their profession, and as Ericsson (2008, p. 1) suggests such activities are enriched through practice, problem-solving, and trial-and-error facilitated by supervisors, teachers, or colleagues. Nonetheless, this also applies to those in roles as educators, whereby their own tacit knowledge, skills, experience, and judgment, also require ongoing intellectual and practical synthesis.

## Treasured Wisdom – Fashion Design Pedagogy (pre-COVID-19)

Practice-based fashion is traditionally taught via a combination of practical and theoretical units of study with formative and summative assignments that enable students to demonstrate their competencies to communicate fashion products to current and future thinking fashion industry audiences, with conceptual and critical thinking skills underpinning their learning.

Each student is given space to recognise and respect, at times invisible, past experiences; and drawing together layer upon layer of knowledge, it is proposed that our notions of learning and teaching practice-based fashion are underpinned by innate tactic feeling of our own tried-and-true practices of learning through imitation, gentle repetition, trial-and-error, problem-solving, deliberate practice, contributing to informal pedagogy, and developing students who combine design innovation with an in-depth knowledge of the technical aspects of fashion design and manufacturing across market levels.

## Context: Changing Study Environment—Remote and Hybrid—Due to Pandemic

During the pandemic of 2020, face to face delivery of all studies was disrupted and transitioned to synchronous virtual studio and lecture sessions using online communication tools (Zoom or Microsoft Teams), as was the case for the majority of education institutions. This presented a conundrum of how to teach the traditional tried-and-tested wisdoms of practice-based fashion, most notably pattern cutting and garment construction remotely. Students found themselves in confined spaces often with little to no traditional resources that might be found in a practice-based fashion school studio environment, which might include, sewing machine, large table space, large sheets of paper, prototyping materials by the metre, full-scale mannequins. It was anticipated that students would have a minimum of basic tools including stationery, tape measure and rulers in their self-styled home studio study environment.

During the planning of online learning and teaching for 2020, one of our long-standing colleagues, with over four decades learning and teaching of practice-based fashion, recalled first learning to cut patterns in quarter scale by her tutor. Moreover, this helped shape her own learning and teaching practice that has contributed to supporting students who studied under her direction to graduate and progress onto successful careers within the fashion industry. The practice of learning in small scale correlates with one of the author's own learning and teaching of pattern cutting, who studied at a different institution (where it is also assumed that their tutor would have been exposed to quarter scale pattern cutting techniques). These reflections constitute in fostering the notion that other fashion schools would follow similar practices and aims to create a sense of ancestral tried-and-true practices employed within practice-based fashion education where the threads of our past are woven into our present.

To support students learning, video tutorials for constructing a range of basic garment types were already available as student learning resources within the university Virtual Learning Environment (Moodle). Research suggests that video demonstrations provide a good alternative, if not better, resource to live demonstrations (Kestin et al., 2020, pp. 013101-4) with all students viewing the same content from the same perspective at a time and pace to suit

their individual needs. Various video tutorials of pattern cutting in fifth scale were created to support these garment types. Fifth scale was chosen as it could be viewed more easily within an A4 pattern book and via on-screen video tutorials.

To support students' learning of fifth-scale, pattern cutting information was packaged up as an A4 document ‘How to create your blocks’ and posted on Moodle for students to download either from home printers or from stores during their restricted shopping visits. Household resources such as cereal boxes, plastic wallets, or plastic bottles (ironed flat) were discussed as suggested materials to create the pattern blocks from, with some being used within the video tutorials.

However, as student learning progressed from basic understanding of pattern development to learning intricate details such as pockets, collars, facings and finishings, it became evident that fifth scale was no longer appropriate as the manufacture of these finer details became difficult to understand and construct at the reduced scale.

Reflecting further into our previous learning and teaching practices; prior to the pandemic students also had the opportunity to work in half scale as an alternative to full scale and with a modest rationale as cited by Phoenix of the benefits of reduction in fabric, paper, and material cost for students to realise their ideas (Phoenix, 2018, p. 1).

## Nascent Practices – Crafting The Fashion Body (during COVID-19)

Prior to the pandemic students readily had access to a range of industry standard full and half-scale Alvaform mannequins. During initial national lockdowns, as students and staff quickly transitioned to home study environments, it was recognised that a proportion of students would not have access to a mannequin, and minimal space in their home studios for a full-scale version, a tool/equipment integral to their studies. In anticipation of this, the wider staff team created resources to enable students to craft their own half-scale mannequins. Instructions and online workshops supported the process.

Students embraced this new step in their design process and came together as a community online, it was noted how they encouraged each other and the range of creative responses to the instructions resulting in unanticipated outcomes. Whilst students do not routinely construct their own tools/equipment, it did prompt debate on topics of diversity and the challenges of representing the body as a mannequin. Each mannequin outcome was unique and a move away from strict adherence to the more familiar industry standard shape and sizes. Such activities provoked an increased critical awareness of the complexities of taking part in creating representations of bodies through the act of making their own mannequin. Rather than selecting from a standard set of available industry options, significantly it was through the act of engaging in the making of half-scale mannequins that staff observed students attributing ‘doll like’ or ‘muse-like’ attributes such as names, hair and other personalised features, along with projecting personalities imbued a sense of the mannequins being ‘more’ than a tool, perhaps a future treasured item. One student created their mannequin as a muse—naming her ‘Brenda,

the skateboarding Grannie', indicating a sense of attachment and cherishing the tool beyond the initial intention.

Significantly, the crafting of half-scale mannequins to form part of student's equipment, became a novel step in the design process, along with a fresh sense of the potential for this to become a pedagogical tool for community building at a time when face-to-face activities were unavailable. Whilst borne out of necessity, it offered an opportunity for students (and staff) to engage in tool making practices, to postulate and support critical engagement and understanding of the impact of 'standard' instruments habitually used within the design and development processes.

In seeming contrast to this craft-inspired activity, digital 3D tools (in this instance CLO3D) increasingly play a role in the student fashion design experience, where, during the lockdown period students were able to install on their own laptops. Students are familiar with 2D CAD tools from their first year of study and in their second year are introduced to 3D avatar-based tools as an opportunity to visualise and experiment in new ways.

Within this, the role of the body represented as a physical mannequin becomes a digital version (avatar), inherent in the software avatar customisation as a logical step already formed as part of the designer's 3D digital process. In essence, this crafting of [digital] mannequins employs digital tools (CLO3D) to create another digital tool (avatar) as an instrument from which to design and develop ideas three dimensionally.

Earlier versions of 3D software for fashion included default avatars based on the software suppliers' programming specifications, not borne from fashion industry knowledge, with the opportunity to customise aesthetics and sizing. More recently Alvanon, as a global supplier of mannequins, has entered the 'phygital' realm to offer digital versions (digital twins) of their physical offerings, bringing the digital tools more in-line with physical fashion industry design activities. As a result, the use of avatars as digital mannequins within CLO3D (and other software suppliers) forms part of a designer's potential workflow. Such customisation of avatars or importing of 3D body scans are becoming part of the available tools for designers, though during the lockdowns, availability of body scans was impractical. It was observed that students engaged in avatar customisation in a playful manner, borne from the interaction with the software tools in a similar way to the doll-making approach of the half scale, whilst healthy debates were emerged regarding the opportunity to encompass a more inclusive range of body shapes, sizes and aesthetics.

## Honouring Digital Technologies – Blurring Boundaries, Reducing Tensions

Dialogue around the use of software as part of a fashion practice toolkit tends to employ capitalist/business driven language, such as 'increased efficiency', 'quicker to market', and 'automation.' Such terms relate to the expected reduction of cost and potentially positive impact on sustainability credentials, and whilst significant, the implementation of any software, be it 2D or 3D CAD, has at times been a source of tension with analogue creative design and prototyping practices.

It is suggested through reflections, the notion of encompassing software undervaluing the role digital technology plays in creativity, causes apprehension and lack of recognition that craftsmanship and creativity are integral to the application of all tools, be it a pencil or a 3D digital prototype. By balancing both, more traditional (non-digital) practices have a place alongside and are entangled with more contemporary and future practices encompassing the vast and evolving range of technologies for processes as well as outcomes, challenging the materiality of both process and product.

By honouring technology *and* traditional methods, consideration of tools and processes can foster a contemporary and future facing mode of designing, whilst treasuring both old and new *equally*, to find a space from which to complement and encourage students and staff to negotiate their own autonomous way of working, using language and encouragement to explore the interdependence and value of all methods and tools.

Bringing the three academics together has given pause for thought and richness of dialogue, framed within a professional environment to create connections between traditional craftsmanship framed in new ways, and new technologies, processes and systems which continue to evolve and expand knowledge and skills. It was noted that by fostering a sense of exploration of digital tools as a contemporary craftsmanship rather than faster/cheaper, that notions of boundaries between physical and digital practices started to emerge as new treasured practices. Unpicking ‘value’ and ‘treasure’ contributed to shaping future professional ancestry.

By positioning technology, away from perceptions of a set of steps to efficiency, and more as a means to explore tried and tested ways of ‘doing’ with an alternative perspective, the shift in language offers potential to value physical *and* digital craftsmanship equally and reduce any tensions, it also offered students (and staff) a conceptual space to explore the boundaries of their own creative processes, where digital infrastructures may sit comfortably with other more traditional tools, and ensures the co-evolution of their own practices (Sarmakari, 2021, p. 1).

## Opportunities to Transition to Hybrid Product Development – Exploring Phygital Practices (during COVID)

The newly developed (our nascent treasured practice) of half-scale teaching resources including mannequin making and consequential student outputs from the first term, inspired further change to the curriculum. Anticipating a continuation of lockdown restrictions and determined to explore potential benefits of working in 3D across both half scale and digitally, the unit leader incorporated amendments to both the project brief and submission requirements, with the aim to foster a stronger sense of not seeing half scale or digital as separate but integrated, distinct elements supporting each other.

The programme instils the belief that ‘design’ and ‘make’ inform each other, fostering a holistic and collaborative approach to the fashion design process across all levels of study. In general, the design process is a combination of activities including research, ideation, design development, 2D to 3D realisation, pattern drafting, sampling, toiling, fitting and final product presentation. Industry professionals may navigate this process in a linear, sequential manner.

Students however are encouraged to travel back and forth between these stages, developing skills in design thinking and critical reflection.

The Fashion Product unit initiates the design process with an archetypal garment. Students investigate exemplary reference garments, acquiring garment awareness from these silent teachers (past garments). The process evolves as described above, final outputs are submitted with supporting sketchbooks, design portfolio and technical specifications.

Three-dimensional virtual simulation had not been part of this particular unit of study prior to lockdown, as it was reserved for final year students. CLO3D was in its infancy on the programme with limited licences or experienced staff on board, yet key unit staff were confident our students if curious, had the ability to embrace this innovative technology. The decision was made to introduce a CLO3D *and* half-scale prototype as submission options on the unit, replacing the pre-COVID full-scale physical version to validate the shift towards phygital practice developments. Taught sessions remained online, the traditional disciplines of design, pattern technology, construction, textile technology were accompanied by additional CLO3D workshops and the creation of a supportive online community.

Engagement with the creation of such tools to represent the body, either physical or digital was typically previously reserved for couture, tailoring practitioners and mannequin-making professionals, it was observed that such practices offer designers new opportunities to engage with critical discourse of the body.

These new practices suggest the recognition of value in active engagement in the crafting of bodies as part of a pedagogy for fashion design students.

It was imperative that changes to the brief and taught sessions were reflected in submission requirements to ensure individuals could play to their particular strengths. It is important to state that students could choose **not** to pursue CLO3D and continue with familiar, tried and tested physical 3D realisation (all be it in half scale) for their submission. The submission requirements were altered from:

> Traditional **Full-Scale Prototype** in Calico (2019/20) *to*
>
> Traditional **Half-Scale Prototype** in substitute fabric *OR* **Virtual CLO3D Prototype** fully rendered in intended final fabric. (2020/21)

### *Outputs*

Observations from the teaching team suggested students, in general continued to communicate their design ideas and development process using expected methods (collage, sketching, CAD, moulage, styling, sampling, and so on). CLO3D was used as a practical tool to develop pattern and garments rather than experimental design provocations. Most interesting was the observations by technical academics, experts in pattern and construction.

They noticed a correspondence between the varying modes of practice:

- Design + Half-Scale 3D product development
- Design + CLO 3D product development
- Design + Physical Sampling + CLO3D product development

1. Students who engaged in real world environments working *only* in physical half scale produced good representations of their designs and were able to communicate accurate technical literacy such as how the garment was constructed and in what order. However, these students struggled to source appropriate components and execute intricate detail on their outerwear prototypes due to reduced scale. It was noted that the half-scale mannequins used by some students for this task had developed personalities. An L5 student featured her 'Skateboarding Granny' mannequin as the muse in her look book photography—images were shot on 35mm film at dawn at her local skate park.
2. Students who worked solely in the digital environment created interesting and accomplished digital outcomes, but the written communication (Techpack) tended to lack the in-depth knowledge of how these garments would be constructed evidencing the student's growing technical literacy. These students tended to be confident and have prior, high-level skills within software such as Adobe Illustrator and Photoshop. Unlike the students working solely with physical half-scale mannequins, portfolio work tended to be based online using free online web platforms to communicate outcomes of the brief.
3. The third process to emerge during the assessment review of students work, and somewhat unexpected, was students who blended real-world and digital practices creating physical half-scale silhouettes of their garment ideas and full-scale samples of design details such as pockets, collars, hood adjustment systems and so on, plus simulating the whole garment in Clo3D as a final output. These students were able to visualise/trial the garment simulations on a three-dimensional avatar as a pedagogical learning method. In the virtual environment, movement and fit are tested, whilst in the real-world environment details and manufacturing processes are tested. These bodies of work evidenced a sound understanding of how the garment would look, fit, perform, and be manufactured.

On reflection, the CLO3D virtual environment has the ability to create a holistic approach to realising a garment. As the pattern is created in the 2D pattern environment, the design is realised in the 3D virtual environment. The pattern pieces can be sewn together in either environment or in any order. Although this creates benefits in terms of efficiency, for the novice practice-based fashion practitioner (student) it can present an unrealistic and unclear understanding of how garments are made and therefore designed. Therefore, in isolation to real world environments, CLO3D has limitations as a pedagogic strategy. Consequently, it is vital for the student who is still learning how garments are manufactured, to engage in real-world sampling to understand the order in which 'their' design is constructed and to document their process as it develops.

## Reflections and New Wisdoms – Recognising a Phygital Framework of Practice

To foster and embed a hybrid approach to the learning and teaching of practice-based fashion into the curriculum, whilst recognising that sustainable practices combined with technology contribute and ensure that fashion remains relevant in the future, all students at all levels of study commence their design enquiry working in half-scale.

Students continue to work towards fulfilling the unit requirements which may ultimately entail creating half-scale or full-scale garments as toiles or in final fabrics.

Real world sampling ensures students understand the correct way to manufacture a garment whilst engaging with digital media presents opportunities for new methods of learning through experiential practice.

The emerging opportunities of a phygital practice-based fashion learning and teaching resulted in categorising a series of reflections:

1. Fashion Design Technology students' accomplished ‘phygital literacy’ provided employment opportunities in emerging roles of hybrid design and development positions within the industry.
2. The student and staff community recognised a positive impact on sustainable learning and teaching outcomes post pandemic through a combination of half-scale modelling and digital simulation.
3. Professional ancestral practice was embedded (small scale prototyping and mannequin making) whilst advancing upon these treasured techniques.
4. Ameliorates tensions between analogue and digital development methods, acting as a catalyst for confidence in bridging perceived barriers.

## Valuing Ancestral Practices -Miniature Three-Dimensional Modelling as a Pedagogy

The pursuit for developing strategies to facilitate the learning and teaching of a discipline in academia is referred to as ‘pedagogy.’ There are several definitions to interpret the word ‘pedagogy.’ However, the overarching theme is to define the various ways that learning, and teaching can be facilitated in an educational learning environment (McPheat, 2020).

Developing an idea in miniature is an age-old craft dating from the second millennium BCE that has been and is still utilised within the architectural industry and seen as a vital part of the process. Stavric, Sidanin and Tepavcevic (2013, pp. 18-38) state that “experience has already confirmed that scale models remain one of the most convincing ways of presenting architectural projects” and Bye suggests that clothing and textile design “shares many characteristics and issues with the broader discipline of design that embraces a wide range of fields from architecture and engineering to communication design and urban planning” (Bye, 2010, pp. 205-217).

It is also documented, and known, that the fashion industry has utilised scaled down versions of a garment to communicate what it might look like in full scale for centuries, for both the designer's benefit, it in terms of understanding the garment intricacies, and that of those who

may wish to purchase the garment, as early as 1700s with the introduction of Pandora Fashion Dolls (Cegindir, 2017, as cited in Phoenix, 2018), to Madame Vionnet, (McDowell, 2015) and Théâtre de la Mode 1945, (Pokovbra, 2017) evidencing the use of small-scale modelling to understanding and showcasing a garment.

During the pandemic of 2020, Design Houses such as Dior (Dior, 2020) and Moschino (Moschino, 2020) were showcasing their latest collections on scaled down versions of mannequins or maquettes, which supported our transition to scaled modelling grounded by our ancestral tried-and-true practices where the threads of the past have informed contemporary methods.

In contrast to half-scale modelling, learning to pattern cut, manufacture, and review garments at ‘full-scale’ can create barriers to students' initial learning as the pattern and fabric pieces can often be large and difficult to perceive; how the pieces fit together, how do they interact with the body and what it will look like when finished? Students often express reticence to explore at full scale during the initial stages of 3D design realisation. It is therefore proposed that if the scale of what the student is required to create is reduced, this in turn, will alleviate some of the initial enormity of the task.

There is also the issue of evaluating the developing garment on a full-size mannequin with the need to follow the garment with your eyes moving from one area to another in a *360°* view. When viewing art in progress, Naito proposes that “our strongest, clearest vision happens in the centre of your eyes. Anything in your peripheral vision is not in focus. Your physical proximity to your canvas can often leave most of your work in your peripheral vision. In this situation the overall composition can be ‘slightly off” (Naito, 2018). Nuthmann's notions on the subject of how we ‘see’ strengthens this claim, in that when viewing an object our eyes must move so that the object becomes centred, and furthermore argues that our peripheral vision is “much worse” and merely “explores a scene”, while the “central vision is used to sequentially analyse regions of interest” (Nuthmann, 2014). Painters and artists regularly step back from a work in progress to take in the overall concept as “Stepping back allows the mind to process the piece as a whole” (Naito, 2018).

These notions of viewing a work in progress resonate with the authors' experience of learning and teaching of practice-based fashion. It is proposed that by moving our eyes over large areas of a garment, that for the most part is still unknown, can make it difficult to build a picture to understand the intent. Half-scale modelling enables the viewers' eyes to be more centred on the garment so that, to coin a phrase we “don't take our eyes off the ball.” The 3D virtual environment CLO3D reflects this practice in that the avatar can be turned in any direction and, on any axis, enabling the student to gain a full sense of what the garment entails.

Ancestorial practices of architecture and fashion evidence the benefits of testing an idea in miniature where Stavric, Sidanin and Tepavcevic (2013, pp. 18) state “the purpose of working models is to define, redefine or correct errors in the architectural design process.” However, when focusing on fashion education, and with particular reference to practice-based fashion, there is little to no discussion urging academia to facilitate learning and teaching practice-based fashion in half-scale as a ‘direct pedagogic strategy’ rather than an option for study.

## Conclusion

The authors offer a contribution of a hybrid phygital framework of practice resulting in three key reflections informed by critical observations of undergraduate units studied during, and post COVID-19:

- Engaging in the creation of individual half-scale mannequins brings a critical re-interpretation of the body in fashion, by offering a space to consider the effects of tools on design practice.
- Re-valuing professional ancestry contributes to teaching and learning, with the potential to blend traditional approaches with contemporary digital methods in *equal* measure.
- Student outcomes demonstrated a confidence in applying unfamiliar, new technological tools when combined with familiar, traditional approaches to visualise in 3D.

By honouring wisdoms of past professional ancestors, we ground our present and future practice. Through a continuation of these teaching and learning legacies and by embracing new modes of practice, whereby merging of nascent 3D digital and reduced scale prototyping offers a hybrid phygital framework as a tangible and relevant methodology to build upon.

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