Teaching to the line: how do visual arts technicians in higher education conceive of their pedagogies?

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Contents

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Abstract

Technician pedagogies have increased in volume, significance, and sophistication across the higher education sector since the turn of the millennium, particularly in the creative arts, in what can be described as a ‘technical turn’. A mature corpus of literature exists concerning academic teaching, but virtually nothing is known about the learning and teaching activities of technicians. Calls for empirical research from scholars and policymakers have intensified as skills and employability agendas have advanced, and blended roles, such as technical demonstrator/instructor/tutor, have proliferated. Prior to this research, it has been problematic to identify, quantify, or plan for quality assurance or enhancement concerning arts-based technical teaching, meaning that despite increasing reliance on technicians as educators, there is no framework for understanding or developing their pedagogies. Accordingly, they cannot be optimally managed, deployed, or integrated with the curriculum, and the opportunities and risks associated with their contribution to learning and teaching remain uncertain, colloquial, and unclear.

This thesis responds to this gap in knowledge by exploring how visual arts technicians working in UK higher education conceive of their pedagogies. It examines what they teach, how they teach it, and the philosophical underpinnings and values that inform their approaches to teaching. The methodology used, phenomenography, explores the qualitatively different ways in which a phenomenon may be experienced and seeks maximum variation in sources of evidence. Seven research sites were selected to ensure a diverse range of institutions and characteristics. In total, twenty-three semi-structured interviews were completed, providing a rich basis for insights into the work of visual arts technicians. Additionally, twelve participants consented to be photographed in their teaching spaces. The images do not directly respond to the research questions but contribute to establishing the embodied identity of the participants while also illustrating the study.

Interview data were analysed using phenomenographic techniques to establish categories of description and an ‘outcome space’ that logically structures the five qualitatively distinct ways participants conceived of their pedagogies: Demonstrator, Instructor, Consultant, Collaborator, and Transformer. These conceptions span a continuum from teacher-centred/subject-oriented to student-centred/transformation-oriented approaches.

These outcomes challenge and disrupt existing frameworks of knowledge within creative arts education, contributing to a fundamental reassessment of how technician pedagogies can be understood and integrated with academic pedagogies and the curriculum. These insights will be of particular use to researchers of practice-based pedagogies, government, policymakers, and HE stakeholders within the creative arts and beyond in adjacent practical fields (e.g., physical sciences, engineering, pharmaceutical, computing, legal, and medicine).

Chapter 1: Defining the research phenomenon

1.1 Introduction

“You don’t teach, you demonstrate” were the words used by my manager to explain my responsibilities when I began my career as a technician in higher education (HE) in 2000. This simple statement encapsulated a sector-wide fallacy that would fascinate and frustrate me for decades to come. In 2023, several participants interviewed for this study would repeat this axiom, for example:

> *What we do is we instruct people. We show people how to use something, show people how to create with something, give them the rules, tools, and skills to do that… I can’t say that I teach… because I’m a technician.*

For many years, it has been problematic to speak of technicians teaching in HE (The *Guardian*, 2016). To do so was provocative; teaching was exclusively conceived of as an academic activity. Dominant hegemonies underpinned long-standing customs and practices through which lecturers taught students while the technicians maintained the facilities and provided basic training. These stereotypes provided simplistic and widely understood reference points. Colloquially, any technician who claimed to be teaching had crossed ‘the line’ into academic territories.

However, since the turn of the millennia, technical teaching has become prevalent, pedagogically sophisticated, and valued across the sector, particularly within the creative arts (TALENT, 2022). This seismic shift has remained largely silent and invisible within the literature “Despite an increasing focus on the professionalism of academic staff who teach, there has been very limited published research focusing on technical staff and their role within teaching and learning at HE level” (TALENT, 2022:125). TALENT was a National Policy Commission established by Midlands Innovation (a collaborative group of eight research-intensive universities in the midlands of the UK) funded by Research England to advance status and opportunity for technical skills, roles and careers in UK higher education and research. The TALENT Commission holds particular importance in the context of this thesis. I was a Commissioner and contributed to developing the vision, establishing principles, decision-making (concerning research design), sampling, methodologies, and methods.

This introductory chapter is arranged in five parts; the first articulates my professional interest in the research topic by describing how my conceptions of technical pedagogies were formed at different points in my career. Accordingly, elements of this chapter (and relevant sections of others) are auto-ethnographical in style. In keeping with many auto-ethnographers I adopt a first-person approach at these points. It is also important to note that this thesis is written to be accessible to a broader audience, including technicians who are infrequently the main subject of published studies and are more likely to be mentioned in passing or at the periphery of the main research topic. It engages scholarly conventions but seeks to use straightforward, inclusive, and jargon-free language. The second part describes how I set out to test and contextualise my observations and experiences through academic qualifications, research, and surveying documentary evidence. The third part defines the scope of the investigation, noting inclusions and exclusions. Part four reflects, in brief, ahead of deeper analysis in Chapter 3 (Theoretical perspectives), why the lack of knowledge relating to technical pedagogies is problematic ahead of introducing the research questions. The chapter concludes by outlining the thesis architecture, methodology, methods, and epistemological approaches.

1.2 My interest and the formation of my conceptions

As Stoltz (2020:1084) points out, a common conception of phenomena under investigation must be established to claim that there are deviations from it. Accordingly, this study begins by explaining how my conceptions of technical pedagogies have been formed, tested, and contextualised at different times and perspectives, specifically:

1. 1995-1998: Photography student.
2. 2000-2006: Technician (AV and photography).
3. 2007-2016: Technical Manager.
4. 2021-present: Director of Technical Department.
5. 2018-2022: University Governor.

The reader should also be aware that these perspectives and experiences occurred within a single institution (known successively as West Surrey College of Art and Design (1969-1994), Surrey Institute of Art and Design (1994-2005), University College for the Creative Arts at Canterbury, Epsom, Farnham, Maidstone, and Rochester (2005-2008), and University for the Creative Arts (2008-present day)). It is also important to note that in addition to establishing the research subject, the following section contributes to methodological controls relating to researcher positionality and bias, which is expanded upon in Chapter 4 (Research design and methodology).

1995-1998: Photography student

I attribute the root of my interest in technical pedagogies to my experiences as an undergraduate photography student at the Surrey Institute of Art and Design in the 1990s. I was taught by lecturers and technicians and experienced these two teams as distinct groups with little or no integration. Lecturers usually taught large groups, describing ways in which the work of historical masters could be appreciated and relating it to the contemporary art world. Lectures included presentations on art history and art theory to develop visual and cognitive literacies, questioning and challenging the boundaries of photography as a discipline. Lecturers also taught seminars to expand these themes in smaller groups and gave tutorials where work-in-progress would be critically appraised.

I experienced technical teaching differently. At the time, photography was an analogue mechanical art insofar as (in most instances) it required knowledge of physics, equipment, processes, techniques, and crafts. Technical teaching developed my awareness, understanding, and abilities within the practical elements of my studies. Based on this account, a reader might consider this blend of education complementary and symbiotic by design. However, this would be an error; technical and academic staff held the other in low regard; indeed, often there was palpable contempt. As custodians of the assessment criteria, the academic focus on creativity, innovation, and theoretical and conceptual elements was held in high esteem whereas skills, execution, and practical knowledge associated with the technical teaching went largely unrecognised. This could be partially attributed to the fact that technicians themselves did not identify as teachers and worked to the archetype through demonstrating a piece of equipment or process in the abstract, to a level at which they were satisfied students could use the equipment safely and without damaging it or harming themselves. A technical lesson typically comprised of a demonstration and explanation (show and tell). Beyond basic competence, there was little advanced technical instruction available. Consequently, once a technical induction or demonstration had been delivered, students relied on self-directed trial and error to improve. I experienced this as a ‘gap’ in my educational experience and found it detrimental to my learning. Several of my peers left the course, complaining the course was producing fine artists with cameras rather than photographers. It was a commonly held conception that summative assessment was based primarily upon the artist's statement rather than the artist's work (talking about photographs rather than creating photographs). A similar complaint had been raised a century earlier at the same institution by the acclaimed author of 'The Wheelwright's Shop' (George Sturt, 1923), who complained to the authorities of too much emphasis on formal knowledge in their teaching, described as 'superior humbug' and not enough 'know-how' of 'pure drawing and the technicalities' (Frayling, 2017:33).

As a fresh graduate, I found the hierarchical value of knowledge sharply inverted. My employers (commercial photography between 1998-2000) held practical skills, abilities, and know-how in greater esteem than the conceptual and aesthetic knowledge and art theory emphasised at university.

2000-2006: Technician (AV and photography)

In 2000, I returned to HE as a photography technician responsible for teaching the use of equipment, processes, and materials. I had almost complete autonomy in what and how I taught. Outside of scheduled teaching, I would support students with their self-directed studies. Sometimes, this was basic troubleshooting or reminding them of something already taught, but as they gained proficiency, these encounters could evolve into authentic co-creations. In these instances, I would find myself working side-by-side with learners, sharing thoughts, helping to clarify and test their ideas, and working through problems and potential solutions with them.

My teaching became more sophisticated as photography transitioned from analogue to digital in the early 2000s. I led conversations with academic colleagues concerning how emerging innovations and technologies could be integrated into the curriculum. In some cases, teaching lecturers and helping them understand the processes used within the works they were responsible for assessing. I also became involved in supporting academic research activities. I continued my photographic practice and began teaching at other institutions part-time. Over time, I gained the confidence to apply for a teaching position at the university. I was unsuccessful, and the feedback was that technicians could not transition into academic roles. This critical incident sparked a career-defining interest in the distinction between technical and academic pedagogies.

2007-2016: Technical Manager

With academic options seemingly closed, I chose to transition my career into management. For the following nine years, I managed a team of sixteen media technicians. In this role, I oversaw technical teachers in disciplines beyond my expertise. During this period, the demand and sophistication of technical teaching increased at pace. The sessions delivered by my staff were, in many cases, integral to the curriculum, progressively developmental, aligned to modules, and virtually indistinguishable from practice-based academic instruction. Indeed, many of my staff were teaching alongside (spatially and philosophically) their academic colleagues, learning, and becoming fluent using the vocabulary, grammar, syntax, and structure of academia (units, aims, learning outcomes), and participating in quality assurance and enhancement activities such as teaching observations, course reviews and validations. Some lobbied for and incorporated professional accreditation programmes into their teaching (notably, Adobe and Avid certifications), which later became embedded within modules. Others blurred their remit further, taking on 'academic' duties such as interviewing applicants, reviewing and re-writing course units, and summative assessment. A significant number sought professional recognition for these elevated duties. Indeed, in 2014, 25% of my staff held Higher Education Statistics Agency (HESA) recognised teaching qualifications (via PgCert or professional recognition), which increased to 88% (qualified or enrolled) when I left the role in 2016.

I reflected that the technical contribution to learning and teaching was advancing informally but consistently. It was not driven by strategy, policy, or procedure. Role creep was common, and technician job descriptions were increasingly non-reflective of the pedagogic duties they were performing. These factors contributed to narrowing the space between academic and technical teaching to the extent that a new human resources process was developed, enabling technicians to 'act up' to cover vacant academic roles or skills gaps. These were sometimes casual and short-term arrangements, while in other instances, technicians took year-long secondments to work within course teams. Additionally, it would frustrate me that my staff would take annual leave to replicate their lessons at rival institutions, more than doubling their salaries as 'visiting lecturers'. Shreeve (2008:36) describes experiencing this same phenomenon. As distinctions between academic and technical teaching blurred, many technicians found themselves successfully able to transition their careers into academia (Savage, 2018a).

2021-Present: Director of Technical Department

Between 2016 and 2020, I worked in a strategic planning role outside the technical department. I returned in 2021 to a newly created Directorate position and retitled the department from ‘Technical Services’ to ‘Technical Learning’. This change signified the transformed purpose of the team, which at that time consisted of around one hundred and thirty staff working across four campuses in the UK (plus a Chinese campus and numerous franchised courses worldwide). In this role, I was a member of the university executive and ceased to be closely connected to the delivery of technical teaching. My technical and practical skills atrophied (as a more junior manager, I continued to practice and published two books in my discipline (Savage, 2013; 2016)). Progressing within a technical career had contributed to my own deskilling of practice - a phenomenon more commonly attributed to academic staff (MacFarlane, 2011).

I was charged with developing a ‘Technical Strategy’ to ensure that the previously uncodified or unquantified technical teaching was explicit, costed, equitably deployed and subject to quality assurance and enhancement for optimal student experiences and learning. Research for the Strategy identified that many courses were heavily reliant upon technical teaching to deliver structured learning hours. In several materially intensive disciplines, technicians taught a significant majority of the practical modules. Critically, these hours were not costed or budgeted for, and there was no transparent or equitable mechanism through which they were deployed.

2018-2022: University Governor

In 2018, I joined the Board of Governors at the University for the Creative Arts as a Staff Governor. The Board is the most senior decision-making forum in the university. “Our Board provides leadership, strategic direction and scrutiny to enable us to achieve our purpose of creating and supporting extraordinary graduates, practitioners and work across the creative and performing arts” (UCA, 2022). In my tenure (2018-2022), no significant discussion concerned the pedagogies of the technicians. My experience was consistent with Wragg *et al.,* who concluded “any awareness or acknowledgement of the contribution that technical staff make was lost as you moved up an institution’s hierarchical structures” (2023:11).

I reflected that at the highest level, the university appeared unaware of the technicians' contribution to delivering the university's core business: learning and teaching. Anecdotally, the Board espoused the widely held view that the lecturers deliver most of the teaching, while technicians provided support and specialist instruction in the background. This is not to say the governors did not value the technical workforce because they did, but for the wrong reasons; the consensus was that the technical staff maintained the resources, ensured safe working, and supported academic teaching. Technicians were considered vital for the smooth and efficient operation of the university but with little direct influence on teaching.

1.3 Testing my conceptions

Over time I became cognisant that my conceptions of technical teaching had differed based on my experience and perspectives of the time and were inconsistent with those of other stakeholders. Drew (2003:1) describes a comparable realisation. It appeared clear to me that the evolution of technical teaching I was observing was critically important, yet I could not quantify, define, or consistently make sense of the phenomenon. In essence, I was experiencing an epistemological circumstance akin to what photographers would describe as a parallax error (where multiple perspectives of the same subject appeared slightly different when viewed from a range of perspectives or lenses). The use of the term ‘perspectives’ is important in this context. Lincoln and Guba describe how within a research context “Perspective connotes a view at a distance from a particular focus. Where we look from affects what we see. This means that any one focus of observation gives only a partial result; no single discipline ever gives us a complete picture” (1985:55). They argue that conventional photography falls short, advocating instead for Schwartz and Ogilvy’s (1979) metaphor of the hologram. In holography, laser beams are split and reflected to generate the multiple perspectives essential for creating the whole coherent image. I will return to the significance of the hologram in this context later.

Aware that my perspectives were limited, I set out to learn from others to expand my understanding. As Cohen *et al.,* note, “Research does not start with research questions. We assemble observations, ideas, concepts, reflections, consider what they mean, and then formulate our theories, our frameworks of related concepts and propositions” (2018:77). In 2010, I enrolled on a PgCert Learning and Teaching course to study technical teaching. As the coming chapters detail, I found little research literature relating to technicians and even less for creative arts technicians. Practice-based pedagogic theories of learning and teaching in the creative arts were written by academics, about academic practices, for academic audiences, but from my perspective, many appeared relevant to technical teaching.

My theories remained incomplete throughout my PgCert, and it was not until I enrolled in a research-orientated MA Creative Arts Education course in 2016 that I was able to mature my emerging theories sufficiently to publish them. My first-year MA thesis titled *'Creative arts technicians in academia: To transition or not to transition?'* (Savage, 2018a) was an empirical study that explored the experiences of technicians who had moved from technical roles to academic posts (something I had been unable to achieve myself). My second-year thesis, *'Challenging HEA Fellowship: Why should creative arts technicians be drawn into teaching?'* (Savage, 2019) examined the experiences of technicians who attained HESA recognised teaching qualifications via Higher Education Academy Fellowship. Unusually for student essays, both were published in an academic peer-reviewed journal (Journal for Art, Design and Communication in Higher Education). Insights from these articles are discussed in Chapter 3 (Theoretical perspectives). Responses to my articles and accompanying blog for AdvanceHE (Savage, 2018b) supported that proliferating technical pedagogies was a pan-institutional phenomenon. I have continued to publish my research, and since undertaking doctoral study work derived entirely or in full from this investigation has been shared in a range of forms and forums, as detailed in Appendix 1 (publications, exhibitions, and conferences).

Around this time (2017), The Technician Commitment was established in the UK with a stated aim "to ensure visibility, recognition, career development and sustainability for technicians working in higher education and research, across all disciplines" (Gatsby, 2022).

Another important (in the context of this study) and concurrent sector wide event was the Teaching Excellence Framework (TEF) Year 2 assessments:

> TEF will place a spotlight on teaching and encourage excellent teaching for all students; help institutions improve the quality of their teaching by highlighting exemplary practices; build a culture where it is recognized that teaching has equal status with research within and across HE institutions (BIS, 2016a:18).

An examination of TEF is beyond the scope of this study, but statements published by HEIs demonstrate that previously understated technical pedagogies were becoming recognised and valued. Analysis by AdvanceHE reveals that just under a fifth of UK HEIs referenced the pedagogies of technicians while staking their claim of teaching excellence (Bradley, 2018). The TEF submission of my institution stated:

> Technical staff are a key feature of our pedagogic model and learning community, delivering workshops, skills training, and support for students in developing their production skills. UCA is in the vanguard of promoting and delivering the highest quality practice-based teaching from technical staff... Praise for our technicians is a consistent theme in qualitative student feedback… (UCA, 2019).

Other creative arts institutions also referenced technicians when staking their claim for teaching excellence. Plymouth College of Art (now Arts University Plymouth), reported:

> All academic and technical staff are employed on the basis of their up-to-date academic theoretical and practical understanding of and involvement in their subject disciplines, as well as their professional pedagogic expertise… lecturers are technical specialists in their respective fields as well as critically engaged practitioners (Plymouth College of Art, 2019).

At Hereford College of Art: “technical demonstrators and technicians are typically practising artists, giving our students access to many types of learning space and extra expertise” (Hereford College of Art, 2019).

In the subsequent TEF (2023), the UCA student experience was rated as ‘very high quality’ overall, but the section pertaining to staff development and academic practice was rated outstanding by the panel, “there is recognition of technical staff as teachers, with several teaching awards, as well as external recognition for technical education provision and development” (OfS, 2023b:7).

Another dynamic barometer of sector trends is the employment market. I subscribed to weekly email alerts from jobs.ac.uk between 2017 and 2022 with search parameters of ‘technician’, ‘creative arts’, and ‘United Kingdom.’ During this period, thousands of roles were advertised detailing the qualifications, skills, experiences, personal qualities, and teaching duties expected of creative arts technicians. The collection and evaluation of these documents and their depictions of technical pedagogies are described in Chapter 5 (Data collection).

These empirical and authentic materials represent what Wenger (2008:105) would term “boundary objects - artefacts, documents, terms, concepts and other forms of reification around which communities of practice can organize their interconnections.” However, for professional support staff, roles as written and advertised do not always reflect the role enacted (Padró, 2018:xiv) and "Staff in professional roles report both the seemingly contradictory freedoms afforded by role ambiguity and relative invisibility and the challenges presented by these very same qualities" (Bossu *et al*., 2018:350). These freedoms and ambiguities can create space for role creep and blurred responsibilities. Indeed, Whitchurch (2006; 2008a) theorised a blurring of academic and professional support roles conceptualising a 'Third Space'(2008b) in which academic and support staff co-locate as roles evolve:

> Binary perceptions (of academic and professional support) tend not to take account of the ways in which individuals interpret their roles as defined, for instance, in a job description or specification. Thus, an individual on a non-academic contract, especially if they have academic credentials and experience, might interpret their role in an 'academic' way (Whitchurch, 2013:4).

I came to believe that I had located a gap in knowledge through my experiences, research, desktop surveys of TEF, and technician recruitment materials. It was apparent that there were commonalities and variations within ways of experiencing technical teaching. However, I could find no consensus on what technicians teach (content), how they go about teaching (strategy), or why they choose to teach in the ways that they do (purpose). While I had experienced technical teaching from various perspectives, they were all viewed through the perception and experiences of a singular individual (myself - albeit at different times and in different roles).

1.4 The research question

In 2018, I applied to the UCA doctoral programme to systematically seek alternative perspectives at a national level as interpreted and articulated by technicians in their own voices. Accordingly, the research question of this study is 'How do visual arts technicians in higher education conceive of their pedagogies?' Focussed through heuristic 'What,' 'How,' and 'Why' sub-questions:

- What is it that visual arts technicians believe they teach?
- How do visual arts technicians approach their teaching?
- Why do visual arts technicians teach in the ways that they do?

The ‘what’ question relates to the ‘object’ of teaching, and ‘how’ relates to the ‘act’ of teaching. The final sub-question question, ‘why’, seeks to discover the philosophies of purpose and educational values underpinning the first two sub-questions. This study aims to discover, describe, and systematise conceptions of pedagogies as experienced and reported by visual arts technicians so that the contribution of this understudied group can be better understood, and engaged for the benefit of creative arts education and related stakeholders.

1.5 Definitions

This study explores how visual arts technicians working in creative arts HE conceive of their pedagogies. It is, therefore, critically important that each of these terms is rendered unambiguously. Key terms include ‘visual arts’, ‘creative arts HE’, ‘technician’, ‘conceive’, and ‘pedagogies’. Each is articulated (in terms of usage within this thesis) below.

‘Visual arts’

While this study is located within the broader field of ‘creative arts’ higher education, it focuses specifically on the experience of ‘visual arts’ technicians rather than the full spectrum of technicians working across all creative disciplines. The term visual arts is used in this context as a broad term to encompass a wide range of artforms and mediums but specifically those with a practical outcome that utilise studios, materials, and/or workshops with a technical component. Accordingly, it is important to acknowledge that the visual arts do not include the creative arts of drama, dance, music, and imaginative writing. This distinction is formalised through the Joint Academic Coding System (JACS), co-owned and maintained by HESA and UCAS as a way of coding academic subjects and modules. JACS was introduced in 2002, and while writing this thesis, a new subject coding system – the Higher Education Classification of Subjects (HECoS), was introduced (2019/20) that superseded JACS (HESA, 2022). However, JACS classifications were retained to guide sampling approaches (Chapter 4 – Research design and methodology) but do not carry through to analysis (Chapter 8 – The outcome space).

The JACS codes of W1 (Art), W2 (Design), W6 (Media), and W7 (Crafts) denote the creative arts' primary sub-domains used within this study (Figure 1). The sub-domains of W3 (Music), W4 (Drama), (W5) Dance, and (W8) Imaginative writing are excluded from the study.

Art (W1)	**Design (W2)**	**Media (W6)**	**Crafts (W7)**
Fine Art	Graphic Design/Vis Communication	Photography	Jewellery
Illustration	Advertising	Film making	Ceramics
Painting	Interiors	TV/Broadcast	Textiles
Sculpture	Architecture	Journalism	Glass
Printmaking	Product Design	Marketing	Metal work
	Furniture Design	Animation	
	Fashion	Computer Games	
	Make-up	Media Studies	
	Curatorial practice	Sound Design	
	Architecture		

Figure 1: The Joint Academic Coding System (creative arts and design).

To avoid any doubt, the reader should be clear that within this thesis, the phrase creative arts is limited to the visual arts as set out above.

'Creative arts HE'

'Creative arts HE' is an umbrella phrase used to describe the collective range of creative arts courses in higher education. These are set out within the JACS subject area H (creative arts and design) and the sub-domains W0-W9 (HESA, 2022).

Within creative arts HE, the term 'subject' and 'discipline' are often used interchangeably, but this is contentious for some. McHugh (2014:38) suggests "Fine art can no longer be bound by the limitations of a term such as 'discipline' for, by nature, it encompasses study, understanding and practice across a range of disciplinary boundaries." Trowler *et al.,* (2012) describe how the term 'subject' is increasingly used within higher education (for example, QAA Subject Benchmarks). They argue the term contributes to the deprofessionalising of academics, effectively 'demoting' them to become 'merely' teachers or 'practitioners':

> Subject is reassuringly concrete – a subject can be defined, has a knowledge base which can be easily constructed into a programme of knowledge acquisition and, perhaps most importantly, of quantitative assessment. Subjects are also passive – they are taught, learned, delivered (Sabri, 2010 cited in Trowler, 2012:11).

This thesis uses 'discipline' (rather than subject) in most instances as a more inclusive and representative term.

'Technician'

Attempts to define a 'technician' have proven elusive (Noke *et al.*, 2024). Etymologically, the word 'technician' derives from the Latin 'technicus' (derived from Ancient Greek (tékhnē, "skill, art") + -icus). The Oxford English Dictionary defines a technician as "1. a person employed to look after technical equipment or do practical work in a laboratory. 2. a person skilled in the technique of an art, science, craft, or sport" (OED, 2012). Technical role titles vary considerably within and between institutions (Wragg *et al.,* 2023). The creative arts technician job vacancy survey demonstrated that 'Technician' and 'Technical Demonstrator' were the most prevalent, with 'Technical Instructor' and 'Technician Tutor' also present. This survey is explored in Chapter 5 (Data collection). However, within this study, the term 'Technician' is used to refer to staff within technical job families who teach and support learning.

'Conceptions'

Conceptions are the units of analysis most frequently examined by qualitative researchers conducting studies into how teachers think about and approach their teaching (see, for example, Samuelowicz and Bain, 1992; Pratt, 1992; Kember, 1997). Pratt offers the following definition (also referenced by Drew (2003) in her doctoral thesis that explored conceptions of and approaches to teaching situated within the context of academic practice-based teachers of art, design, and communication):

> Conceptions are specific meanings attached to phenomena which then mediate our response to situations involving those phenomena. We form conceptions of virtually every aspect of our perceived world, and in so doing, use those abstract representations to delimit something from, and relate it to, other aspects of our world. In effect, we view the world through the lenses of our conceptions, interpreting and acting in accordance with our understanding of the world (Pratt, 1992:204).

Conceptions focus on the experience as described rather than the psychological process generating the experience or the objective facts themselves (Ashworth and Lucas, 1998:415-6). “Thus, people can experience the same event in a literal sense and hold different conceptions of it as a function of their individual perspectives without statements about one having any inherent implications for the truth value or existence of the other” (Feldon and Grehl, 2018:890). Conceptions are located within the constructivist paradigm, which “assumes a relativist ontology (there are multiple realities), a subjectivist epistemology (knower and respondent cocreate understandings), and a naturalistic (in the natural world) setting” (Denzin and Lincoln, 1998:32).

Marton and Booth (1997) theorise conceptions as consisting of two intertwined aspects: the referential aspect, which denotes the global meaning of the object conceptualised (the context of the experience being conceptualised), and the structural aspect (the lived experience), which shows the specific combination of features that have been discerned and focused on. A more in-depth exploration of the epistemological foundations of conceptions, justification for their use, and their critical importance in the context of this study is described in detail in Chapter 4 (Research design and methodology).

‘Pedagogies’

Watkins and Mortimore (1999) describe ‘pedagogy’ as a contested term. They observe that it is seldom used in English writing about education, having greater prominence in European countries, specifically France, Germany, and Russian-speaking academic communities. Etymologically, they point out, the word derives from French and Latin adaptations of the Greek terms for ‘boy’ and ‘leader,’ literally meaning a man overseeing a child. For Higgs *et al.*, “Pedagogy can encapsulate the entirety of the teaching and learning environment, how and what is taught, and how, and through which learning strategies, students learn” (2012:73). The interpretation of pedagogy used in this study is borrowed from Watkins and

Mortimore, whose inclusive definition is “any conscious activity by one person designed to enhance learning in another” (1999:3).

1.6 Scope and delimitations

Scope refers to the extent that the research area will be explored and the parameters within which the study will be conducted. This investigation aims to learn from and categorise how visual arts technicians conceive of their pedagogies. Accordingly, the population scope consists of technicians with teaching responsibilities working in JACS subject codes of W1, W2, W6, and W7. Participants were drawn from seven institutions across the UK (England, Northern Ireland, Scotland, and Wales), from institutions that vary by size, specialism (arts or multidisciplinary), and age (pre and post-92).

Delimitations are characteristics that arise from the limitations in the scope of the study (defining the boundaries). Delimitations result from elective choices rather than limitations that emerge during the enquiry. Limitations (matters and occurrences that arose during the study beyond the control of the researcher) are identified and acknowledged at relevant points where they impact upon the research. Noteworthy delimitations include the omission of perspectives relating to technical duties without direct pedagogic value (for example, maintenance, record keeping, management of booking systems, shops, stores, or budgeting), co-teaching with academics during which technicians have supported pedagogies (rather than led), and contribution to academic research. Inexperienced technicians were also excluded; the sampling criteria stipulated that participants were required to be currently employed as arts technicians, working at one (or more) of the selected institutions with a contract of 0.2 FTE or greater, having at least two years of experience. Most fieldwork was conducted in person, except for institutions that were not reasonably practicable to visit in person due to distance, cost, time, or limited availability of participants. In these instances, interviews were conducted online.

1.7 Thesis architecture

It is common for a thesis to begin with an introduction to the research topic (as this chapter has), followed by a literature review in which the subject is contextualised within existing knowledge and theoretical frameworks. In this study, a literature review, in the conventional sense, is not employed. This is primarily due to the lack of literature directly relating to technicians and their pedagogies. Instead, the research topic is framed within a contemporary context (Chapter 2) and explored through relevant educational theories and conception-based research (Chapter 3). Further historical perspectives are provided in Appendix 2, offering insights into the origins, antecedents, and development of technical pedagogies. These perspectives combine to coagulate the study as a definable and contextualised phenomenon before clarifying the research problem and informing the research design (Chapter 4).

This approach is distinct from the deliberate strategy of excluding a literature review used by some phenomenographers (Ashworth and Lucus, 1998). Arguments against using a literature review in phemonenographic studies are that it may lead to preconceived ideas that can influence the design of the study and/or collection/analysis of data. “Indeed, conducting prior literature reviews may be dangerous as it may prematurely close off or determine what one sees in the data; it may cause one to read data through given lenses rather than with fresh eyes” (Cohen *et al.*, 2018:715). This point is acknowledged but deprioritised in favour of establishing a richer framework to explain and understand technical pedagogies in creative arts HE. The study has genuine potential to disrupt and advance current thinking about creative arts education; therefore, the topic needs to be defined and grounded robustly. However, preconceived ideas, researcher positionality, and bias can impede rigour and trustworthiness, as with all qualitative studies. Mitigations and controls are set out within the research design. Data collection is described in Chapter 5, ahead of a photographic chapter (Chapter 6) in which participant portraits visualise technicians in their teaching spaces. Data analysis is grouped over Chapter 7 (process of analysis) and Chapter 8 (outcome of analysis) before a discussion concerning the insights and their potential applications (Chapter 9).

1.8 Summary

This chapter has introduced the thesis by defining the research topic and setting out the scope, inclusions, and exclusions. I have sought to demonstrate and disclose my interest, and positionality through a sense-making introspection of my experiences and pre-doctoral attempts to contextualise them. I have briefly described what I perceive as a gap in knowledge, why I believe it is problematic, and the research questions that respond to it.

Chapter 2: A contemporary context

2.1 Chapter Introduction

This chapter advances the thesis by examining the contemporary context, ontologies, and epistemologies in which the research topic is situated. While this broader context may appear peripheral to the pedagogies of technicians, as Cohen *et al.,* note “Researchers need to consider not only the nature of the phenomenon under study but also what are or are not the ontological premises that underpin it, the epistemological bases for investigating it and conducting the research into it” (2018:175). It is also noteworthy, that while the theories and frameworks proposed in this chapter are pre-empirical, they constitute what Corsaro (1982) describes as “prior ethnography” during which the researcher engages within and observes the field for a lengthy period in advance of their study, to fine-tune understanding and become sensitised to the critical issues. This commences by reflecting upon the relatively recent transformation of art schools into universities. It considers how the curriculum, epistemologies, and workforce (specifically the changing roles of technicians) have evolved in response. It theorises different forms of practice from a technical perspective and speculates on how a university experience might prepare graduates for the creative industries.

In the second part of the chapter, the changing profiles of technicians, their relative invisibility in the literature, and their relationships and integration with academic colleagues are discussed. Studies concerning the pedagogical practices of technicians are rare, but there is an established body of scholarly literature and policy that describes and explores the contribution of non-academic educators in HE. This niche field is more frequently examined and documented in relation to professional support roles such as learning developers, academic skills support and careers (Bossu *et al*., 2018), librarians (Romany, 2023) or from roles that span, blend, blur, or bridge conventional HE job families such as ‘integrated professionals’ (McIntosh and Nutt, 2022) or posts that combine teaching with professional practice, such as ‘pracademics’ (Dickinson *et al.,* 2020).

In this chapter, I explore this contested field, drawing on a range of sources pertinent to the establishment and evolution of the pedagogical role of technicians, drawing upon Whitchurch’s (2008b) ‘Third Space’, where academic and professional specialists co-exist in a joint endeavour and Macfarlane’s (2011) counter position in which non-academic teachers such as technicians contribute to a hollowing out, or disaggregation of academia.

2.2 The academic turn

Before reflecting upon the ways in which creative arts technicians teach and support learning, it is essential to acknowledge the impact of the relatively recent paradigm shift through which art schools, colleges, polytechnics, and institutes transitioned to become arts universities. This is described by Orr and Shreeve (2018:15) as an 'academic turn', which they identify as the single most important change in arts education since 1980 as arts institutions changed as they were forced to conform to the production of university knowledge and research. This point is pertinent because the changes reframed institutions, their purposes, curricula, and pedagogies from the practically focussed skills teaching of the twentieth century into the contemporary arts universities of the present. The first example was when the Royal College of Art was granted a Royal Charter in 1967. However, the transformation accelerated when the University of the Arts London (UAL) became established as a university in 2003 through the merger of Camberwell College of Arts, Central Saint Martins, Chelsea College of Arts, the London College of Communication, the London College of Fashion, and the Wimbledon College of Arts. In 2005, The University College for the Creative Arts at Canterbury, Epsom, Farnham, Maidstone, and Rochester was formed as the Kent Institute of Art and Design merged with the Surrey Institute of Art & Design, gaining University status in 2007. In 2008, University College Falmouth merged with Dartington College of Arts to become Falmouth University. In 2009, The Arts Institute Bournemouth changed its name to the Arts University College at Bournemouth, then to Arts University Bournemouth in 2012. In 2013, Norwich School of Design gained full university status as Norwich University of the Arts. In 2017, Leeds College of Art became Leeds Arts University, and in 2022, Plymouth College of Art became Arts University Plymouth.

In his history of arts education Newall contends how, in his view the incorporation of art schools into universities has weakened and compromised art school education (2021:157), identifying modularisation, fewer contact hours, rising administrative duties, and the requirement for teaching staff to have research degrees "making the job unattractive or inaccessible to better-established practicing artists" (2021:158). Tight (2019:131) points out that for an institution to achieve university status was considered a significant achievement, but as McHugh (2014) reflects, the studio and workshop-based hands-on, experiential, and 'real world' learning synonymous with art colleges brought questions of need, parity, cost, and efficiency at the university level. The cultural critic Daisy Dunn summarises and critiques these points in her article 'The Strange Death of the Art School':

> Gaining university status was as one of the worst things that could have happened to art schools… out went practical, apprenticeship-style learning, and in came the need for endless self-justification. The faux-academese that began to creep in in the 1980s has intensified as universities clamour for government funding (Dunn, 2021).

Interpretations such as Dunn's attribute these changes in arts education to academisation, but they overlook that this transition coincided with a complex period of change for HE. During this time, there was exponential growth and diversification within the sector, particularly within the creative arts. This movement can be conceived as an industrialisation of sorts, and the operating models of many smaller institutions (as the legacy art schools had been) became unsustainable or scalable for both practical and operational reasons. Academisation also brought numerous advantages and opportunities for the legacy institutions, including increased and diversified funding routes, research opportunities, academic prestige and recognition, and economies of scale.

Regardless, within the literature, the academisation of art schools is almost exclusively regarded as detrimental and deemed part of a wider systematic programme of deskilling. Elkins describes how the priorities of the new curricula were "teaching people to appreciate art, as opposed to teaching people to make art" (2001:105). This binary does not hold in the context of this study and will be explored in detail later. Still, for the moment, Elkins' perspective provides a frame that loosely categorises arts teaching as theoretical (thinking and talking about artworks) and practical (making artworks). Both are essential; as the QAA specify in the Subject Benchmark Statement for Art and Design "The outcomes of art and design practice almost always combine the conceptual, the theoretical and the practical" (QAA, 2017). It is appropriate to note that 'practical' is distinct from 'technical', and while I will argue later that technical teaching can also be theoretical and conceptual, the locus of technical teaching is within practice. The QAA interpretation is consistent with this perspective:

> At the threshold standard, an honours degree in Art and Design confirms that the holder has acquired technical knowledge and practical skills. The graduate is able to use materials, media, techniques, methods, technologies and tools associated with the discipline(s) studied, and is familiar with good working practices… Considerable importance is attached to the acquisition of technical skills in the use of discipline-specific materials and processes (QAA, 2007).

2.3 Practice

Having proposed that technical teaching predominately relates to practice, a working definition of and distinctions of the terms ‘practice’ (noun) and ‘practise’ (verb) is required. The noun is used here, but the usage and spelling vary in context (e.g., American English). Three interpretations of meaning are employed in this study:

1. To repeat a task with the intention of improvement.

2. Studio activity, autotelic experimentation, enquiry, or making for the sake of realising or developing an idea. An artist’s work is their ‘practice’.

3. Beyond the academy, ‘practice’ is the term used to describe the commercial application of creative skills.

Practice in the sense of repeating an activity to improve technique or ability remains an essential element of arts education, and practical making (frequently supervised and supported by technicians) remains fundamental to most art students’ learning. The practice of this nature involves discovery, problem-solving, risk-taking, skills development, refinement of technique, and confidence building. “One could argue, it is exactly there, in practice, that the idea of learning in its most fundamental sense is born, in carrying out acts with the sole purpose of becoming able to do, or to know, or to understand something that was not previously the case” (Marton and Booth, 1997:55). However, this form of practice is mainly unseen to a lay person. It is the rehearsal before the show, akin to the musician learning an instrument, making mistakes, trying, listening, retrying, experimenting, or the athlete, training, reflecting, and training again. These cumulative hidden moments critical to success are sometimes described as an iceberg metaphor (Monk, 2015) based upon K. Anders Ericsson’s (1993) ‘*The Role of Deliberate Practice in the Acquisition of Expert Performance*.’ Syed (2011) drew similar conclusions:

> Purposeful practice is about striving for what is just out of reach and not quite making it; it is about grappling with tasks beyond current limitations and falling short, again and again. Excellence is about stepping outside the comfort zone, training with a spirit of endeavour, and accepting the inevitability of trials and tribulations. Progress is built, in effect, upon the foundations of necessary failure. This is the essential paradox of expert performance (Syed, 2011:79).

Similarly, in his book, '*Outliers*,' Malcolm Gladwell (2008) hypothesised that novices required 10,000 hours of practice to become world-class in any field, although as Higgs *et al.,* point out, 10,000 hours of practice will likely be unachievable within a three-year undergraduate degree, and "graduates should aspire to the level of 'competent practitioner' rather than master" (2012:166).

The second interpretation of practice concerns the creation of artworks. Indeed, "it could be argued, the whole raison d'être of a creative arts education is to create new knowledge in the form of innovative artefacts, performances or products and services" (Orr and Shreeve, 2018:66). The 'practice' of creating an artefact is usually critical for the process of assessment (education) or sale (market). However, some commentators, such as Richard Wollheim (former President of the British Society for Aesthetics), reject the object-orientated ontology of art, arguing instead that the highest form of art is cerebral. Wollheim dismantles the "physical-object hypothesis" (2015:11), which relates to the necessary physicality of artwork and, by association, the requirement for skills and technique, and by a further level of abstraction: teaching the technical skills of making. The British philosopher of aesthetics R.G. Collingwood (writing in 1938) takes this further, proclaiming, "a work of art may be completely created when it has been created as a thing whose only place is in the artist's mind" (2016:97):

> The making of it, is therefore not the activity in virtue of which a man is an artist, but only a subsidiary activity, incidental to that. And, consequently, this thing is a work of art, not in its own right, but only because of the relation in which it stands to the 'mental thing' of experience (Collingwood, 2016:29).

It is important to acknowledge that these points were made in relation to the fine arts rather than the full spectrum of creative work made across disciplines as we understand them today, but Mottram *et al*., (2008) describe how practice (concerning the exploration and manipulation of materials) has become less relevant in contemporary art as production has shifted towards specification and outsourcing of fabrication. In this outsourcing model, theory and practice are embodied in different bodies (those with ideas and those with the skills, techniques, ability, and resources to implement them). However, these outsourced bodies are also humans who have educational histories, and many developed their skills and abilities within creative arts HE. Becker (2008) terms these as "integrated professionals" and characterises them in ways synonymous with the stereotype of a technician:

> Integrated professionals have technical abilities, social skills, and conceptual apparatus to make art. Because they know, understand and habitually use the conventions on which their world runs, they… stay within bounds of what potential audiences and the state consider respectable… And make it possible for art works to occur efficiently and easily (Becker, 2008:229).

While some may argue the value of processes and outcomes might be depressed in the contemporary art world, within HE, the artefact (or less physically tangible outcome in some disciplines) can be considered the reification of learning made concrete. Put simplistically, a successful artefact within the academy encapsulates the maker's learning against pre-determined criteria. As Orr and Shreeve note, "In education, the object is to enable learning, whilst in the creative industries it is to produce a product, performance, artwork or service" (2018:153).

The third definition of practice used here lies beyond HE in the commercial sector; it is the world where many graduates are likely to seek to work as professionals, where their practice becomes their profession. Church *et al*., (2016) differentiate a 'practice' from a 'business' on the basis that the former delivers service based on the professional expertise of the founder.

Despite what some view as a deskilling of the academic curriculum, creative arts degrees have become increasingly occupational (Clews, 2010) and "the boundaries between education and training, and between competencies, skills, attributes and habits are unclear in a competitive profit-oriented education market" (Coaldrake, 2001:15). Accordingly, many institutions have reorientated their curricula towards economic requirements (Wilkinson, 2016). For some (Pegg *et al.*, 2012; Newall, 2021) training for commercial practice by embedding employability skills in academic study is fundamentally opposed to the liberal purpose of education. Souleses (2013) suggests these approaches can valorise the production of the artefact over critical thinking. However, these philosophies vary by discipline, with design subjects less problematic to associate with commerce than the fine arts, yet, as Elkins (2001:103) notes, "most teachers would not be happy to be told that the central function of an art department is to teach students how to become commercial successes." Indeed, within some disciplines, the idea of not being tied to the commercialised version of the discipline is very important to the academics (Orr and Shreeve, 2018:55). In contrast, for many technicians, an essential aspect of their pedagogies is to teach skills relevant to industry, and student employability is regarded as a critical success criterion (Savage, 2018a; 2019).

At a sector level, it is relatively uncontentious to assert that a university education is primarily a pathway to a career for most students (Scott, 2022). Indeed, the measure of course quality is increasingly linked to graduate outcomes (DfE, 2019). Singerman (1999:2) identified a shift in which fewer students were likely to identify as 'artists' rather than professionally specific titles such as painter, filmmaker, photographer, etc. Santoro and Snead (2013) suggest that students increasingly value vocational course content of a practical nature over theory or intellectual enquiry. Moreover, "the majority of students hope to make their careers in these art forms, so much of the focus is on how to be that practitioner, rather than creating new knowledge within a traditional scholarly mode" (Klebesadel and Kornetsky*,* 2009:101). Accepting that debates of graduate skills are also inclusive of 'academic skills' such as criticality, versatility, resilience, and reflection that build the innovation, these trends towards know-how and practice support what Higgs *et al.,* (2012:60) describe as a "competency turn" in HE, in which the focus is increasingly placed not primarily on what students know but on what they can do.

2.4 Creative arts HE as a pipeline to the creative industries

The establishment of the 'creative industries' as a distinct, coherent, and significant economic sector in its own right was an important historical moment that influenced the missions, ontologies, and epistemologies of creative arts HE institutions. In their analysis of creative graduates' career opportunities, Comunian *et al*., (2011) identified how the increasing emphasis on creativity – both as a sector of the economy and as an acquirable skill – permeated into HE.

The first use of the term 'cultural industries' is attributed to Horkheimer and Adorno (1947), but the 'creative industries' as we understand them in the present were first conceptualised and published in the Creative Industries Mapping Document (DCMS, 1998), led by Chris Smith (the first Secretary of State for Culture, Media and Sport). The aim was to identify and codify:

> Those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property… These have been taken to include the following key sectors: advertising, architecture, the art and antiques market, crafts, design, designer fashion, film, interactive leisure software, music, the performing arts,

publishing, software and television and radio (DCMS, 1998:3).

In Jonathan Goss's account of the birth of the creative industries and history of the DCMS mapping document (Goss, 2020:1), Baroness Bull pinpointed the publication of the 1998 document as the critical moment that "changed forever the discourse around the creative and cultural sectors and the ways in which they generate and deliver value".

During the twentieth century, there has been increasing pressure on universities to incorporate a variety of professional programmes into higher education (Dhalgren *et al.,* 2007:462) in support of economic advancement rather than individual fulfilment servicing the knowledge and workforce needs of a neoliberal free-market economy (Scott, 2022:25). Within creative arts HE courses were developed specifically to prepare graduates to enter the professions, e.g., "Programmes in Architecture, Acting and Textiles are often linked to, and accredited, by their relevant professional bodies" (HEA, 2007:8). Houghton (2008) describes this as the 'professional curriculum'.

Data from the DCMS, before the pandemic, showed that the creative industries were growing at four times the rate of the UK economy as a whole, employing over two million people in the UK and were projected to create an additional one million jobs by 2030 (DCMS, 2017). As jobs are created, capable people are required to fulfil them. In a report examining the qualification profile of applicants to the creative arts courses Paul Gough (Chair of UKADIA and Vice-Chancellor of Arts University Bournemouth) argued that "Universities play an important role in the creative skills eco-system, offering high quality and industry specific training which other technical Post-16 education routes cannot replicate" (UKADIA, 2021:2). Post-pandemic, the *#ArtIsEssential* Creative Education Coalition published their Creative Education Manifesto in 2023 that identified with around 2.4 million filled posts, 7.1% of all UK jobs in 2022 were in Creative Industries with nearly three-quarters (73%) of those employed in creative occupations qualified to degree level or above, compared to 44% across all UK jobs (University Alliance, 2023). It is therefore, "vital that we ensure a pipeline of talent continues to flow into the creative sector" (UKADIA, 2021:3). In this study, the relevance of these points depends upon whether the required attributes and skills are taught and learned within creative arts HE, and if so, what, if any, relevance technician pedagogies have to student outcomes.

Creative arts universities celebrate and publicise their most successful alumni, who are often portrayed as innovators, elite thinkers, and disruptors. However, in most cases, graduates will seek their first job, typically at an entry-level level, and the UK Government believes their university experience should prepare them accordingly (BIS, 2016b). Steve Jobs, for example, learned of typography at art college and later applied this knowledge in the design of the iMac interface as the visionary founder and leader of Apple. It is also noteworthy that Jobs' first job was as a technician working for Atari (Business Insider, 2009). Goodheart (2020:21) argues that the knowledge economy does not need an ever-growing supply of knowledge workers. While a top layer of the most capable is still required to push the frontiers of the discipline, it is the roles beneath the leading innovators that provide employment prospects for the majority of graduates. King's College researcher Paul Lewis describes this as the 'missing middle' in the economy and HE. It represents the growth area for employment but is largely ignored by education systems. Lewis (2020) argues HE produces graduates with the wrong mix of skills. In a later study, suggesting that despite the record numbers of the population with an undergraduate degree, businesses are reporting a shortage of people with technical skills (Lewis, 2023:12). This perspective is echoed by Giles *et al.,* (2020) in relation to the creative arts and creative industries. The point is discussed here to illustrate the rising importance and status of technical skills and technologies in the world beyond HE, that a creative arts education should prepare graduates to enter.

As Walter Benjamin (2008) observed in the 1930s, technology is a driver and enabler of creativity. This assertion holds true today, as the world finds itself amidst the fourth industrial revolution (4IR) that will fundamentally alter how we live, learn, work, and interact (Gleason, 2018). Technological skills are forecast to be in strong demand (MGI, 2018). These global trends and associated skills gaps might appear abstract to how technicians conceive of their pedagogies in creative arts universities, yet they are relevant. Dahlgren *et al.,* (2007:479) identify that the interplay between national policy agendas and disciplinary and professional traditions and practices profoundly impacts students' experiences, education, and journeys from higher education to work life.

2.5 Epistemological hierarchies

Practice (as a form of knowledge) exists in the visible world as opposed to the intelligible world of theory. Plato first articulated this distinction in Book IV of the Republic, through his analogy of the divided line. The divided line is understood as a metaphor for the ontological and epistemological view of the universe, distinguishing between the visible and intellectual realms. Plato accorded the intellectual realm higher status than the physical. These hierarchies are reproduced within creative arts HE through curricula that can espouse ideation over execution—the pedagogies of the former more associated with academic teaching and the latter more frequently with technical.

Gibbons *et al.,* (1994) outlined two distinct forms of Knowledge: Mode 1 and Mode 2. Mode 1 represents knowledge production for universal understanding without concern for how that knowledge may be applied (for example, pure research) or by whom. Mode 2 represents forms of knowledge production generated for application to real-world issues or professional practices. Within HE, Mode 1 knowledge can be thought of as aligning with research (new knowledge created and taught by academics within their fields of expertise). Mode 2 more commonly reflects the application of knowledge. However, Orr and Shreeve (2018:58) point out that these modal dualities are blurred and unhelpful in the arts: “Knowing how and knowing that, is not as neat and tidy as one may imagine when applied to the arts”. Frayling also critiques the distinction between knowledge and know-how, describing how they can be thought of as being part of the same continual process, which encompasses a whole spectrum of “knowing what, knowing who, knowing when, knowing where, knowing why, and knowing how” (Frayling, 2017:71).

Gibbon’s modes are, therefore, blunt instruments that, for many, do not reflect the epistemologies of creative arts practice. However, it is reasonable to assert that with their emphasis on practical application, technical pedagogies are more frequently associated with developing Mode 2 knowledge in learners, characterised by ‘know-how,’ ‘functioning,’ ‘procedural’, and experiential knowledge applicable in the material world. Knowledge of this nature represents a practice that is perceivable through its application and outcome. However, the ‘know-how’ manifest within the outcome or artefact may not be accessible to general audiences (but more readily understood by those with experience of making). As Orr and Shreeve (2018:60) note, “It [know-how] produces procedural knowledge, knowing how something was done, but also insights into the thought processes of the producer.” And, as Elkins (2001:106) posits “teaching people how to make art inevitably involves teaching them to appreciate art.” These are distinct but related; if the criticism and appreciation of an artwork are held higher in status than the production of one (as has been theorised), then as Witkin points out, “the critic is engaged in a rather different exercise, one which is largely discursive, and which talks about the feeling without invoking it” (Witkin, 1981:48).

Candlin (2001) argues that the inauguration of creative arts practice-based Ph.D.s provides evidence that practical knowledge is a legitimate vehicle for scholarship. The seat of this knowledge is less clear, as Niedderer & Reilly (2007) question: where is knowledge situated or contained? Is it the artwork, the explanation (artist statement), or the audience responses? While Mode 1 knowledge is usually communicable in text or lectures, Mode 2 know-how is more likely to be tacit and embodied (experienced as authentic, personalised, and trusted by the holder) until externalised through making. Polanyi's conceptualisation of tacit knowledge in the 1960s is critical to these debates and the practices and pedagogies of the creative arts. For Polanyi, "we know more than we can tell" (2009:4). Bourdieu defines tacit knowledge as knowledge that "exists in a practical state in an agent's practice and not in their consciousness or rather in their discourse" (1977:27). Polanyi explains "The skill of a driver cannot be replaced by a thorough schooling in the theory of the motorcar" (2009:20). While for the writer and art critic Peter Dormer:

> Tacit Knowledge is acquired through experience and it is the knowledge that enables you to do things as distinct from talking or writing about them… it is practical know-how, and it exists in people… absorbed by individuals through practice and from other people; it cannot usually be learned from books (2019b:147).

For Dormer (1994; 2019) and many other creative arts practitioners and commentators (Witkin, 1981; Pye, 2015; Frayling, 2017), know-how is not an exclusively mental phenomenon and usually relies upon developed physical traits such as perceptual and sensory training, strength, and manual dexterity, particularly in arts and craft disciplines. Sennett aligns with Kant's supposition that "the hand is the window to the mind" (2009:147).

2.6 Technical creativity

Categorising knowledge/know-how, mind/body, and theory/practice is complex, ambiguous, and interrelated within the creative arts. These challenges are compounded when viewed through the lens of creativity. Technicians are sometimes positioned as the antithesis of creativity (Eisner, 1983:5). Collingwood asserts, "'Creating' relates to an activity which is not technical in character" (2016:111), and describes how "a technician is made, whereas an artist is born" (2016:21). He theorised 'The Technical Theory of Art,' which entailed the power to produce a pre-conceived result by means of consciously controlled action that allowed no space for innovation in the maker. For some, within the academy, a perceived lack of creativity (in content and pedagogy) is the critical distinction between academic and technical teaching. The following section explores various perspectives on creativity and reflects on the influence of technicians and their pedagogies concerning learners' creative practice.

There is no consensus on whether creativity is ‘knowledge,’ ‘know-how’, or a skill that can be learned (or taught). The term ‘inspiration’ is sometimes associated with God breathing air into Adam, or Archimedes’ ‘Eureka’ moment signified by the iconic ‘lightning bolt’. These notions of divine intervention and ‘specialness’ are termed the “genius view of creativity” by Weisburg (1993). Weisberg critiques and dismantles this perception of creativity, in which creative thinking results from extraordinary thinking processes employed by elite individuals that are qualitatively different from the ‘ordinary’ thinking we all use for our daily activities. De Bono agrees, writing in his iconic ‘*Lateral Thinking: A Textbook of Creativity’* “in order to be able to use creativity, one must rid it of this aura of mystique and regard it as a way of using the mind – a way of handling information” (2009:10). Weisburg’s central argument is that creativity results from ordinary thinking that goes beyond the past but does so in straightforward ways through reasoning and accumulating new pieces of information.

Creativity has become an essential currency in today’s global society and is critical to the conceptual age (Pink 2006– cited in Ruopp and Unrath, 2019). The economy is powered by creativity (Florida, 2014). Linked-In reported that of its 135 million professional profiles globally, ‘creative’ is the word most frequently used by its members to describe themselves (Ceyhan, 2011). It is, therefore, unsurprising that universities have sought to position creativity as an economic imperative and essential skill for 21st-century learners (Lin *et al.*, 2015:1). As noted previously, some educators reject that arts universities should teach creativity for commercial activity. In Newall’s 2022 lecture ‘For and against creativity in art schools’, he describes this as “instrumentalised creativity.” Newall is a world-leading thinker on arts education and Director of Learning and Teaching for the School of Arts at the University of Kent. He asserts:

> Judging the value of creativity by its potential for commercial use conflicts profoundly with the values and culture of advanced art, and art schools-nevertheless, pressures often exist pushing and luring artists and art schools in that direction… it’s vital that creativity in the art school is not reduced to this… (Newall, 2022).

Newall’s perspective is inconsistent with the rhetoric of his employers, who market their arts degrees based on industry placements, preparation for commercial practice, and “equipping you with skills sought after by employers” (UoK, 2022). Many who work in creative arts HE will recognise this ideological tension between educator and institution.

Creativity (like art) is notoriously slippery to define. Ability, however, is measurable, and as Hickman notes “we are able to identify two observable phenomena, namely creative behaviour and the objects which arise as a result of creative action" (2019:117). Boden's highly cited definition of creativity is "the ability to come up with ideas or artefacts that are *new, surprising and valuable*" (author's emphasis) (2004:1). However, while there is plenty of discussion about the 'mystery of creativity' there is little understanding of how teaching occurs in creative contexts (Budge, 2016:432). This is perhaps, as Orr and Shreeve (2018:196) suggest, because "Creativity as a concept does not lend itself to the idea of tightly defined learning outcomes (signposts rather than directions)." Weisburg argues that attempting to teach 'creativity' is an error focussed upon the 'genius' view, concluding instead that to facilitate creativity "we should emphasise the development of deep expertise in a particular domain" (1993:262), which is consistent with Csikszentmihalyi's assertion that to be creative, one must first understand the domain (2013:340). To understand a domain, its rules, technologies, conventions, and 'threshold concepts' (Mayer and Land, 2006) must be apprehended. Though conventions are often conceptually contrasted with creativity (Kronfeldner, 2016). As Witkin explains:

> The vast body of rules, techniques, conventions, and practices that constitute the heritage of expressive form are an immense threat to the expressive act itself. They give rise to the possibility of organising expressive forms on the outside of the self, or producing forms by application of rules (1989:45).

However, while being 'conventional' has limited appeal in the arts, conventions (rather than conformity) are a legitimate form of knowledge, enabling the dissemination and appreciation of creative artefacts and providing a framework for inducting and developing inexperienced learners. For Becker (2008:30) conventions can create the possibilities for art making, while Hirst, writing in *'The Art of Critical Making'* argues that "creativity arises out of the tension between the rules and imagination" (2013:37). Moreover, as Dormer points out:

> [it has]… never been justified empirically, even though it is widely held ideologically – the assumption being that rules, formulas and instruction are necessarily restrictive upon creativity. Yet in reality the use of rules and formulas is pragmatic: they are an efficient means of helping novices become experts (2019:221).

A knower of conventions can choose to break with them for creative effect, though "breaking with conventions, increases artists' time and trouble, decreases the circulation of their work but allows them to choose unconventional alternatives" (Becker, 2008:34). Hirst (2013:39) points out that without a standard from which to deviate, neither originality, exoticism, or otherness can exist. Becker continues his point to argue that technical equipment embodies conventions, “you learn the conventions as you learn the machinery” (2008:57).

The British philosopher Berys Gaut considers creativity to be an agentic disposition, noting “it is often possible for someone to act for reasons only because she has the skills to guide her actions by the relevant reasons” (Gaut and Kieran, 2018:131). This accords with Mottram *et al*., (2008) who identified that previously acquired knowledge and expertise within the domain promotes innovation. Contemporary theorists such as Wheeler (2018) take this further, arguing, as Benjamin (2008) did in the 1930s, that advanced skillsets afford ‘extended cognition’ that can act as a prosthesis, merging and extending human creativity beyond the mind and body of the agent into and through toolsets and technologies.

If the perspectives of Weisburg, Csikszentmihalyi, Gaut, and Mottram *et al*., are accepted, then creativity builds upon prior learning, like a skill; therefore, it follows that deliberate and purposeful practice (Ericsson, 1993) can lead to improvement. Mottram *et al*., (2008:108) describe an “investment model of creativity” in which learners develop their knowledge, skills, and creativity through deliberate practice and familiarity with past achievement rather than divine inspiration. Thought of in these terms, creativity arises from deep and sustained interrogation of a (disciplinary) practice generated from a synthesis of different forms of expert knowledge – technical, theoretical, contextual, and applied in response to problems and challenges.

2.7 Mind and matter

To this point, idea and execution have been discussed as distinct but related entities and art practice has been conceived of as the realisation or expression of an idea. However, art can be experimental, expressive, or a continuum of both. As Professor Tim Ingold (2012) points out in his iconic lecture ‘Thinking through Making’, in the West, it has been traditional to think of making as a bringing together of a preconceived, ideal form in the mind of the maker, with an initially formless mass of raw material (consistent with Collingwood’s (2016) Technical Theory of Art). In this view, the thinking has been done before the making begins. Ingold proposed an alternative perspective: “Rather than imposing form on matter, the maker — operating within a field of forces that cut across any divisions between body and environment — is caught between the anticipatory reach of the imagination and the frictional drag of materials” (2012) Ingold’s ideas are consistent with Bolt (2010:3), who suggests that “it is in the joining of hand, eye, and mind that material thinking occurs.” And Witkin (1981), who asserts that ideas (and creativity) are also formed and evolve through practice:

> We often talk as though idea became *expressed* in material form. This is entirely misleading. Idea is made in the interaction between the individual's feeling, experienced as impulse for release, and the medium that he works into the form that releases it (Witkin, 1981:108).

O'Conner describes this same phenomenon in relation to her ethnography of embodied knowledge:

> The glassblower listens and responds to the glass corporeally, with a body equipped for listening to glass; equipped with techniques and skills that act like a type of grammar, allowing her to express that which she becomes increasingly skilled to perceive – technique activating, much like words and gestures… It is often said that glassblowing is not about blowing the perfect piece of glass, but about coming up with effective solutions to the problems that consistently present themselves in practice (2007:117).

Baker and Sicchio (2016) describe these reciprocal epistemologies in relation to digital technologies (as Benjamin (2008) did for mechanical technologies):

> Sometimes the idea for an artwork comes first and requires a technology to make the work happen, while other times the technology is present and one finds a way to work with it to create an artwork, and the technology pushes the concepts within the artwork (2016:4).

The practical and experiential pedagogies of creative arts technicians as they teach and support learning introduces, at a basic level, the materials, equipment, and tools, combined with skills and techniques, to express, develop, and give form to ideas. In the early stages of learning, there is a dissonance between the cerebral intent (the learner's private intelligible world) and the physical manifestation (the physical world in which the artefact is brought to existence). However, as ability increases, learners become more attuned to alternating between modes of consciousness; dissonance between the two worlds decreases, and the learner develops a trust in the foundation of their abilities (Witkin, 1981), and just as the intelligible world can direct the physical, the reverse is also true. As skills and techniques improve, hands and tools become extensions to minds, and messages between cerebral and physical realms flow bi-directionally with increasing coherence. This phenomenon bridges the realms in which reflexive, liminal, and synergistic creative practices can occur. This principle of traversing realms is used by Barley (1996) in his classic study of technicians in the workplace:

> Technicians worked at an empirical interface: a point at which a production system met the vagaries of the material world. Using sophisticated instruments, techniques, and bodies of knowledge, technicians stood with one foot in the material world and the other in a world of representations (1996:418).

For Collingwood the production of an artefact is an ‘expression,’ whereas its inception is an ‘impression’, and all ideas are derived from impressions (Collingwood, 2016). This position assumes that the idea for the artwork precedes the physical creation of the artwork, but this is not always the case. Material properties and engagement guide design, as Newall points out “Art-making can be an exploratory process, in which the artist develops the idea of their artwork only through the process of making it” (2021:138). For others, such as Dewey (2001:167) “Thoughts are incomplete. At best they are tentative; they are suggestions, indications. They are standpoints and methods for dealing with situations of experience. Till they are applied in these situations they lack full point and reality.” Collingwood accepts physicality is more visceral “senses are more strong, lively and distinct than those of imagination… A real sound is louder than an imaginary one” (Collingwood, 2016:130). Sennett puts it succinctly, “an idea for a painting is not a painting” (2009:68), yet an idea for a painting, does at least posit a ‘potential’ painting. Aristotle coined the term ‘entelechy’, which he defined as that which realises or makes actual what is otherwise merely potential. While the path from impression to expression will not be resolved here, the transition between intelligible and material worlds must occur at some position between the intention and the outcome. In the creative arts, this can be interpreted in the context of Barley’s (1996) empirical interface. The following section considers this interface from the perspective of visual arts technicians whose pedagogies support learners to articulate, develop, and realise their ideas in a physical form though their practice. It should be noted that the discussion centres around the fine arts, but the principles of idea generation, exploration, and their outworking remain applicable to all sub-disciplines of the creative arts.

For Witkin, an impression is the seed of an idea’s inception, and impressions originate from sensations. He points out that a sensation is fleeting, whereas an expressive act occurs in time. “If the individual does not encapsulate the sensate impulse, then it will quickly dissolve in other sensate disturbances" (Witkin, 1981:180). Witkin proposes that an individual must establish a low-resolution mental 'holding form' for the idea, that must be held for duration of the process of resolving it. He described the holding form (the envisaged outcome) as 'the oak in the acorn' of the expression and concluded that if his theory is correct (the sensate impulse giving rise to the displacement of an expressive medium which recalls the sensing), then "this is the epistemological foundation of all creative arts" (Witkin, 1981:22). This resonates with Herbert Read's concept of eidetic images. In '*Education through Art*,' Read suggests that "optical-perceptual (or eidetic) images are phenomena that take up an-intermediate position between sensation and images" (1943:42). Collingwood argued against envisaging pre-determined outcomes (citing his Technical Theory of Art), instead suggesting that the artist (differentiated from the craftsman) "has no idea what the experience is which demands expression until he has expressed it (poem taking shape, or clay in his fingers)" (2016**:**23). David Pye, former professor of furniture design at the Royal College of Art and craftsman describes envisaging as "what the designer has seen in his minds' eye: the ideally perfect and therefore unattainable embodiment of his intention… just as in music the score is a necessarily imperfect indication of what the composer imaginatively heard" (Pye, 2015:49-50). Wollheim (2015) argues mental images cannot be sufficiently developed to locate the idea of an artwork in physical space because to do so would require the envisaging mind to have foreseen and solved the problems that arise, either necessarily or accidentally, in the working of the medium.

The outworking of an idea typically requires physical and tactile interaction with materials. Media such as paper, clay, paint, metal, glass, and wood readily come to mind, though the term is used inclusively here, extending to light, sound, cellulose, pixels, print media, code, and data. Dobson observes:

> We are rarely invited to think about materials as the agents of action, as forceful substances with tendencies, perhaps even desires. Once we recognize these properties and learn to work with them, we become sensitive to their potency and possibility… people are material, too, after all; our materiality renders us in the mix" (Dobson, 2013:139)

To entertain that such media be passive and inert is misrepresentative; "material has potential and activity independent of what we may see in it, make of it, or do with it (Dobson, 2013:140). As the artist drives the material, the material may also be driving the artist. Data (as digital matter of sorts) is a less conventional interpretation of artists' material. However, as Dulic and Newby (2016:209) point out "In an artwork expressed by means of code, the code itself is an artistic material that actively articulates both aesthetic concepts and creative processes." Orr and Shreeve (2018:148) describe digital and screen as medium in itself. While for Frayling:

> Information on the screen embodies research, experience, and the understanding of materials. You still need intimate knowledge of the materials, of course, but the tacit knowledge of the maker is beginning to *preced*e the concept in some areas (Frayling, 2017:140).

In '*Teaching and Learning with Matter'* Page describes how matter teaches us what it can and cannot do; she conceives of this as "a material pedagogy" (2018:1). In a similar vein, Sennett describes "material consciousness" (2009:121), in which "learning from things requires us to care about their qualities" (2009:16). Engagement with materials and processes varies by discipline, context, and learner. However, creative arts students develop ideas through practice, and new meanings can occur through interacting with visual and sensual materials (Burton 2000, 2005 – cited in Salazar, 2013). Moreover, there is consensus among creative arts practitioners and theorists that the relationship between thinking and making, envisioning, and realising, is bi-directional (Bolt, 2010, Ingold, 2012; Pye, 2015; Frayling, 2017; Page, 2018; Dormer, 2019). Put simply "Making is thinking" (Sennett, 2009:9). John Dunnigan, Professor of Furniture at Rhode Island School of Design conceptualises this symbiotic relationship in a broader context of 'Thingking' where students explore ideas and technique simultaneously to integrate thinking and making, theory and practice:

> Thingking expresses the symbiotic relationship between making and thinking in art and design, between object and idea. It connects critical making and critical thinking and relies on embodied knowledge, practice, and research. It integrates multiple ways of knowing and promotes holistic reflection and learning (Dunnigan, 2013:95).

Witkin (1981) and O'Connor (2007) describe this dialectical movement between immaterial and material realms as an 'oscillation' during which the envisaged outcome can deviate from preconceived intention. Udal, too, regards creativity as an oscillation "Creativity is the dance between what we know and what we don't know, and it is through this dance that we make meaning of the world around us, making the unknown knowable, the unconscious conscious, and the invisible visible" (Udal, 2014:6).

Becker (2008) explains how external influences (such as the support and advice of technicians) affect internal choices that guide and shape how the final work emerges from a body of possibilities. The learners' intentions and potentialities often exist as dynamic, divergent, incomplete, and quixotic thoughts in their private intelligible realm, to be developed and realised through engagement with materials in the physical world, it's constraints and conventions, through the act of making. Becker theorises these informed and enforced choices as 'editing' and the points at which they occur as "editorial moments" (2008:198).

To conclude this section, I return to Barley's (1996) conceptualisation of technicians operating at an "empirical interface" between the immaterial and material worlds. I will theorise later that visual arts technicians teach and support learners during their acts of making (and therefore acts of thinking (Sennett, 2009)) and oscillations between impressions and expressions, aiding in making the invisible visible (Udall, 2014). However, in advance of doing so, it is important to note:

> Pedagogies that bridge theory and practice are never simple. They entail highly complex performances of observation and analysis, reading and interpretation, question and answer, conjecture and refutation, proposal and response, problem and hypothesis, query and evidence, individual invention and collective deliberation (Shulman, 2005:56).

2.8 Skill and technique

If we accept that the creative act or artefact is realised through an oscillation of inner and outer worlds, a learner's ability to manifest their intent empirically depends upon access to appropriate resources (equipment, instruments, and materials), the level of their abilities (skill and technique), and aptitudes (mindsets and confidence). Skills and technique can be thought of as the core focus of technical pedagogies. These terms are related concepts but have different meanings; in this context, skill can be considered the broader ability to execute a task well, while technique refers to more specific methods, approaches, or procedures used to do so. However, this interpretation relates to a relatively narrow interpretation of 'skill'. As Frayling points out, a difficulty emerges without consensus on the nature of skill. He questions whether skill in the creative arts refers to "manual dexterity, craft experience, conceptual activity, general know-how, or a shifting combination of these four?"

(2017:75). For Weisburg, artistic creativity is “a skill that must be learned” (1993:236). This is a perspective shared with Sennett, for whom skill “…is a trained practice. In this, skill contrasts with *coup de foudre*, the sudden inspiration” (2009:42). Semantics aside, skills teaching (as referred to within the creative arts) is frequently contextualised as ‘professional practice’ when delivered by academic staff. For example, Clews (2010) describes how teacher practitioners teach much-needed skills for use in industry, making the courses relevant, but when technicians teach these same skills, they are more likely to be referred to as training.

Within the academy, technical teaching is held in relatively low esteem (compared with academic teaching). Perhaps because, as Lupton (2005) suggests, “The idea of skill has come to seem woefully outdated in an art world that emphasizes conceptual innovation, and making the right statement at the right time, with the right media.” Or more generally, as part of what Newall and others describe as the deskilling of art schools over the preceding fifty years (Newall, 2021:36). Newall also points out that skills teaching does not in itself give students the capacity to be creative “These techniques give formulas that one can follow, and, because of this, they require no significant flair on the part of the user” (2021:146). However, exponents of applied or technological arts would disagree, and so, according to Lupton (2005), would students. “Technical skills are what many of our students want. Teachers would often rather spend a five-hour critique talking about ‘ideas,’ while their students are hungry for technical knowledge.” Salazaar (2014:36) also reported that students valued skills teaching “to find their “own voice,” “gain confidence,” or “feel “empowered.” Conversely, students said that those “professors who failed to make connections between technical skills and bigger ideas were, overall, poor instructors” (Salazaar, 2014:36). Sovic (2008) identified that the devaluation of skill is particularly problematic for international students (studying in the UK) whose cultures value practical skills and applied knowledge over philosophy and theory.

Sennett dismisses that technical training is convergent, arguing instead for the opposite “the better your technique the more impossible your standards” (2009:50), suggesting the most skilled are the those who think about the ideal and endless possibilities. Collingwood too, accepts “all other things being equal, the better the technique, the better the work of art” (2016:21), and Herbert Read specifically identifies “In so far as technical skill is the ability adequately to express a mental perception, or a feeling, it will contribute to the aesthetic value of the act of expression. It is for this reason that the acquisition of skill… is to be encouraged” (1943:208). Like Read, Witkin (1981) locates skill and technique, of the kind taught and supported by technicians, in the space between inner (holding form) and outer worlds (realisation of artefact) and correlates this to the value of skills and motivation of the learner:

> The pupil’s respect for his expressive art vanishes when he loses control of the medium. The greatest threat to his control of the medium occurs when the oscillation in consciousness between impulse and medium results in the two sensings (outcoming and incoming) being too far apart to set up any kind of effective reverberation, and consequently there is no effective guidance for further expressive behaviour (1981:183).

2.9 Invisibility of technicians

There is a paucity of research concerning the contribution of professional staff, such as technicians, to learning and teaching (Bossu and Brown, 2018; Tight, 2019). The National Technician Development Centre highlights “concerns have been raised for many years about the lack of knowledge and understanding around the role of the professional technician in the UK, particularly in the Higher Education sector” (NTDC, 2018:7). Searching the Educational Research Complete (ERIC) (15/11/2020) database using the keywords ‘Academic,’ ‘Creative Arts,’ and ‘Teaching’ yields 154 journal articles across a broad range of subject areas. Substituting ‘Academic’ with ‘Technician’ returns just four peer-reviewed articles (two are mine, another is an Elliott Eisner (1983) paper in which he disparages technicians in passing while discussing another topic, and the final paper appears to be incorrectly keyworded). This is likely due to the simple reality that most researchers are academics, the majority of whom write about their own experiences and interests – which rarely include technicians.

The invisibility of technicians (as both research subjects and contributors to research outputs) within the literature is replicated in workforce information. The Higher Education Staff Statistics: UK, 2018/19 (HESA, 2021) statistical bulletin identifies that 439,955 (excluding atypical staff – a term used by HESA to describe those whose working arrangements are not permanent, involve complex employment relationships and/or work away from the supervision of the normal work provider) were employed in the HE Sector in 2018/19. Staff contracts comprised 49% academic and 51% non-academic. Technicians are not recorded as a discrete grouping but as a subset of the non-academic staff categorised as ‘associate professional and technical.’ This grouping increased from 45,830 to 50,310 (+9.8%) between 2014/15 and 2018/19. From 2019/20, it has no longer been mandatory for

HEIs to report details of non-academic staff to HESA; therefore, information regarding technicians has become further obscured (Noyes, 2024), and pre-existing datasets covering the national technical workforce are extremely limited (TALENT, 2022:46).

For many HE commentators, the academic/non-academic dualism perpetuated by HESA is outdated. Indeed, HESA consulted on a major review in 2023 to take stock of the changes that have taken place since their last major review of staff groupings a decade earlier to assess their impact and determine the extent to which the Staff record meets users' needs. Consultation remains ongoing, but the final recommendations for change for the 2025/26 Staff record will be published in autumn 2024. In the published feedback to date, 71% of respondents supported the mandatory inclusion of technicians within the record, and 65% of respondents suggested technicians should be identifiable as a distinct grouping (HESA, 2023). Notably, respondents raised similar points concerning the importance of other non-academic staff groupings who support the student experience (for example, careers, library, registry, widening participation, and study support). Feedback from these areas objected to the term 'non-academic', arguing that its negative phrasing diminishes the important work done by such staff (HESA, 2023).

Henkel (2005) acknowledges that academics no longer work in a bounded space, also suggesting the distinction between academic and non-academic work has become less useful. Yet, the tensions remain, characterised by Dobson (2000) as a 'them and us' attitude. Dobson and Conway (2003) describe "fear and loathing" between professional and academic staff. Orr and Shreeve acknowledge this same point of friction within the creative arts. "The relationship between technicians and academics, as anyone who has worked in higher education art and design will know, can be fraught with difficulties and challenges about boundaries between teaching and technical roles and responsibilities" (2018:133). In his writing about the negative influence and effect of dualisms in HE, Macfarlane suggests that the academic/non-academic dualism "is probably one of the most disrespectful of othering dualisms" (2015:107) serving to "isolate one group of individuals from another" (2015:102).

Smith *et al.*, reported that "despite their invisibility in the literature, technicians' work expanded considerably during the second half of the twentieth century" (2004:79). Indeed, invisibility has become the adjective of choice for HE commentators (Shapin, 1989; Dobson and Conway, 2003; Vere, 2013; TALENT, 2022) "Technicians rarely make higher education news, are notably absent in sector-wide award ceremonies, are not featured in the National Student Survey – the list goes on" (Vere, 2013:2). They are described as a "neglected, but important, group of workers” (Lewis and Gospel, 2011), “servants and experts” (Zabusky, 1997), “poorly understood” (Croft, 2016), “unsung heroes” (THE, 2012), “Cinderella’ staff” (Vere and Murphy, 2012), “highly significant, but often invisible” (McLaren and Dent, 2021), “valued and invisible” (Conway, 2000), “unknown professionals” (NTDC, 2018), “hidden yet vital” (Tolhurst, 2023), “neglected” (Barley and Orr, 1997) and “second class citizens” (Feldman, 2008). Paradoxically, “The more successful they are, the less visible they-and their work-becomes” (Liffe, 2008:5)

These perspectives were empirically corroborated by TALENT (2022:104) drawing upon the largest survey of technicians in HE to date which found that “many felt undervalued, and described negative, ingrained attitudes towards technical staff and that a hierarchy (with academic staff) exists.”

The lack of visibility, knowledge, and literature about technicians is a significant epistemological omission. As Shapin notes in the sciences, “In the case of laboratory work, the price of technicians’ continued invisibility is an impoverished understanding of the nature of scientific practice” (1989:563). The same is true of the arts studios and workshops. As Barley noted “To understand technicians’ roles fully, one must also consider the social meaning of their work, which rested on how they were situated in a local division of labour” (1996:420). This is particularly pertinent in creative arts higher education in which:

> The most important group of staff, about whom very little is known, are the technicians who frequently constitute the stable and accessible aspects of learning, more likely to be present and available than tutors… likely to be based in a workshop or technical resources environment, with a home base which provides assistance with making skills, whether using digital tools, textiles, metal or other materials. The technical teams support student access to processes and making, enabling learning in a less formal way than with tutors. They are more likely to be available on an ad hoc basis throughout the week; they do not form part of the assessment process and therefore have different power relations with students… (Orr and Shreeve, 2018:133).

While this study concerns technicians, it must also be acknowledged that academic roles have also transitioned from what some perceive as the golden age of the past (Tight, 2010; MacFarlane, 2011; Ball, 2013). Traditional teaching and research roles have divided, lectures have been devalued (Loughlin and Lindberg-Sand, 2022), administrative duties have burgeoned and role variants such as ‘teaching only’ and ‘teaching and scholarship’ have evolved, with teaching held in lower regard to research, particularly in pre-92 universities.

As academic roles have diversified and fractured, the formerly clear boundaries with professional support workers have become blurred (Henkel, 2005). Drawing on her own experience of transitioning from management to academia Whitchurch conceptualised an emergent “Third Space” (2008b) in which academic and professional support staff (termed ‘service’ by Whitchurch) co-exist and overlap. Whitchurch developed her ideas based upon her observation that new forms of professional staff have been able to forge new identities:

> Third Space, therefore, offers a way of problematising binary approaches to HE communities, and a lens through which to view the roles, identities and working practices of staff who find themselves dealing with the tensions, discontinuities and practical accommodations that arise in contemporary institutions (2013:44).

Whitchurch identified four ‘dispositions’ within her Third Space: Bounded professionals, Cross-boundary professionals, Unbounded professionals, and Blended professionals (2013:9). In the context of creative arts technicians and their pedagogies, Whitchurch's ‘Blended professionals’ present as the closest fit. Whitchurch evolved her concept of Blended professionals (2009), describing these roles as dedicated appointments spanning professional and support domains with academic credentials, but not appointed to academic contracts. She asserts that through their practices and constructed legitimacies these roles contribute to establishing the emergent ‘Third Space’ they occupy. Whitchurch describes how these roles are illustrative of why the binary distinction between ‘academic’ and ‘non-academic’ roles and activities are no longer clear-cut (Whitchurch 2009; 2013). In her exploration of contemporary nomenclature Caldwell (2024:2) develops Whitchurch’s theories, and points out that the term ‘non-academic’ has historically been used in HE to define staff who do not teach. Whitchurch’s Third Space can be illustrated via a Venn diagram (Figure 2).

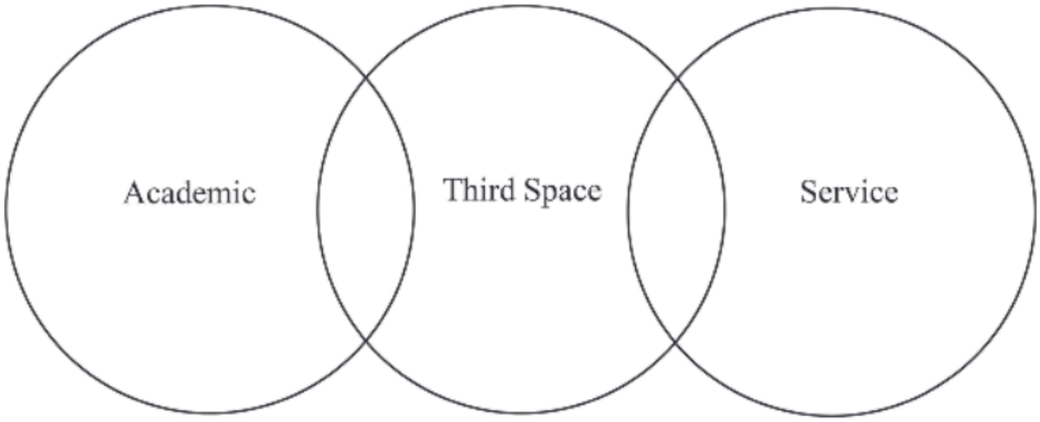

Figure 2: A visualisation of Whitchurch's (2008b) 'Third Space'.

While Whitchurch does not explicitly reference the pedagogic contribution of technicians, others have projected her theories upon them. For example, Orr and Shreeve suggest creative arts technicians "partly inhabit the third space… there is no doubt about the technician's role in supporting and helping students" (2018:133). They describe how technicians can have similar conceptions of their role in learning to many tutors as part of a mutual learning relationship and as partners in a learning community. They characterise technician pedagogies as "'a kind of exchange' which might be considered to be teaching by a different technician in a different institution or a different time" (2018:133). The linguistic slipperiness of this statement speaks to the thesis's opening sentence, 'you don't teach, you demonstrate'. This perspective is discussed and challenged in the final chapter of this thesis.

In their sector-wide study of technicians for the Higher Education Funding Council for England (HEFCE), Smith *et al*., (2004:41) used the term "quasi-teaching" to describe the teaching carried out by technicians, reporting the greatest prominence in the field of art and design. Macfarlane uses the same term to describe his concept of "Para-academics" (2011) whose teaching he argues is detrimental to the sector and a contributory factor to what he characterises as a 'disaggregation, or unbundling' of traditional academic roles. Some, such as Donoghue (2008) suggest these non-academic teaching roles devalue academic standards, while others (Whitchurch, 2013; Bossu and Brown, 2018) propose that the quality of teaching can be improved through specialism and diversity. Macfarlane perceives non-academic teachers as part of "the deskilling of academic staff in HE" that "follows a pattern designed to lower the costs of a university education and obtain better 'productivity' from those working to deliver it" (2011:63). Finkelstein and Schuster describe academics being replaced by para-academics in a 'silent revolution' (2001). Macfarlane (2011) bemoans how traditional academic roles once consisted of the “holy trinity of teaching, research, and service” but accepts “undoubtedly, these para-academic services do offer professional expertise but their establishment has also brought about a ‘hollowing out’ of what it means to be an academic” (2011:69). Macfarlane’s illustration of the disaggregation of academic practice is shown in Figure 3. The outer ring illustrates the roles deemed to contribute to the disaggregation; notably, from the perspective of this study, technicians do not feature. However, more recently, others have cautioned the threat of technicians as ‘cheap labour’ to replace under-resourced academic teaching communities (Wragg *et al*., 2023:1).

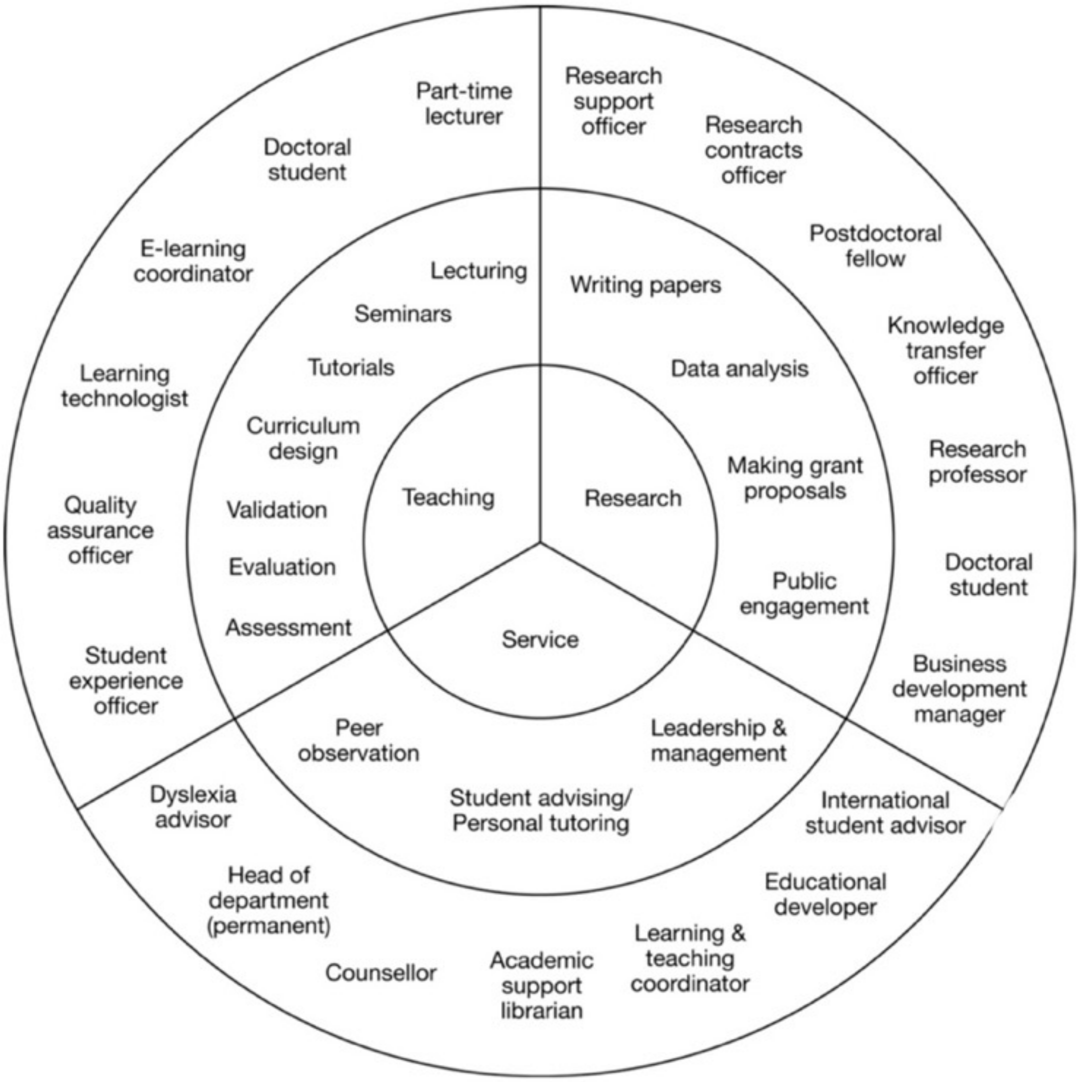

Figure 3: The disaggregation of academic practice (MacFarlane, 2011).

Blended and hybrid roles (such as Technical Demonstrator) are not recent phenomenon in creative arts education. Comparable roles to technicians who teach include Artist Teachers, Artist in Residence, and Practitioner Tutors. Daichendt (2010) traces the idea of the Artist Teacher back to the early 1800s, revealing familiar tensions of practice being unrecognised as scholarship in educational forums of the day. Singerman described how "the artist teacher in particular was derided as a 'confused hybrid,' not fully acceptable to either species" (1999:20). The term "Practitioner Tutor" is used by Shreeve (2011) to denote those who undertake a creative arts professional practice and teach that practice to others. Sheeve's study explored the experiences of practitioner tutors in art and design as they make transitions between their practice and their teaching. Her findings were predominantly negative, that "aspects of identity as a teacher and a practitioner are threatened, leaving the individual in limbo between the two social practices" (2011:79). Shreeve identified that practitioner tutors are simultaneously novice teachers and expert practitioners experiencing similar identity hybridity to Artist Teachers, identifying quality assurance issues (2008:13). A related contemporary term is 'Pracademic' (Dickinson *et al.,* 2020), denoting former or current practitioners now in academia, whose practice is deemed as "constituting the 'real world', as opposed to academia" (2020:11). Brown *et al*., (2008:23) describe how this type of role fragmentation is particularly accentuated in the context of art, design, and media higher education, where logistical and identity tensions already exist between the roles of practitioner and academic.

Another emerging blended role is the 'Dual Professional' (Beaton, 2020a) advocated by GuildHE (2018). Dual Professionals are perceived to be experts in their field, yet novices in their new environment (SRHE, 2019). SRHE articulates the distinction with Practitioner Tutors as one of valuable experience rather than skills. SRHE describe how Dual Professionals are thought to expose students to workplace expertise, promoting the integration of workplace-like approaches into the curriculum, responding to value-for-money discourse, e.g., (Belfield *et al.,* 2018 - cited in SRHE, 2019), scrutiny of graduates' job-readiness, e.g., (Moore and Morton, 2017; Tomlinson, 2017 - cited in SRHE, 2019), and to help bridge "the disparity between industry needs and higher education provision" (Jackson 2013 - cited in SRHE, 2019).

However, as Shreeve notes in her PhD thesis, "very little is actually known about this bridge and how it works" (2008:47). Arseneau (2016:163) describes a 'bridge to understanding', in which teachers move students from "not knowing to knowing". For Arseneau, the ability to bridge knowledge in this way separates an expert teacher from a content expert. Beaton (2020a) reports that the emphasis on workplace preparation means universities increasingly appoint Dual Professionals.

2.10 The reframing of technicians as teachers

For some, the change vectors of contemporary HE have served to 'disaggregate,' 'hollow out,' 'unbundle,' and 'deskill' academic roles (Macfarlane, 2010; 2011; Finkelstein and Schuster, 2001) in a culture of performativity (Ball, 2013). For others (Bossu and Brown, 2018; Savage, 2018a; Whitchurch, 2013; TALENT, 2022), the same conditions have begun to elevate the status and professional agendas of non-academic staff enabling them to forge new identities (Whitchurch and Gordon, 2010). It can be argued that despite their historic invisibility, following the establishment of the Technician Commitment in 2017, the status of the HE technical workforce has been elevated. A critical aspect of this rising profile in the creative arts has been the proliferation of technical teaching (Wragg *et al.,* 2023). Historically, institutions have been slow to recognise technical teaching at the higher level, but policymakers have been clearer. Dearing, for example, stated "There is a wide range of non-academic staff employed in HE and, for some of them, the distinctions from academic staff are becoming increasingly blurred" (Education in England, 1997:32). "The technician role is increasingly growing to include the demonstration of concepts and theory, and is ultimately moving towards an active teaching role, away from 'pure technicians' roles" (HEFCE, 2010:27). Lewis and Gospel predicted that technicians would continue to "become more and more deeply involved in teaching" (2015:10). Scholars also recognise the rising contribution of technical teaching to student outcomes "Technicians are increasingly the more stable part of a relationship in learning, consisting of student, tutor and technician… A tripartite teaching team" (Orr and Sheeve, 2018:134) and "the technical demonstrator role can be a vital bridge between support staff and teaching staff in relation to the student learning experience" (Brown *et al.,* 2008:29).

As technical teaching has become more prevalent, increasing numbers of arts technicians have attained HESA-recognised teaching qualifications through post-graduate certificates or professional recognition via AdvanceHE Fellowships (Savage 2018a, 2019; TALENT, 2022; Wragg *et al.*, 2023). Fellowships are currently offered at a range of levels: Associate Fellow (AFHEA), Fellow (FHEA), Senior Fellow (SFHEA), and Principal Fellow (PFHEA). The use of 'HEA' in the nominals refers to the 'Higher Education Academy', which was subsumed in the 2018 merger with the Leadership Foundation for Higher Education, and the Equality Challenge Unit to form AdvanceHE. AFHEA is marketed as the most appropriate level of recognition for technicians (AdvanceHE, 2023). However, in a previous study (Savage, 2019), it was demonstrated that creative arts technicians were able to attain recognition at FHEA for their teaching, and subsequently, several of my technical colleagues have attained SFHEA and my application to become the first technician PFHEA was accepted in 2019.

The trajectory of creative arts technicians becoming qualified teachers is significant because teaching qualifications have become symbols of individual and institutional teaching excellence (Cashmore *et al.,* 2013). However, the correlation of qualifications with excellence is contentious. Killick, for example, argues this form of credentialism is merely another part of "the professionalisation of teaching and learning" (2015:14). However, the consensus is "Trained teachers are rated more highly by students, are more sophisticated in their thinking about teaching, and have students who take a more sophisticated approach to their studying" (Gibbs, 2012:16). HEFCE consider teaching credentials "to act as one of a number of indicators of quality; develop and value learning and teaching; and allow recognition of the expertise of those who teach" (2016a:2). Teaching qualifications of staff are also deemed valid evidence in determining an institution's grade in the Teaching Excellence Framework (BIS, 2015). Students also support teacher training as an indicator of quality. Following the increase of student fees in 2012/13, Liam Burns, the president of the National Union of Students (NUS), stated that "university lecturers should be forced to acquire teaching qualifications to ensure that students paying tuition fees are getting the most out of their degrees" (Guardian Higher Education Network, 2016b). In the creative arts, students prefer their academics to be skilled teachers rather than skilled researchers (Beckmann, 2015).

The concept of 'value' has gained traction in UK HE. "The student is no longer (just) a learner, the argument goes, but is now also, and perhaps primarily, a customer of the institution they are registered with, as well as a consumer of the higher education experience" (Tight, 2019:173). This is potentially problematic in the creative arts because a study by HEFCE (2016b:19) demonstrated that academic staff working within the Creative Arts and Design subjects had the second lowest percentage of qualified teachers (49%) in the sector (Physical Sciences were the lowest with 47%). Paradoxically, technicians working in the creative arts were found to have the highest percentage of teaching qualifications compared with technicians working in other disciplines (Wragg *et al.,* 2023). However, gaps in HESA reporting prevent this from being a reliable metric (TALENT, 2022:130).

The trend of technicians qualifying as teachers can create dissonance within the established hierarchies. As Fung observes, "Professional awards can have implications for promotions and career progression; both the awards themselves and the authority to make them can affect power relations within and between groups and departments" (2014:8). It is not uncommon in some disciplines for the technical teachers to have equal or higher teaching qualifications than their academic peers and for some, qualification is an enabler to transitioning into academic careers for reasons of status, esteem, salary, and autonomy

(Savage, 2019). Smith *et al.,* reported in 2004, "It is unlikely that a technician would be able to progress to being a pure academic" (2004:30). This was consistent with my experience at the time (see Chapter 1), though this has subsequently been disproven in the creative arts, as appropriately qualified and experienced technicians have been able to transition their careers into academic positions (Savage 2018a).

To summarise these points and bring them into focus them on the research topic, creative arts technicians are gaining HESA recognised teaching qualifications (via professional recognition routes) in significant numbers; there is evidence that qualified teachers provide better student learning experiences (HEA, 2017) though this is disputed (van der Sluis, 2023; Cathcart *et al.,* 2023). The regulator holds them in high regard as a measure of teaching quality. The government recognises individual credentials to indicate institutional teaching excellence. In the creative arts, there are comparatively low numbers of qualified academic teachers and rising numbers of qualified technical teachers delivering real-world skills, techniques, and abilities demanded by the government (DfE, 2021), employers (Bakhashi and Spilsbury, 2019), applicants, students, and graduates (Guardian Higher Education Network, 2016b; Gibbs, 2012), and technical staff are increasingly able to transition their careers into academia if they choose. It is, therefore, perhaps unsurprising that TALENT (2022) concluded "lines have become blurred between the responsibilities, duties and expertise of teaching technicians and teaching academics" (TALENT, 2022:129), continuing, "there are now two extremes of teaching technicians: one primarily supporting the teaching activities of academic staff; the other effectively performing the duties of academic teaching staff, despite not being recognised or remunerated as such" (TALENT, 2022:129). Insights from a previous study (Savage, 2018a) identified that previously disparate academic and support demarcations have evolved in creative arts HE to overlap and coexist within what was theorised as a "Synchronous Space", developing Whitchurch's (2008b) Third Space concept (Figure 4).

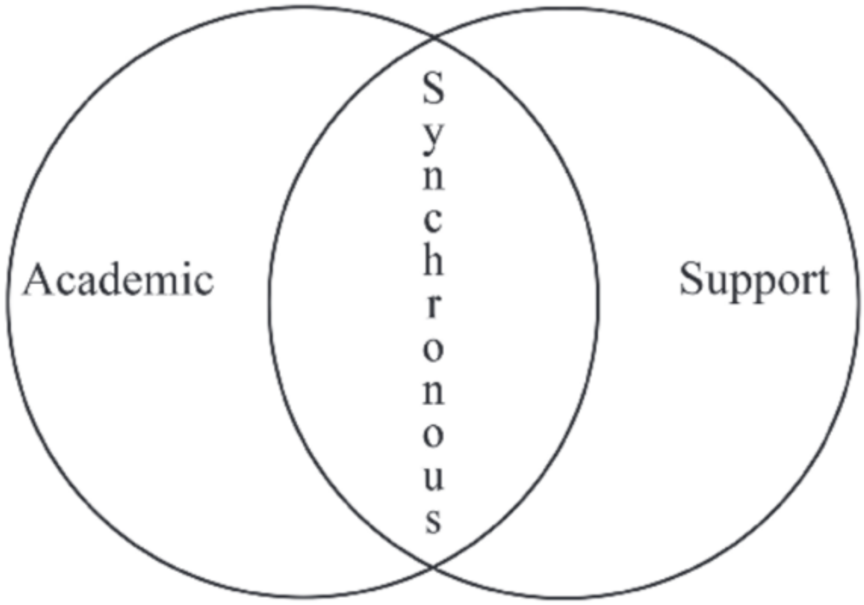

Figure 4. The Synchronous Space (Savage, 2018a).

The reader should note that this model was theorised based on research in a single institution and with a small sample. Within Whitchurch's model, professional support staff occupy a section of the contested space between realms; in the Synchronous Space, practice and teaching can coexist in the same space in what Graham (2018:308) describes as "pedagogical partnerships" signifying the potentially symbiotic roles and relationships of professional and academic staff in the twenty-first century. However, the term 'partnership' belies tensions that point to how technicians conceptualise the academic role, and how they demarcate, negotiate, and contest the boundaries of their pedagogies within the synchronous space.

2.11 Summary

In this chapter, I have reflected upon the contemporary context of creative arts HE, surfacing and discussing discourses concerning the academic art school's function and purpose. These discussions have illuminated transformations and tensions between legacy institutions' 'materiality and making' ethos and their current university curricula. As Prentice puts it, "The art school tradition is rooted in professional practice and a commitment to experiential learning, while theoretical knowledge underpins the tradition of academic research on which the reputations of universities are founded" (2000:524). Despite what many might consider an emphasis on scholarly knowledge in the academy, I have speculated that for many learners, the university experience is perceived as a pathway to a career as a creative practitioner. Consequently, while obtaining an undergraduate degree is the primary goal for learners, their personalised learning needs often focus on developing the skills, techniques, and know-how of their practice. Shreeve highlights how “in art and design, theory is often taught by a different set of tutors to those who teach the practice components of the curriculum” (2008:24). Shreeve’s comments concern the distinction between academic teachers of contextual studies and those of practice, but in this chapter I have proposed that technicians are increasingly instrumental in learning and teaching activities; and asserted that their pedagogies are foregrounded in practice and challenged negative connotations of constraint and inhibition to the creative act, arguing instead that clear orientation, instruction, and understanding of technical conventions enable creativity rather than constrain it.

I have suggested that relationships between theory and practice, head and hand, and idea and implementation can be explored and framed as reflexive poles on a continuum rather than a binary in creative making. Transitioning between these poles has been conceptualised as an ‘oscillation’ between realms with technical practice (and pedagogies by association) located at the ‘empirical interface’ or ‘bridge’. The concept of ‘bridging’ is revisited in Chapter 9 (Discussion).

This chapter has also discussed the evolving nature of established roles and job families within creative arts HE and the broader sector, examining visibility and the changing status of technicians and how these contested territories are experienced and negotiated in the literature. The subsequent chapter develops and expands on these points from a theoretical perspective.

Chapter 3: Theoretical perspectives

3.1 Chapter introduction

This chapter advances the thesis through an exploration of relevant theoretical literature. While there is a lack of studies on technical teaching, the few that exist are identified and examined in the context of the research questions. The chapter is organised into four parts. The first identifies relevant studies, with particular attention to the findings of Wragg *et al*., (2023), who found, building upon TALENT (2022) that creative arts technical teaching is disproportionately prevalent and sophisticated within the sector. The second part introduces a pre-empirical tripartite pedagogy encompassing 'Environment', 'Teaching', and 'Support of Learning' as a framework to examine pedagogic theoretical models. The third part reviews the literature concerning 'conceptions-based' studies of teaching and the final part draws these points together to identify the knowledge gap, discussing why it matters and for whom?

3.2 Creative arts technicians in the literature

In the introduction to this thesis, I described identifying gaps in my knowledge of technical pedagogies at different points in my career before summarising my pre-empirical attempts at making sense of my experiences and observations. What had not been clear to me at the time was that I had stumbled upon a sector-wide knowledge deficit that would become prevalent and problematic throughout my career and define my research interests. Through my initial attempts at understanding, I sought a universal truth or a definition. This proved problematic as, over time, I came to understand that there was a plurality of equally valid truths, multiple socially constructed realities, and subjectivist perspectives. It became clear to me that orientations, beliefs, approaches to, and conceptions of technical pedagogies vary, sometimes from the perspective of the same perceiver (myself included), in different contexts and points in time, but also by different perceivers simultaneously.

Searching the literature, I could find no research that had explored variation in what creative arts technicians believe they teach, how, or why. A relevant study had been completed by Sams (2016a). Sams (a technician at Central St Martins at the time) reported on a small-scale study of creative arts technicians using a mixed methods approach (a survey and participant-produced images) through which she sought to examine how her peers at the

University of the Arts London (UAL) conceived of their technician roles (distinct from, but inclusive of, their pedagogies). Sams (2016b) described her motivation for conducting the study in a personal communication “At the time I was a technician hoping to be recognised as a teacher and feeling more than a little frustrated” (Email sent to Savage, T. 29/11/2016). Her findings were that her peers perceived their role as “supporting staff, students and events in both traditional and virtual learning environments, but also as educators, artists and expert practitioners within their specialist areas of art and design” (2016a). She identified three key themes of ‘supporting’, ‘helping’, and ‘teaching’ as fundamental. Sams defined supporting as those who:

> Use their expert knowledge of tools or specialist equipment in supporting academic teaching in workshops and studios… These staff may prepare materials or equipment for the use of academic lecturers in their teaching practice, and may also be a point of contact for students in the absence of academic staff (Sams, 2016a).

She defined ‘helping’ as using specialist knowledge to create physical and virtual learning environments, while her category of ‘teaching’ relates to:

> Those technicians who see their role in higher education as teaching based. This aspect of a technicians role uses their knowledge directly, to teach students how to use artefacts in their own creative practice… facilitating learning as well as teaching, a role that could also be described as a *technical lecturer* (Sams, 2016a).

Despite the lack of studies, there have been widespread calls for research in this field from Government (Education in England,1997), scholars (Drew, 2003; Orr and Sheeve, 2018), policymakers (TALENT, 2022), Research Institutions (Gatsby, 2022; NTDC, 2018) and technicians (Vere, 2013, 2017).

Pedagogic research is almost exclusively undertaken by academic authors “HE research has become a victim of its own success in institutionalising itself and training a new generation of researchers in its specialist knowledge base, thereby narrowing the scope and vision of newer researchers in the process” (Macfarlane and Burg, 2019:18). For research in this field to be authentic and informed rather than vicarious ventriloquism, accounts and insights must be derived from experience, grounded empirically, and articulated from the perspectives and voices of the technicians themselves. To be effective, these voices must also be heard and valued. Fricker (2007) describes “testimonial injustice” where the knowledge and voices of a particular group are underestimated based on identity or social standing. This term resonates with the technicians' voice, which has been seldom heard. However, since its establishment in 2017, The Technician Commitment has funded and supported numerous research projects and initiatives that have increased knowledge and understanding of technicians' vital roles in HE (Gatsby, 2024). These initiatives have instigated numerous research publications exploring the contribution that technical staff make to HE, for example, within student wellbeing and pastoral support (Science Council, 2019), Equality, Diversity, and Inclusion (STEMM-CHANGE, 2019), contribution to research (The Royal Society, 2021), and Health and Safety (TALENT, 2023).

In 2020, the TALENT Commission was established. It did not set out to explore technical pedagogies specifically in creative arts HE, but respondents from arts roles were disproportionately high in number, and the report concluded "Creative arts disciplines appear to be at the forefront regarding technical staff as teachers" (2022:131). Continuing:

> Technical staff in the creative arts seem to have a particularly strong link to the teaching and learning of students. Compared to other disciplines, creative arts technical staff were significantly more likely to be involved in all suggested teaching and teaching-design activities, and were more likely to: identify solely as teaching technicians; have received training for teaching activities; and have completed part or all of an externally recognised qualification/accreditation… it is perhaps useful to consider it a foreshadowing of things to come to a wider extent throughout the sector…it is apparent they are also taking on ever-increasing teaching responsibilities, in many cases blurring the lines between 'academic' and 'technical' teaching duties (2022:130).

Following the publication of TALENT (2022), Wragg *et al.,* (2023) set out to extend the Commission's findings though an examination of the role of technicians as teachers. Their data comprised a survey of 1766 technical staff from 90 universities and 16 UK research institutes who participated in an online survey of 60 questions that explored various themes. Four questions directly referred to the respondents' role within HE teaching and learning, with a further two open-ended questions being used by many respondents to explore teaching-related elements. The authors aimed to establish a quantitative measure of:

1. The extent to which UK technicians are involved in HE teaching.
2. Common types of involvement.
3. How those involved feel their contributions are valued by others.

4. Whether those involved have completed teacher training and/or accreditation.
5. Whether any of these four measures varied by discipline area.

Findings were consistent with TALENT (2022) but surfaced additional insights concerning creative arts technical teaching. Not least prevalence, as 95% of creative arts technicians who responded to the survey described being involved in teaching (compared with the sector average of 81%). See Figure 5:

		Discipline area							
	All surveyed university technicians	Creative arts	Engineering	Chemistry	Biosciences	Medicine, dentistry & health	Physics	No specific discipline	All other disciplines
Involved in teaching (%)	81	95	83	82	79	78	73	58	85
Total sample population (number)	1593	227	206	134	399	183	70	114	260

Figure 5: Proportion of university technical staff involved with teaching HE students by discipline area (Wragg et al., 2023).

The authors set out the types of teaching activities that surveyed technicians described (Figure 6).

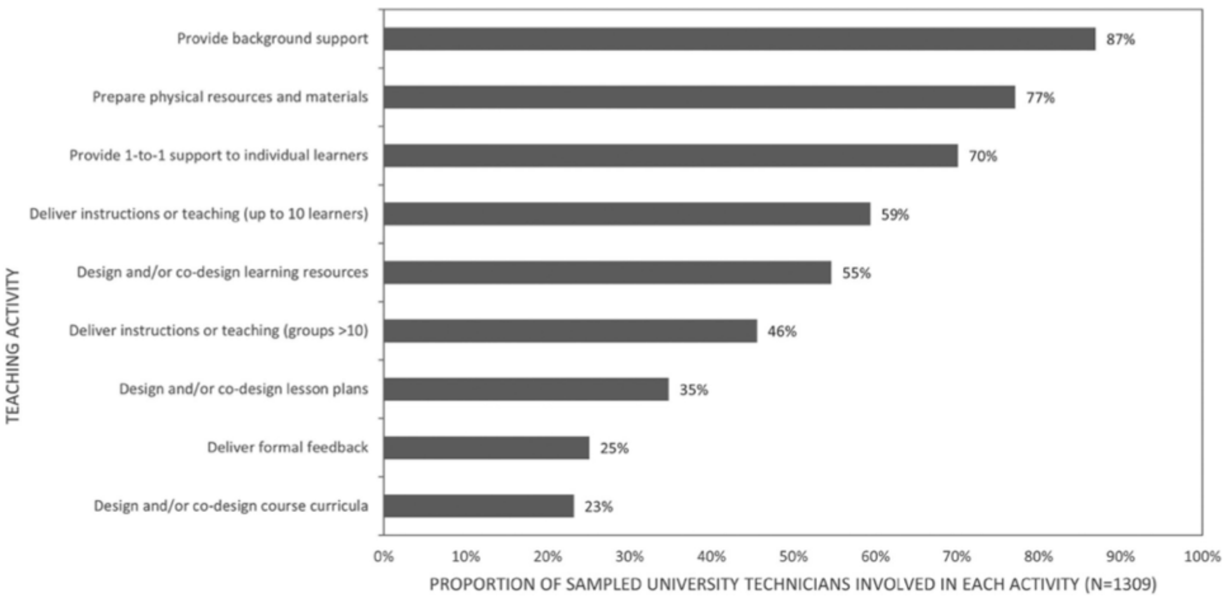

Figure 6: Types of activity delivered by university technical staff involved in teaching (Wragg et al., 2023).

To illustrate creative arts responses as a statistical outlier, Wragg *et al.,* compared these respondents with those working in other disciplines (Figure 7).

	Proportion delivering activity as part of their role (%)	
Activity within HE teaching and learning environment/s	Surveyed HE creative arts technicians (n = 216)	All other surveyed HE technicians (n = 1093)
Provide background support	94	86
Prepare physical resources and materials	92	74
Provide 1-to-1 support to individual learners	92	66
Deliver instructions or teaching to groups of up to 10 learners	83	55
Design and/or co-design teaching and learning resources	84	49
Deliver instructions or teaching to groups of more than 10 learners	75	40
Design and/or co-design lesson plans for individual sessions	68	28
Give formal feedback to learners to support their learning	33	23
Design and/or co-design curricula for courses or modules	41	20

Figure 7: Types of activity delivered by university technical staff involved in teaching; a comparison between creative arts disciplines and those in other disciplines (Wragg et al., 2023).

Notably, 41% of creative arts technicians described designing or co-designing curricula (more than twice the number of technicians working in other fields). Responses also revealed significant involvement in formative feedback and summative assessment. The authors surmised that **"**these technicians are performing duties well beyond 'supporting' teaching and are in fact delivering duties more traditionally associated with academic teaching staff" (Wragg *et al*., 2023:7).

The authors attribute the disproportionate (within the sector) quantity and sophistication of creative arts technical teaching to the inherent nature of the taught disciplines requiring the application of technical skill and expertise of skilled practitioners:

> This is likely accelerated by a competitive higher education environment and global graduate job market which incentivise skills-based learning and graduate employability, with a general transition towards increased value of 'know-how' as well as 'know-what' (Wragg *et al*., 2023:1).

Wragg *et al.,* concluded by acknowledging that their findings echo those previously highlighted by my prior studies (Savage 2018a; 2019) while extending them into new areas. They assert that their study illustrates the blurred pedagogic responsibilities of technicians occurring and/or being perceived across different discipline areas and throughout different types of HE institutions. While Wragg *et al*., provide quantitative scale and nuance to the field, their study confirmed the existence of a knowledge gap rather than addressing it. Their study did not explore the actual experiences (what, how, and why) of technical pedagogies, which is the core of this study.

Another publication emerging from the TALENT (2022) National Policy Commission was the book '*Technicians in Higher Education and Research'* (Vere, 2024). I contributed a chapter (Savage, 2024) that conceptualised technicians as educators, in which I theorised a tripartite technical pedagogy of 'Environment', 'Teaching', and 'Support of Learning'. 'Environment' concerns the configuration of specialist spaces, specification of equipment, and selection of materials. 'Teaching' refers to the content technicians teach, why, and how they teach it. 'Support of Learning' explores the unplanned, and reactive interactions between technicians and learners as they collaborate in producing and discovering knowledge, building understanding, skills, developing techniques, and abilities to create artworks. I expand upon the tripartite in the following sections to delimit the research topic and provide a framework through which it can be examined.

3.3 Pedagogy of environment

A core responsibility of creative arts technicians is to oversee specialist learning environments and facilities. As Freire (2015:30) noted, "to teach is not to transfer knowledge but to create the possibilities for the production or construction of knowledge." The configuration of space, choice of materials, and equipment specification are critical to the work that can be produced. Creative arts technicians frequently have autonomy and agency in selecting, configuring, and operating complex and specialist spaces, facilities, and materials. These artefacts can configure activity, inscribing relations between people (Trowler, 2016:51) regulating and reifying Becker's notion of artistic 'conventions' (2008). Sims and Shreeve note this curation of possibilities is of particular importance in the creative arts:

> The studio is not only a location, but also an environment filled with the accoutrements of creation. Images, objects, and works in progress are often situated

> here. Conversations, criticism, evaluation, and the generation of ideas are key activities... to create the habits of mind associated with the profession (2012:75).

Seidell agrees “The artist’s studio space is not a place filled with the inebriating and mysterious fog of ‘creativity,’ in which the work of art just ‘happens.’ It is a space where specific aesthetic decisions are made that might result in a successful work of art” (2009:7). “Time spent in the physical studio helps students to embrace an immersive, personalised, and self-regulated approach to learning, with students taking responsibility for their own learning journeys” (Marshalsey, 2017:36); a “locus of learning” for experimentation and discovery (McHugh, 2014), “laboratories of learning” (Ingham, and Sadowska, 2021). “The quality of the space (for example, size, layout, temperature, light, cleanliness) can all have an influence on the teaching and learning experience” (Shreeve *et al.,* 2010:24). Put simply, “Studio is a pedagogy in its own right” (Orr and Shreeve: 2018:243).

Technicians advocate for their environments through horizon-scanning new and emerging technologies, contributing rationales for funding, providing non-technical explanations for decision-makers, and supplying evidence and options analysis to support funding bids. They liaise with academic colleagues, central departments, and suppliers, engage in procurement activities, oversee and manage installation, identify and manage risk, commission, configure, test, experiment, and learn new facilities before teaching and supporting others in their use. Involvement can vary in complexity and scale, from selecting a particular specification of a tool to working with architects and senior stakeholders to design and create new buildings.

The provision and handling of consumables and materials are important, too, and the term ‘material’ is used here in the broadest sense. Cumulatively, through oversight and informed choices relating to the environment, equipment, and materials, the possibilities of what may be created and how are determined principally by the technicians in consultation with academic colleagues. This impact should not be underestimated because, as Csikszentmihalyi points out, “It is easier to enhance creativity by changing conditions in the environment than by trying to make people think more creatively” (2013:1).

3.4 Pedagogy of teaching

Technical teaching is often characterised as ‘inductions’ and ‘demonstrations.’ This language reinforces the long-standing shibboleth that technicians do not teach (Guardian Higher Education Network, 2016a). Though these terms are legitimate descriptors, they identify what is taught, how, and for what purpose. An induction, for example, may be characterised as a structured learning occurrence in which novice learners are told and shown specific pre-determined knowledge that enables them to access and use resources safely, competently, and with sufficient skill to allow independent and self-directed experimentation and practice. In some instances, inductees are required to evidence their understanding by repeating the taught action, technique, or process to a satisfactory standard. Once inducted, learners can access resources to develop their knowledge, abilities, and ideas through self-directed practice.

Competence can be defined as "having the necessary skill or knowledge to do something successfully" (OED, 2012). It is frequently associated with inductions to facilities but can represent an unrealistically high bar for an initial encounter. As Dreyfus and Dreyfus surmise "Competence comes only after considerable experience actually coping with real situations in which the student notes or an instructor points out recurrent meaningful component patterns" (1980:8).

Demonstrations often share these characteristics and sometimes expand them through instruction. To differentiate these terms, it is helpful to return to Polanyi's driving analogy from the previous chapter. A driving 'demonstrator' would show the learner how to drive by doing it skilfully and explaining the techniques used, whereas an 'instructor' would locate the learner in the driving seat and teach them through dialogue and personalised corrective feedback to build their confidence and ability. An arts demonstration is likely to explain the purpose and operation of a resource and then show practical examples of how the resource can be used for different creative outcomes. As Dormer notes:

> It is essential the novice be presented with standards of work to strive towards. The goal has to be external. Progress in practical ability and judgement is an exchange, a continuous looking to and from what the pupil, teacher and other expert practitioners have accomplished (1994:48).

While a demonstration usually 'shows and tells,' the impressions on the learner extend beyond merely demonstrating a means to achieve an end. "When we use demonstrations, we must ask ourselves what skills are to be acquired and whether the demonstration will provide enough information for learners to try it out for themselves" (Hillier, 2005:131).

Arguably, inductions and demonstrations represent the least sophisticated of the technician pedagogies. Some within the academy dismiss them as transactional, akin to a didactic transference of functional knowledge (reminiscent of Freire's (1996) banking model of education in which students are regarded as empty vessels into which teachers must deposit knowledge as passive recipients). For Freire, an active teacher/passive learner approach leads to a lack of critical thinking in students and a lack of ownership of their learning. Trigwell and Prosser (2004) describe the didactic approach of telling a learner what to do as 'Information Transmission/Teacher-focused (ITTF) approach to teaching', valuing the subject rather than the learner (Hickman, 2010), leading to an "uncritical acceptance of orthodoxy… rather than 'creative dissent'" (Ashby, 1973 cited in Ramsden, 2003:21). Drew (2003:135) categorises creative arts skills teaching as ITTF. However, despite the trend of educational theory towards adopting a single, dominant view of effective teaching, usually one that is 'learner-centred' and based on a constructivist view of knowledge and learning (Pratt *et al*., 2016:3), legitimate and compelling counterarguments can be made in support of ITTF instructional pedagogies. Biesta points out that teachers offer something external to the students' existing known world or worldview, and separates the notion of 'being taught' from 'learning from':

> While in the situation where students learn from their teachers, the teacher figures as a resource so that what is being learned from the teacher is within the control of the student, the experience of "being taught" is about those situations in which something enters our being from the outside, so to speak, as something that is fundamentally beyond the control of the 'learner.' To be taught— to be open to receiving the gift of teaching— thus means being able to give such interruptions a place in one's understanding and one's being (Biesta, 2013:459).

Critics of ITTF methods, or technical teaching might regard these activities as imitation rather than inspiration, mimicry rather than mastery, reproductive rather than productive, training rather than educating, transactional, not transformational, and so on, but "Creativity is a long process. It often requires the maker to make something again and again, learning each time from the previous iteration" (Sutton, 2013:211). Furthermore, professional practice often includes repetition. A professional practitioner is a specialist who encounters certain types of situations again and again (Schön, 2016:62). And, as Audi points out in his writing on creativity, imagination, and intellectual virtue:

> Many creative people must begin as imitators. Consider apprenticeship as the route on which many creative people have begun their careers… For many, imitation is a ladder that leads upward to creativity. Some who must begin their development in

> this way reach a height at which they may discard the ladder (2018:25).

However, in his writing on craft, Dormer acknowledges that “rigid instruction does not always encourage creativity. For one thing, instruction, as distinct from teaching, is non-negotiable… instruction is based on the principle that there is a right way and a wrong way of doing things” (2019c:220). Furthermore:

> Within art and design there is a tendency to value and affirm divergence in learning and teaching. Learners are encouraged to progressively extend the arena of possibilities within which they operate, not to seek enduring solutions or answers but to open up unfamiliar territory and new ideas (Danvers, 2003:50).

Yet, the value of knowing the ‘right way’ (or indeed, the safest, most expedient, cheapest, or efficient way) should not be underrated; it is often a critical foundation for achieving results, enhancing motivation, saving time, energy, money, and facilitates advanced learning. The safety point is particularly salient. A sector-wide report commissioned by the TALENT Programme examined 1,448 responses to an online questionnaire, followed up with 36 interviews, and found that 64% of technicians had some responsibility for teaching health and safety. Findings stipulated that through prioritising health and safety, universities create an atmosphere conducive to effective learning, productivity, and discovery. The authors also argue that teaching and role-modelling adherence to safety protocols fosters a culture of responsibility and awareness that learners will go on to apply in their careers (TALENT, 2023:2). As Hillier notes (in relation to the UK Health and Safety at Work Act 1974) “In practical demonstrations, our responsibility under the Act is paramount” (2005:132). This is both a pedagogic, moral, and legal responsibility for creative arts universities, whose workshops accommodate a vast array of materials, equipment, and potential hazards. The importance of safety cannot be overstated and the technician often acts as an important authority and role model in these situations.

Inductions and demonstrations occur at points where learners have relatively little knowledge of the subject. “Thoughtful teachers understand that highly structured initial experiences provide students with confidence and a sense of purpose; these experiences tend to make subsequent freedoms all the more fruitful and exciting” (Ramsden, 2003:123). Hickman concurs “young people need structure and guidance in their lives, and in order to help them create their own things of significance, they need to be taught the relevant skills at an appropriate time in their development” (2010:113). Transformative knowledge is built upon the fundamental domain knowledge (Csikszentmihalyi, 2013), and as Weisburg

(1993:236) points out “All artists undergo extended periods of formal or informal training before they are capable of producing something that others value.” Moreover, the requirement for learners to grasp the basics ahead of more advanced study informed the development of Bloom’s influential theory of ‘Mastery Learning’ (1956).

Technician pedagogies frequently introduce and orientate learners to equipment, tools, software, materials, and processes at the start of a developmental journey. Common aims include safe working, confidence, and the ability to practice autonomously through repeating what has been observed. Hubert and Stuart Dreyfus outlined five stages of skill acquisition: novice, advanced beginner, competence, proficiency, and expert (Dreyfus and Dreyfus, 1980). They point out that the novice level is universal; all masters took their first steps as novices. The task for a technician planning an induction or demonstration then is to create a seemingly simple and accessible learning experience through which learners can develop awareness and knowledge of the subject in a way that is understandable, has value to them through purpose, and leads to an appropriate level of practice. As Michael Oakeshott (1967) (cited by Frayling, 2017:73) notes “in order to *teach* an activity, it is necessary to have converted our knowledge of it into a set of propositions.” Or, as Witkin (1981:10) puts it, the teacher “must be able to organise the ‘then-and-there’ of his experience into the ‘here and now’ of the learners’ experience.” Shulman theorises this as ‘Pedagogical Content Knowledge’ (PCK), which is a “special amalgam of content and pedagogy that is uniquely the province of teachers” (1986:9).

More sophisticated and divergent approaches are employed by technicians when teaching in accordance with learning outcomes of units of study and assessment criteria (though the use of predetermined outcomes in arts education is contested, see for example, Buss, (2008), for discourse and debate relating to creativity and conformity). In these instances, technical teaching moves beyond the fundamental operation of the tool or facility by shifting emphasis from the instrument to the instrument’s application as a means of expression or experimentation. Teaching of this nature is less teacher or content-centric and more likely to take the form of exploratory practical lessons that provide supportive direction and space for learners to reflect-in-action and upon action (Schön, 2016) through sustained enquiry.

Little is known of the educational strategies used by technicians; however, as Orr and Shreeve note, there is lots of autonomy in studio teaching, staff can teach what they want and how, this is a position of trust and enables students to act as practitioners (2018:132). In planning these lessons, technicians combine structured and semi-structured teaching approaches with opportunities for learners to identify and solve problems and challenges, to develop their understanding, make discoveries and refine their learning through their individualised application and experimentation in response to the project brief.

3.5 Pedagogy of support

The third pedagogy relates to the support of learning. ‘Support’ is employed here as a broad term to describe helping, guiding, and advising students in their learning, experimentation, self-expression, and the outworking and production of an artwork. It is important to note that this is distinct, but inclusive of ‘technical support’ which is focussed upon troubleshooting and resolving issues with equipment and processes. TALENT (2022:36) found “our research suggests that technical contributions to teaching and learning environments in many cases go well beyond ‘support’” but the value of support should not be understated. Support is, by nature and definition, ‘supportive’ and assists learners in building their knowledge, problem-solving, creating a personal style, and generating individualised creative outputs. At a passive level, support of learning can mean supervision (ensuring safe working practices). However, more sophisticated and collaborative support models triage learners as they develop, reach, and breach the limits of their current knowledge.

Support of practical learning occurs in studios and workshops at the point of need, sometimes following a demonstration, before the commencement of a task, or at a mid-point where the successful outcome of the activity becomes at risk. Support can also be reflective and retrospective. “The studio space is the space where decisions are made; and those decisions must be infused with wisdom and discernment, the products of distilled knowledge and understanding about oneself and the medium of one’s artistic practice” (Siedell, 2009:1). Hickman describes how in the ‘doing’ of art learners are “encountering the reality of paint, stone, wood, metal, sound, bodies, including one’s own body, encountering resistance, in order to explore possibilities” (2018:17). In terms of what is taught, Witkin suggests “the art teacher tends to be relatively inactive with respect to the pupil’s idea; he [sic] is there to facilitate liberation of the idea in the pupil rather than to stimulate it directly or develop it” (1981:100). Shreeve *et al.,* (2010) consider these collaborations and interactions between tutor (in this context a technician) and learner as an ‘exchange’ echoing the guild model of the master and apprentice, where novices learn to be experts from experts and where ideas are informed through making.

Swann (1986) also characterised creative arts studio teaching as rooted in the atelier method in which a master might instruct their apprentice. In his iconic article ‘Nellie is dead’ he theorised and critiqued “The over-the-shoulder, atelier method of art school teaching” (1986:18), in which the tutor would spend the majority of their day moving between individuals offering advice on the work in progress “often resulting in the tutor demonstrating his/her own expertise to improve some aspect of the students work” (1986:18). Swann’s title relates to the British colloquialism of ‘Sitting by Nellie’, first referenced in the 1950s (Tréguer, 2018), in which a job is learned from watching a more experienced worker rather than being taught.

Whereas timetabled technical teaching is often process-focused and associated with the use and potentialities of equipment and materials, support of learning is more frequently student-centric and personalised to the learner, their project, level of learning, and/or problem at that moment. As Schön reminds us, each student makes up “a universe of one” whose potentials, problems and pace of work are unique (2016:308).

Support can be thought of as an intervention, or discontinuity, that can interrupt, enable, or extend the trajectories of thinking and making, leading to unanticipated, serendipitous perspectives, creating potential for unexpected connections and establishing new relationships between previously disparate elements. For Brown, teaching and learning methods in this context are “of discovery rather than knowledge” (2018:483). In addition to facilitating experimentation and expression, technician support is also pragmatic in nature, enabling a realistic and viable outcome from what might begin as an ephemeral, loosely defined, incomplete, quixotic concept. Support and advice from technicians provided in these moments can inform the learner’s decision-making during the creation process, which can be integral to how an idea develops and the production and resolution of a creative outcome.

As learners reach the limit of their knowledge, they may require personalised support. This can be speculative, ad-hoc, while in flow, or pre-planned, where feedback is sought upon the work in progress. In these instances, technicians can take on the role of coach, mentor, or peer, explaining issues at a level appropriate for the learner, correcting failing work, or conducting a post-mortem of an unsuccessful artwork. In this context, technical support might be conceived of as situated learning (Lave and Wenger, 1991) and located within Lev Vygotsky’s Zone of Proximal Development (ZPD), in which learners are ‘scaffolded’ by a more experienced practitioner. Vygotsky first conceptualised ZPD in the 1920s characterising it as “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978:86).

Shreeve suggests "The ultimate collaboration between students and tutor is the integration of 'knowledge' on an equal level with students who are becoming practitioners too" (2008:98). Wilkinson agrees, considering the non-hierarchical relationship between tutors and students to be key to creative arts pedagogies (2020:8). But, as Orr and Shreeve note, for academic staff, the shift of power (to the student via increased knowledge over lecturer) can challenge and disrupt established studio relationships (2018:66). This is less problematic for technicians, as McCaffery notes "academic culture tends to be one of knowers rather than learners" (2010:202). In contrast, professional support staff (such as technicians) are more at ease with not knowing. Technicians have less power to shift; they are usually remote from the formal process of summative assessment, and any perceived authority they have is derived from subject expertise and experience (Barley, 1996).

3.6 Pedagogic theory

The tripartite technical pedagogies outlined above have defined and delimited technical pedagogies, enabling them to be theorised in relevant literature. In the following section, 'Experiential Learning' (Kolb,1984),'Threshold
Knowledge and Troublesome Concepts' (Meyer and Land, 2003), 'Signature Pedagogies' (Shuman's, 2005), and 'The Hidden Curriculum' (Jackson, 1968) are considered from a technical perspective.

Experiential Learning

"For the arts, experiential learning (Kolb,1984) is key. We learn by doing and making, by enacting what it means to become an artist, designer or performer" (Shreeve *et al.*, 2010:128). This reference to Kolb concerning creative arts practice and pedagogies appears to strike a natural affinity given the experiential nature of creative disciplines, but it is relatively unusual. Kolb's analysis (undertaken in 1999) of sectors where his theories are most frequently applied includes: education (43%), management (20%), information science, psychology (10%), medicine (7%), nursing (2%), and law (0.5%) and the arts are absent (2015:24). In Kolb's Experiential Learning Theory Bibliography (2007), he lists all citations by title between 1971 – 2001; of 2,636 entries, just ten (0.38%) relate to the arts or arts education.

Kolb's Experiential Learning Theory (ELT) is a perspective on learning that combines experience, perception, cognition, and behaviour. ELT is founded upon the idea that knowledge results from the combination of grasping and transforming experience. Grasping experience refers to receiving information while transforming experience is how individuals interpret and act on that information. Kolb (2015:76) describes how his model portrays two dialectically related modes of grasping experience—Concrete Experience (CE) and Abstract Conceptualisation (AC)—and two dialectically related modes of transforming experience—Reflective Observation (RO) and Active Experimentation (AE). These modes constitute a four-stage model that is represented as a cycle (Figure 8) in which the learner travels clockwise through each stage. Kolb proposes that learning arises from the resolution of creative tension among these four learning modes. He describes how ELT is based upon a dual-knowledge theory, combining the empiricists' concrete experience, grasping reality through direct apprehension, and the rationalists' abstract conceptualisation, grasping reality via the mediating process of abstract conceptualisation.

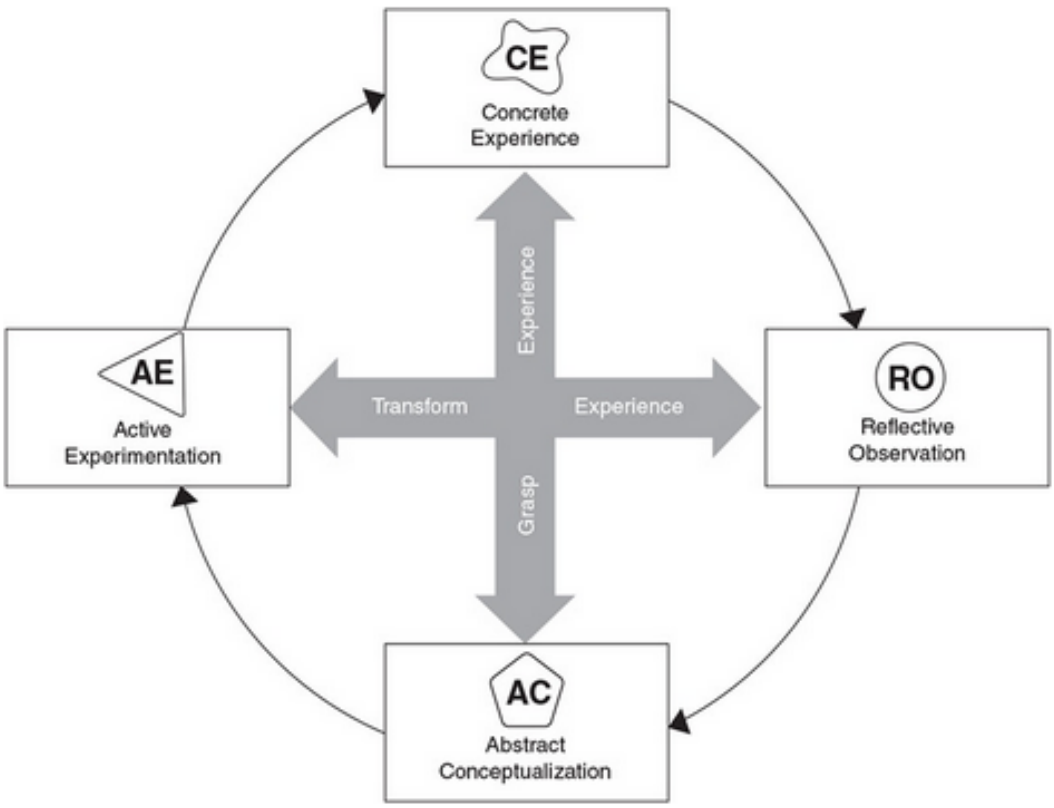

Figure 8. The Experiential Learning Cycle (Kolb, 2015).

In Kolb's model, immediate or concrete experiences (such as taught sessions or material, sensory, or haptic encounters of studio practice) can be conceived of as the basis for observations and reflections. Reflections are assimilated and distilled into abstract concepts from which new implications for action can be drawn. The dual dialectics align with the two pedagogic activities most frequently associated with technicians: 'teaching' and 'support of learning'. In this context, teaching activities can be thought of as Concrete Experiences (CE) and Reflective Observation (RO), whereas support of learning is aligned more closely to Abstract Conceptualisation (AC) and Active Experimentation (AE). Regarding technical pedagogies, CE (a tangible experience of learning in a specific situation) and AC (supporting while making sense of observations and experience) relate to the interactions between learners and technicians. At the same time, RO relates to the constructivist approach to learning and "cognitive housekeeping" (Moon, 2004:129), where new knowledge is assimilated with existing while AE enables learners to apply the knowledge in a unique situation.

Threshold Concepts and Troublesome Knowledge

Mayer and Land's theories of Threshold Concepts and Troublesome Knowledge are primarily concerned with identifying the core disciplinary knowledge that, once understood, is irreversible and transforms and deepens learners' comprehension. Meyer and Land (2006:3) describe how these concepts can be akin to a portal, opening up a new and previously inaccessible way of thinking about something. It represents a transformed way of understanding, or interpreting, or viewing something without which the learner cannot progress. For Shanahan and Meyer (2006), a threshold concept is often more than just a 'core-concept'; it is a 'transformative concept' and they relate the threshold concept to what Perkins (1999) labelled "troublesome knowledge", representing counterintuitive knowledge that provides difficulty for the learners, conflicting with their existing beliefs or requiring them to shift their perspective to progress.

Threshold concepts and troublesome knowledge theories are more frequently associated with theoretical subjects, though this is not exclusively the case. Land *et al.,* (2016) devote a chapter of '*Threshold Concepts in Practice'* to transformational learning in architecture (Hokstad *et al*., 2016), emphasising the relevance of Mayer and Land's theories to the uncertainty and liminality of the creative arts. In practical and technical disciplines, threshold concepts and troublesome knowledge can be tacit, perceptual, sensory, skill-based, haptic, or applied. Meyer and Land (2003) suggest that teachers should identify the threshold concepts and troublesome knowledge of their disciplines and design curricula, pedagogies and strategies to teach and support learners to gain deeper understanding. Becker's (2008) notion of artistic 'conventions' also resonates, given they are thresholds "whose acquisition is essential to their advancement in a given discipline" (White *et al.,* 2006:17). Indeed, the word 'threshold' suggests a dynamic learning experience that moves a student from one state to another (Felten, 2016:5). The space between states is one characterised by liminality (Land *et al.,* 2016), in which a learner moves from not knowing, to knowing, or in practical terms, being unable, to being capable.

Signature Pedagogies

Skills instruction (of the kind commonly associated with technicians) is frequently linked with vocational and employability agendas (Santero and Snead, 2013; Klebesadel and Kornetsky, 2009). It may, therefore, be reasonable to propose that technical teaching within some disciplines could constitute what Shulman (2005) theorises as "Signature Pedagogies". For Shulman, "These are types of teaching that organize the fundamental ways in which future practitioners are educated for their new professions" (2005:52). Shulman stipulates that a signature pedagogy must have three characteristics: firstly, it must be distinctive in that profession. Secondly, it must be pervasive within the curriculum, encouraging learners to think like practitioners (e.g., to think like a photographer or animator). The third feature relates to ubiquity, breadth, and boundaries; a signature pedagogy should cut across courses and institutions.

Corazzo (2019:1250) suggests that the combinations of visually and materially unique learning spaces might be "the pre-eminent 'signature pedagogy' of the creative disciplines." Shreeve *et al.,* (2010) analysed pedagogic practices within art, design and performance to determine signature pedagogies:

> Commonalities in teaching and learning were identified as particularly significant, such as student-centred approaches that emphasise the centrality of ideas and embrace uncertainty, experiential learning and materiality, and the highly visible and experimental processes that accompany learning about creative practice. Also key is the emphasis on understanding how to be a practitioner, bringing out the often tacit knowledge through socially situated approaches to teaching and learning (Sheeve *et al.*, 2010:135).

Neither Shulman nor others have considered technicians or their pedagogies within their interpretations of signature pedagogies. This study of conceptions of technical pedagogies at a multi-institutional national level may support and lend legitimacy to their existence. If surfaced and conceptualised in the empirical stages of this research, as Ciccone (2016:12) notes, signature pedagogies can highlight tensions and controversies in a field and thus helps frame discussions about priorities and emerging trends.

The Hidden Curriculum

As previously highlighted, technicians are frequently described as ‘invisible’, and for some, the environments they work in (studios and workshops) can operate “in a dark cloud of misconceptions, myths, and distortions” (Seidell, 2009:1). In this context, Jackson’s concept of “the hidden curriculum” (1968) emerges as a pertinent framework to discuss technical pedagogies. The hidden curriculum refers to the values, attitudes, behaviours, and norms that students are not taught explicitly within the formal curriculum but that they pick up through socialised learning. Tsang (2011) explores the connections between the hidden curriculum, threshold concepts and students as ‘evolving professionals’ (a term used to describe learning to become a professional). Tsang’s article relates to the health sciences and training to become a medical doctor. However, her theories would appear to hold in relation to the creative professions. For Tsang, “Crudely, the hidden curriculum could be described as the aspects of a profession that students are not taught but which they learn and are influenced by along the way… a wide variety of concepts and domains that are not ‘core curriculum’” (2011:3). From Tsang’s interpretation, the acquisition of tacit knowledge, and experimental practices of creative arts students may be considered ‘hidden’ because while technical instruction can be timetabled, few curricula are explicit in terms of technique, know-how, and skills.

3.7 Conception-based studies of teaching

Literature discussed so far has concerned technical pedagogies; however, it is important to restate that this thesis explores conceptions of the phenomenon rather than the phenomenon itself. Accordingly, in the following sections, relevant conception-based studies of learning and teaching are identified and discussed. There have been numerous studies that have explored academic conceptions of teaching (e.g., Dall’Alba, 1991; Pratt, 1992; Samuelowicz & Bain, 1992; Kember and Gow, 1994; Prosser *et al.*, 1994; Kember, 1997;

Boulton-Lewis, 2004; Pratt and Smulders, 2016). Research of this type is categorised within the field of the Scholarship of Teaching and Learning (SoTL). SoTL is an emerging field of study which began as a discipline-based movement committed to exploring the signature pedagogies and learning styles of each discipline within higher education, with little exchange across disciplines (McKinney, 2013). Felten and Chick (2018) suggest that for some, SoTL itself is a signature pedagogy of higher education. In their study of teachers 'Thinking, Beliefs and Knowledge in HE' Hativa and Goodyear concluded:

> Academics differ in their beliefs about which forms of knowledge are valuable, how knowledge should be organized for learning, and what should occur during teaching and learning, and these differences influence the methods which they and their students use (2002:56 cited in Trowler *et al.,* 2012:26).

To date, there appear to be no comparable studies concerning conceptions of technical teaching. However, the conceptions described by Hativa and Goodyear would appear to be uncontroversial and generalisable to non-academic educators. Yet, the authors explicitly differentiate 'teachers' from 'technicians' stating "teaching should be likened to the professional work of medical doctors, lawyers and architects, *rather than to technicians* [my emphasis] who use their skills to perform tasks using prescriptions or algorithms designed and defined by other professionals" (2002b:335).

However, as previously identified, in the past two decades, distinctions between academic and non-academics educators are increasingly blurred and eroding (Macfarlane, 2010; 2011), non-academics (such as technicians) can play an important role in teaching and supporting learning (TALENT, 2022), many professional staff have academic credentials paralleling those of their academic colleagues (Whitchurch, 2013), creative arts technicians are at the vanguard of this phenomenon (Wragg *et al.,* 2023), are frequently recognised as qualified teachers (Savage, 2019) and find themselves able to transition into academic roles (Savage, 2018a). In light of these convergences, it would seem reasonable to speculate that academic and technical teachers of practice-based subjects may share similar conceptions of their pedagogies (Orr and Shreeve, 2018:133).

A detailed review of academic conceptions of teaching is beyond the scope of this study; however, there are notable studies that provide a theoretical context. These include the "Teaching Perspectives Inventory" (TPI) (Pratt *et al.,* 2000), The "Approaches to Teaching Inventory" (ATI) (Trigwell and Prosser, 2004), Approaches to Teaching Design Subjects

(Trigwell, 2002), and Drew's (2003) adaptation and application of the ATI to creative arts subjects.

Pratt *et al*., (2000) developed the Teaching Perspectives Inventory (TPI) to measure the actions, intentions, and beliefs of teachers (of adult learners). For Pratt, "A perspective on teaching is an inter-related set of beliefs and intentions that gives direction and justification to our actions. It is a lens through which we view teaching and learning" (Pratt, 2002:1). Pratt interviewed and observed over two hundred and fifty teachers using phenomenographic methods and identified five distinctly different views of teaching, summarised below:

- Transmission perspective: delivering content effectively

- Apprenticeship perspective: learning through application and practice

- Developmental perspective: building bridges between present and desired ways of thinking

- Nurturing perspective: providing safe and trusting spaces for learners to take risks, and make mistakes, celebrate success to build self-efficacy

- Social Reform perspective: dominated by explicit, well-articulated social, political or moral ideologies.

Pratt's perspectives span a continuum ranging from the relatively simplistic (Transmissive), to more complex (Social Reform). Notably, he does not advocate for any perspective as best practice, or suggest any is more effective than another; instead describing the perspectives as 'mapping a plurality of good teaching' (Pratt *et al.*, 2016). He identifies that within this continuum of perspectives, there are two fundamentally different views of knowledge: 'objectivist' (where the teacher conceives knowledge as existing independent of the learner), and 'subjectivist' (conceiving of knowledge as something that is socially and contextually constructed by the learner). Objectivist views are based on a logic of discovery; subjectivist view are based on a logic of interpretation. Objectivist conceptions relate to increasing (quantitative) the learner's quantity of knowledge or skill (additive), whereas subjectivist perspectives move the learner from passivity, to being active interpreter and interrogator of content (qualitative), to shape their own learning, develop self-efficacy, and instigate positive change.

Trigwell *et al.,* (1994) conducted a comparable study into teaching approaches used by science teachers, which would develop into what would become the ATI. The ATI was developed to explore approaches to teaching in a way that was ontologically consistent with the established means for measuring students' approaches to learning (Trigwell and Prosser, 2004). Like the TPI, the ATI developed from a phenomenographic study. In this instance, it aimed to measure the critical aspects of the variation in approaches to teaching based upon interviews with twenty-four first year university physics and chemistry teachers in Australia. The study identified five approaches to teaching (strategies adopted by teachers and the underlying intentions that guided the strategies):

- Approach A: Teacher-focused strategy with the intention of transmitting information to students

- Approach B: Teacher-focused strategy with the intention that students acquire the concepts of the discipline

- Approach C: A teacher/student interaction strategy with the intention that students acquire the concepts of the discipline

- Approach D: A student-focused strategy aimed at students developing their conceptions

- Approach E: A student-focused strategy aimed at students changing their conceptions.

Approaches A and E (the extremes of the study) informed the development of the ATI. Comparable to Pratt's work (and consistent with the conventions of phenomenography) the findings were presented as a continuum. Approach A is conceived of as Information Transmission/Teacher-focused (ITTF), while Approach E is conceived of as Conceptual Change/Student-focused Approach (CCSF). ITTF approaches employ teacher-focussed strategies to communicate facts and skills. CCSF approaches are student-focused, in which the intention is to help students change their worldviews or conceptions of their discipline by actively constructing their knowledge. While Pratt (2016) does not advocate for the effectiveness of any particular perspective, Trigwell and Prosser (2004) concluded that a

CCSF approach was more likely to lead to high-quality student learning and greater teaching satisfaction. In contrast, ITTF approaches were found to be associated with surface levels of learning.

Trigwell and Prosser present the ATI as a valid and reliable relational instrument for measuring critical aspects of the variation in how teachers see and approach their teaching (2004:421). However, this is disputed:

> There are serious and irreversible concerns with the rigour and methodology adopted in the psychometric development of the ATI. The ATI manifestly does not reflect a functionally useful range of 'approaches to teaching', and its application to activities connected with the professionalization (and evaluation) of university teaching is rejected (Meyer and Eley, 2006:633).

Several of Meyer and Eley's criticisms relate to the epistemological underpinning of phenomenography, rather than the ATI itself (such as the focus on variation and deprioritising of frequency). These points are discussed in greater depth later in Chapter 4 (Research design and methodology). The ATI remains an active instrument used within contemporary research and SoTL (e.g., Cassidy and Ahmad, 2021; Mladenovici, *et al.,* 2022).

The aforementioned studies relate to conceptions of teaching within the broader HE sector rather than the specific ontological and epistemological idiosyncrasies of the creative arts. However, the potential to explore arts teaching as a distinct phenomenon using the ATI was recognised by the authors. Trigwell (2002) studied 67 design teachers' approaches to teaching and found consistent outcomes with non-arts teachers. Drew applied the ATI apparatus to creative arts teaching through her collaboration with Trigwell in which she developed a revised version of the ATI (Drew and Trigwell, 2003). Drew expanded the scope of the ATI to include skills teaching and social and situated learning (communities of practice). She worked closely with the original authors and is credited with contributing data sets that informed the review and revision of the ATI (Trigwell and Prosser, 2004).

Drew's collaboration with Trigwell built upon her earlier research (Drew, 2000 – cited in Drew and Trigwell, 2003), in which she identified five qualitatively different conceptions of teaching design subjects that ranged from the teacher "offering a range of practical and technical skills" to "teaching as helping to change students' conceptions." Drew's doctoral thesis '*The Experience of Teaching Art, Design, and Communication'* (2003) explored conceptions of and approaches to teaching situated within the context of practice-based teachers of art, design and communication using a combination of phenomenography (qualitative) and a modified ATI (quantitative). The qualitative element used semi-structured interviews to interview 44 teachers from 8 UK Universities. The study also explored links between these conceptions and communities of practice associated with the subject context. Analysis was grouped into three discrete sub-disciplines: fine art, design, and media, intended to discern variation within practice dimensions. Media was defined by Drew as "those teaching the practices of journalism, film making, television and video production, animation and photography" (2003:82). Contemporary interpretation of the findings should acknowledge that disciplines relating to computer games, visual effects, UX, virtual, augmented, and immersive realities had yet to become established in HE.

Drew's findings (based on 73 responses) were consistent with earlier studies (showing an ITTF/CCSF continuum). However, she identified similarities between the conceptions of design and media teachers (with a broader range of approaches) and variance within fine art (emphasis on developing learner conceptions and changing students as a person). She speculated this was likely due to design and media courses being more likely to embody the characteristics of a hard-applied discipline with a vocational slant and emphasis on problem-solving. In contrast, Fine Art could be conceived of as a soft, applied discipline (Drew, 2003:138). Drew synthesised the three sub-disciplines into a single outcome space that she titled "Conceptions of Teaching Creative Practices" (2003:140), summarised below:

- Conception A: Teaching is offering students a range of practical and technical skills
- Conception B: Teaching is developing students' critical, practical and technical skills through student interaction
- Conception C: Teaching is developing students' skills and conceptions in the context of professional practice
- Conception D: Teaching is helping students change conceptions
- Conception E: Teaching is helping students to change as a person.

Although technicians did not feature in her study, Drew acknowledged “in the practice-based areas, technical staff are important and valued team members. Recruitment, training, retention and the role of such staff needs further analysis” (2003:49).

While no studies prior to this have specifically examined technicians’ conceptions of their pedagogies, the transmissive approaches of both Pratt (2016) and Trigwell and Prosser (2004) are consistent with stereotypical ‘show and tell’ methods of technical demonstrations. Drew’s (2003) ‘Approach A’ (academic instruction relating to practical and technical skills), is perhaps most representative of how many working in creative arts HE might conceive of technical teaching, in which:

> The teacher aims to reinforce technical ability by giving demonstrations and showing individual or groups of students’ ways of making or doing…There is an emphasis on correct procedures and observing or checking that these are carried out correctly or for the students to demonstrate some technical competence… The teachers discuss the focus of their teaching, to demonstrate a process, observe the students practising it and to check they can do it (Drew, 2003:141).

3.8 The gap in knowledge: who it matters to and why?

The final section of this chapter explicates and problematises the lack of knowledge and understanding of technician pedagogies in creative arts HE. The ‘problem’ and why it matters is described from the perspective of eight key stakeholder groupings spanning the macro to the micro: Researchers, Government and Policymakers, Networks and Sector Bodies, the HE Sector, Creative Arts Universities, Academics, Technicians, and Students.

Stakeholder	Problem	Why it matters
Researchers	• Despite playing a vital role within HE and research, the technical community has historically not been represented or considered within research or policymaking (TALENT, 2022:39). Existing theories, assumptions, knowledge, and understanding concerning practice-based teaching in the creative arts are based exclusively upon academic activities and studies.	• The omission of technical pedagogies from research literature represents a significant epistemological gap within existing frameworks and theories of SoTL. Additionally, the lack of a corpus or frameworks of understanding inhibits the learning and research of students studying education.
Government and Policymakers	• There is almost total invisibility in data (HESA) and policy regarding technicians and their pedagogies in UK HE meaning “Policy makers routinely fall back on stereotypes or images of work drawn from other occupations in order to make sense of technical work” (Barley and Orr, 1997:18). • Governmental policy (e.g., BIS, 2016a; DfE, 2019; DfE, 2021) overtly supports emphasis on technical skills development and employability, yet there is scant knowledge of how they are taught and learned in the creative arts.	• The UK has the potential to become a global authority in this domain. However, a lack of credible research or researchers limits this potential and inhibits the development of authentic policy or strategy.

Networks and sector bodies	• Following TALENT (2022), the UK Institute for Technical Skills & Strategy (ITSS) was founded in 2023 to provide consultancy and advice to government, policymakers, and HEIs on all aspects of technical practice. A workstream includes the establishment of a national development programme of technical teaching (UoN, 2023), however, there is limited understanding of pedagogical component of technician roles. • The Council for Higher Education in Art and Design (CHEAD) and the European League of Institutes of the Arts (ELIA) have partnered with the European Technical Heads Organisation (ETHO) to develop leadership and management models for creative arts technicians.	• Without credible empirical research that explains and theorises how technicians teach and support learning, any developmental programmes, career or promotion pathways of technical staff will be incomplete and impoverished.
The HE Sector	• The technician workforce in UK HE is estimated to comprise up to 50,000 staff (TALENT, 2022:7). Yet, there are no established frameworks to aid in understanding or developing the educational contribution of this nationally significant element of the workforce.	• Without reliable knowledge of technical pedagogies, senior leaders must rely upon anecdotal frames of reference to strategise, recruit, onboard, manage, and deploy technicians. These are likely to be ill-informed, and inefficient. As Barley (1996:408) notes, “without knowledge of technicians work,

	• The Independent Panel on Technical Education (BIS, 2016a) highlighted a national shortage of technicians across all sectors and the Governments' R&D People and Culture Strategy (DfSIT, 2021:10), identified a fifth are aged over 55 years (18%) and likely to retire within 10-15 years (TALENT, 2022:52).	organizational theorists risk building theories of change around terms with shallow content."
Creative Arts Universities	• Creative arts universities are typically small and specialist institutions, and technicians represent a sizable and integral element of their workforce. Workforce planning can be based on outdated legacy models, assumptions, and stereotypes and fail to integrate or scale effectively with the curriculum, or academic pedagogies. • Pedagogic responsibilities within technician role profiles are not always representative of roles enacted and duties are not well understood or acknowledged within job evaluation schemes (e.g., Higher Education Role Analysis (HERA)). • Learning, Teaching, Assessment, and Quality Strategies typically exclude the pedagogies of	• Without a clear understanding of how technical staff contribute to their educational model, creative arts universities risk inefficient workforce models, a fractured curriculum, leading to sub-optimal learning and teaching experiences for their learners and demotivated staff. Furthermore, the lack of clarity concerning pedagogical activities of technicians risks quality assurance and quality enhancement issues. Institutional improvement plans, teaching observation and evaluation schemes, or improvement initiatives for teachers can omit technicians, and there are no models of teaching excellence to benchmark. As Kane *et al.*, note "An important outcome of any research on university teaching is its application in assisting novice or less experienced teachers in their development" (2002:200).

	technicians. Annual course reviews, evaluation policies, procedures, criteria, and validations are unlikely to be informed by or encompass all who teach the course.	
Academics	• Academic staff responsible for designing, planning, and monitoring the delivery of curriculum may lack knowledge and awareness of technical teachers' intentions, content, strategies, and methods. • The lack of integration between academic and technical job families and roles compromises the principle of constructive alignment (Biggs and Tang, 2009), in which taught content in the studios and workshops is aligned to the intended outcomes of the unit or course and the related assessments.	• The curriculum as written may not be representative of the curriculum delivered, increasing the likelihood of dissonance, dual or duplicated curricula, and misalignment between technical and academic learning and teaching activities.
Technicians	• Despite increasing reliance on creative arts technicians who teach, technical pedagogies are not widely acknowledged, recognised, or rewarded by the sector or institutions. Therefore, they are not easily quantified, managed, improved, or theorised. This apparent paradox contributes to what Vere (2016) describes as a	• These factors, combined with the notion of invisibility and a lack of accountability for teaching quality, can foster self-limiting beliefs, high stress, low morale, underperformance, sub-optimal teaching, and poor staff retention.

	disparity of esteem with academic colleagues.	
Students	• Students are largely unaware and unconcerned whether or not their teacher is formally classified as an academic (Whitchurch, 2013:90). However, it is critical that they are taught the right content at the right time in a way that is understandable and meaningful to them.	• The wrong teacher or poor teaching risks learners' health, safety, and wellbeing, lowering motivation, aspiration, attainment, expectations of success, and overall experience of education and life prospects.

Figure 9: The gap in knowledge: who it matters to and why.

The problems and potential impacts set out in Figure 9 are located in the present, but looking ahead, the creative arts HE sector is in the vanguard of the adoption, implementation, and subversion of new and emerging technologies and technology driven arts-disciplines. At their leading edge, technical pedagogies in these fields extend beyond instructional duties, becoming more holistic and immersive, to include the construction and curation of authentic spaces, configuring and designing workflows, and role modelling for learners the complexities of thinking through and solving dynamic technological problems without precedent. The impact of these technologies, combined with an emphasis on creativity (Shashindar *et al*., 2021; Aguilera and Ortiz-Revilla, 2021; Videla *et al*., 2021) indicate that specialist skillsets will be scarce, and those who combine technical knowledge with the ability to teach will be in high demand, leading to skills shortages (DfSIT, 2021). If the sector cannot understand and define these roles, they cannot recruit to them.

3.9 The research aim and objective

A concise summary of the research problem set out above is that there is a lack of knowledge, understanding, consensus, or definition of the 'what,' 'how,' or 'why' concerning technical teaching and support of learning (the term 'teaching' is used as shorthand from this point forward) in the creative arts, and this impacts the sector, and its key stakeholders in a multitude of ways. Rather than seek a universal truth or identify a singular 'essence', this study adopts a pluralistic interpretative non-dualist ontology seeking to discover and categorise multiple equally valid truths experienced in different ways, in different scenarios, and at different times.

- The aim of the study is to discover, interpret, describe, and systematise conceptions of teaching as experienced and reported by visual arts technicians.

- The research objective is to establish a classification of conceptions.

The aim and objective of the research are operationalised through the research questions, and the voices capable of providing the most complete, authentic, and credible accounts in response to the stated problem are those of the technicians themselves. Therefore, as set out in the introductory chapter, the main research question is:

- How do visual arts technicians in higher education conceive of their pedagogies?

Focussed using three heuristic sub-questions:

- What is it that visual arts technicians believe they teach?
- How do visual arts technicians approach their teaching?
- Why do visual arts technicians teach in the ways that they do?

This framework is designed to facilitate a systematic acquisition and organisation of knowledge and to aid the construction of theory and practical solutions. Two details not explicit in the questions (but detailed in this thesis), are the location of the research (UK) and timing (fieldwork undertaken during 2022). The gap in knowledge set out in Figure 9, is revisited in the final chapter and reflected upon based on the insights of the study.

3.10 Purpose and potential usage

The primary goal of this study is to generate new theories that can make an original contribution to knowledge. A secondary purpose is to inform, challenge, and disrupt existing orthodoxies and paradigms while informing meaningful educational interventions:

> …once these variations are made explicit, educators can implement corresponding strategies to change the less desirable variation(s) of these elements (e.g., fragmented conceptions, surface approaches, and negative perceptions) to the more desirable ones (e.g., coherent conceptions, deep approaches, and positive perceptions) (Han and Ellis, 2019:2).

There are no comparable studies in this expanding and strategically important field and there is potential for the study to generate new knowledge that the sector may apply to enhance its understanding of itself.

3.11 Summary

This chapter has reviewed theoretical literature, and studies concerning the prevalence and sophistication of technical pedagogies within creative arts HE and theorised a pre-empirical theoretical framework to arrange and reflect upon existing academic theories of teaching. It has also identified relevant academic conception-based studies and set out the gap in knowledge, why it matters, and who to. The following chapter introduces the research design formulated to address the gap.

Chapter 4: Research design and methodology

4.1 Chapter introduction

This chapter bridges the pre-empirical stages of the study (Chapters 1 to 3) and data collection and fieldwork (Chapters 5 and 6) ahead of the process of analysis (Chapter 7) and the outcome of analysis (Chapter 8). It does so by setting out the function, purpose, and detail of the research design, by establishing and justifying the methodological approaches of collecting, analysing, and reporting data to respond to the research questions.

4.2 Research design

Cohen *et al*., (2018:173) point out that planning research has two phases; a divergent and a convergent phase. The divergent phase opens the range of possibilities, whilst the convergent phase evaluates and assesses the desirability and practicalities that will provide the optimum outcomes to be taken forward in a realistic action plan. At the divergent stage, choices are made, each with advantages and limitations. One of the most critical choices to be determined during the divergent stage relates to methodology. The ontological and epistemological attributes should primarily govern decision making. Clough and Nutbrown describe how an ontology is a theory of what exists and how it exists, and an epistemology is a related theory of how we can come to know those things (2012:37). “To characterize how something is apprehended, thought about, or perceived is, by definition, a qualitative question” (Marton, 1986:33).

4.3 Ontological and epistemological positions

It was clear from the outset that a study of subjective conceptions of technical pedagogies (rather than technical pedagogies as a discrete objective phenomenon in and of itself) would require a qualitative (rather than quantitative), and interpretive (rather than positivist) methodology. The positivist approach is fundamentally inconsistent with the nature and characteristics of conceptions:

> An interpretive paradigm rests, in part, on a subjectivist, interactionist, socially constructed ontology and on an epistemology that recognized multiple realities,

agentic behaviours and the importance of understanding a situation through the eyes of the participants (Cohen *et al.,* 2018:175).

Interpretative research is based on the notion that there is no reality waiting to be discovered or 'single truth that can be revealed' (Denzin and Lincoln, 1998); instead, there are likely to be a plurality of authentic realities and legitimate but contrasting interpretations of them. Therefore, the research design employed was aligned with the interpretative-qualitative tradition espousing a non-dualist ontology, in which the world (as it is experienced) is not constructed by that individual, nor is it imposed upon them; it is constituted as an internal relationship between them both (Marton and Booth, 1997). It is this relationship between technicians and their pedagogies and the meaning-making that they infer from it that informs the design of this research. The relationship between technicians and their teaching is the critical element of the study and participants' conceptions represent the "units of analysis" (Collier-Reed and Ingerman*,* 2013:2). Conception-based enquiries bring both challenges and the potential to create compelling studies, developing factual, theoretical, and conceptual outcomes. They can also lead to real-world enhancements to improve teaching (Kane *et al.*, 2002). Furthermore, "It has been claimed that the most significant factor in influencing teaching practices and learning outcomes may be the underlying conceptions held by teachers" (Åkerlind and Jenkins, 1998:287).

Ontologically speaking, conceptions are individual and personalised. The same person can experience a singular phenomenon in different ways at different times, and in different contexts. Ekeblad and Bond describes this as "The Dynamic Nature of Internal Relations" (1994:156), in which the relation between a person and a phenomenon is always of a dynamic nature, which also involves the dynamics of the situation. It is also possible for multiple people to experience an identical occurrence simultaneously and to conceive of it differently based on their individual histories, values, beliefs, and characteristics (a phenomenon termed apperception). From an epistemological perspective, conceptions (as experienced in the first order) cannot be rendered by another as research data. Put another way, "The way teachers think about teaching and learning cannot be observed" (Prosser *et al.*, 1994:218). Therefore, conceptions must be studied via a second-order perspective. The difference is that "In the first-order perspective we aim at describing various aspects of the world and from the second-order perspective we aim at describing people's experience of various aspects of the world" (Marton,1981:177).

Pratt describes conceptions as being composed of a dynamic and interdependent trilogy of Actions, Intentions, and Beliefs (2016:9), while for Ekeblad and Bond, a conception is simply “the phenomenon as it is described by the person” (1994:153). Ashworth and Lucas (1998:428) describe conceptions as having their own inner validity and suggest researchers (using phenomenography) should adopt no position on the correctness or falsity of participant accounts. However, the researcher and research design should also be mindful of the epistemological status of conceptions; insofar as they are descriptions of experiences rather than the experiences themselves. Nobel Prize-winning psychologist Daniel Kahneman theorises this distinction between the “experiencing self” and the “remembering self” (Kahneman *et al*., 1993). A similar distinction was noted by Schön (2016) in his iconic Reflective Model that differentiates reflecting ‘in-action’ (during an experience) and reflecting ‘on action’ (after an experience). Kahneman’s experiencing self exists within the moment, receiving, interpreting, feeling, and acting in real-time as an experience unfolds. In contrast, the remembering self (the self that synthesises and generates conceptions for description) reflects and recalls an edited and neurologically processed version of the experience. Imagination and recollection are low-resolution versions of the world as experienced, lacking the multi-sensory intensity of haptic, visceral ontologies, and are subject to error, misinterpretation, degradation over time, and embellishment. This distinction surfaces a potential dissonance between what the research participants actually think and do and what they say they think and do. However, while conceptions are overtly subjective descriptions, when recorded in sufficient quantities, they can “represent variations of a phenomenon, or more accurately, variations of awareness of a phenomenon (or lack thereof)” (Varma, 2019:36). For Collier-Reed *et al*., (2009:2) actively focussing upon the collective experience “points to coming to discern phenomenon in new and more powerful ways”, which is consistent with Marton and Booth (1997) who propose that awareness of a phenomenon occurs through the experience of variation in that phenomenon. It was, therefore, critical that the methodology and methods provide the framework and toolset to record a diverse spectrum of narrative accounts of creative arts technicians expressing their conceptions of their pedagogies.

4.4 Methodological options

After establishing the ontological and epistemological foundations, several research methodologies were initially considered as potentially viable options. Specifically, Grounded Theory, Ethnography, Case Study, Phenomenology, Variation Theory, and Phenomenography were evaluated. A succinct overview of the advantages and limitations of each method is described below. Following this evaluation, phenomenography was selected.

Methodology	Advantages	Limitations
Grounded Theory	Provides practical and flexible approaches to interpret complex social phenomenon. Generates rich and textured data to develop theory and aid in describing and explaining a given phenomenon.	Multiple versions differing in epistemologies, ontologies, theoretical foundations and frameworks (Cohen *et al.,* 2018:715). Enquiry disregards previous studies, literature, policy, and contextual information concerning the research topic. Usually requires multiple sources of data (such as interviews and observations) and can be time intensive. Conceptions are not taken at face value, without analysis and critique (Hussein *et al.*, 2014).
Ethnography	Uses observation and interaction with research participants to gain a rich and detailed understanding of a particular culture or community.	Ethnography is observational and does not place emphasis on variation or seek to capture the full range of possible experiences. It usually requires the researcher to have close and extended contact with participants to experience and document their life worlds.
Case study	Can be used to provide intensive analysis of a specific unit (or multiple instances) of a phenomenon, uses a range of methods and outcomes can be	Focus is specific to the locale of the examined units. Does not seek variation or aim to capture the spectrum of experiences. It has been criticised on the basis of

	generalisable to comparable contexts.	rigour, researcher bias, and reliability (Zainal, 2007).
Phenomenology	Well-established and respected methodology that aims to describe the essence or inner core of a phenomenon.	The focus is on establishing commonality of an experience or 'essence' and does not provide the epistemological apparatus to capture and explore variation.
Variation Theory	Developed as an alternative to phenomenography, with a specific emphasis on identifying variation in learning. The emphasis is on explaining variation.	Variation Theory focuses on the experiences of learners rather than the teachers. It seeks to explain variation between instances rather than describe the full range of possible ways of experiencing (Land *et al*., 2016).
Phenomenography	Developed with the specific goal of recording the qualitatively different ways in which a group of individuals experience a given phenomenon. Strong track record of use and impact within education when used to study the conceptions of teachers or learners.	Criticised for researcher subjectivity and lack of depth, individual, and context in the final outcome (Webb, 1997a), and lack of consensus on methodological approaches and analysis (Åkerlind *et al*., 2005). Further limitations (and controls), are described from this point forward in the thesis.

Figure 10: Methodological options initially considered within the research design.

4.5 Why phenomenography?

In the following section, the rationale for selecting phenomenography is justified, and the methodology is introduced in terms of its origin, theoretical foundations, and how its conventions were used to inform the design of this study. The founder, Swedish educational psychologist, Ference Marton explains:

> Phenomenography is the empirical study of the limited number of qualitatively different ways in which we experience, conceptualise, understand, perceive, apprehend etc, various phenomena in and aspects of the world around us. These differing experiences, understandings etc are characterised in terms of categories of description, logically related to each other, and forming hierarchies in relation to given criteria. Such an ordered set of categories of description is called the outcome space of the phenomenon… The categories of description corresponding to those differing understandings and the logical relations that can be established between them constitute the main results of a phenomenographic study (Marton, 1994:4424).

While any of the methodologies set out in Figure 10 could have feasibly been used to conduct an in-depth study of technicians' perspectives of their pedagogies, phenomenography is particularly suited to addressing questions relevant to learning and understanding in an educational setting (Marton and Booth, 1997). It provides a framework to construct multifaceted representations of a given phenomenon. With its focus on variation, it facilitates an exploration of diverse conceptions, creating the potential for a greater and more detailed understanding of creative arts technical pedagogies.

4.6 Origins and nature

Phenomenography was originally conceived and developed by educational researchers led by Marton at the Department of Education, University of Gothenburg, Sweden, in the late 1960s and early 1970s. The word 'phenomenography' was coined in 1979 and appeared in print for the first time two years later (Marton, 1981). It shares many characteristics with the more established phenomenology (developed by Edmund Husserl) insofar as both enquire into phenomena as they are experienced in human life worlds, with the distinction that phenomenography focuses upon the qualitatively different ways in which people experience a phenomenon rather than the essence, or inner core, of the phenomenon itself that phenomenology explores (Larsson and Holdstrom, 2017).

In terms of its philosophical underpinnings, phenomenography is a non-dualist, second-order, qualitative, inductive research approach which seeks to identify and understand the variation in individuals' experience and conception of a shared experience or aspect of the world. Marton and Booth (1997) describe how it combines a non-dualist ontology with a concrete focus upon experience. For Uljens the only reality there is, is the one that is experienced. The essence of reality lies in the whole range of individual experience (Uljens, 1996:114). Reed expands "The subject and object of an experience are not separate, and an individual's experience of a phenomenon is the internal relationship between them. It is this relational view that forms a cornerstone of phenomenography" (Reed, 2006:2). This implies that there is no dividing line between the individual, or 'inside world', and the phenomenon, or the 'outside' world (Varma, 2019:37). Thought of in these terms, phenomenography is epistemologically aligned with a key element of the research topic: the reflexive nature of theory (idea) and practice (implementation) found within the creative arts.

Through investigating the world as people experience it and construct their knowledge of it, phenomenography "aims to describe the key aspects of the variation of the experience of a phenomenon rather than focus on the richness of individual experiences" (Reed, 2006:2). However, to do so, the researcher must first ensure the phenomenon in question is defined and consistent. Marton explains, "We have to distinguish seeing the same thing in different ways from seeing different things" (2015:120). Once a phenomenon-in-common is established, a foundational principle of phenomenography is that for any given phenomenon, there are a finite number of ways of experiencing and understanding it. While phenomenographers accept that all individual experiences of a phenomenon are characteristically unique, based upon our personalities, biographies, and prior experiences (Varma, 2019; Ekeblad, and Bond, 1994), they argue that in the process of creating meaning from variation and invariance and structures of experience within a phenomenon, a limited number of ways of understanding will remain (Larsson and Holdstrom, 2017). A phenomenographic study aims to describe variation in experience in a useful and meaningful way, providing insight into what would be required for individuals to move from less powerful to more powerful ways of understanding a phenomenon (Åkerlind, 2005).

Trigwell (2006:369) offers the following illustration and point by point commentary on how phenomenography deviates from other research approaches (Figure 11):

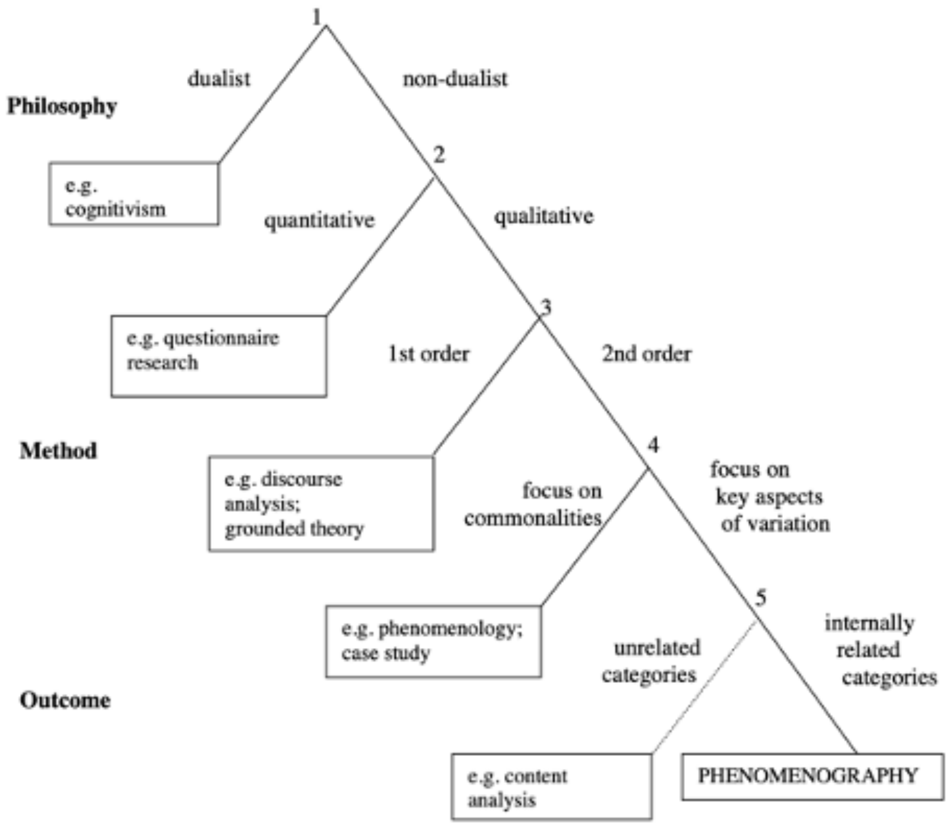

Figure 11: Defining phenomenography (Trigwell, 2006).

At point 1: phenomenography is non-dualist, meaning is seen as being constituted in the relationship between the individual and the phenomenon.

At point 2: phenomenography is a qualitative rather than quantitative approach. It can be seen as being philosophically or methodologically qualitative.

At point 3: phenomenography adopts a second-order rather than first-order approach.

At point 4: the focus of the analysis in phenomenography is on the variation in the experience of a group of people.

At point 5: phenomenography aims to articulate the logical internal relations between the different ways of experiencing a phenomenon.

4.7 Usage in education

Since its inception, phenomenography has been used within higher education to study various teaching and learning activities and has contributed to major educational theories, including "Deep and surface learning" (Marton and Säljö, 1976; Biggs and Tang, 2009); the Teaching Perspectives Inventory (Pratt, 2000), and the "Approaches to Teaching Inventory" (Trigwell and Prosser, 2004). Tight suggests "Phenomenography has a good claim to be recognized as the most innovative development - in terms of method, theory and/or design - so far within the higher education research field" (2019:11). Despite this, it has comparatively low usage in educational research. At the time of writing (02/01/2024), a search for peer-reviewed studies available on the Education Research Complete (ERIC) generates 798 phenomenographic articles in contrast with grounded theory (14,103), ethnography (15,513), and phenomenology (11,813). However, it is favoured by numerous researchers in the field related to creative arts and teaching, e.g., (Drew, 2003; Trigwell, 2002; Vaughan *et al.*, 2008; Shreeve, 2008, 2010; Souleles, 2012). It is proven to be an adaptable methodology that researchers can combine with other heuristics or mixed methods. Examples include Variation Theory (Durdon, 2018), visual imagery (Collier-Reed, 2006), Role Theory (Romany, 2023) and Activity Theory (Shreeve, 2008). Additionally, approaches such as participant observation, documents (lesson plans and schemes of work, analysis, field notes, photographs, exemplars, and so on) can also be used to increase confidence in research insights.

4.8 Methods

Phenomenography seeks to capture the broadest possible range of experiences using verbally articulated accounts. In traditional phenomenographic analysis, sections of transcripts containing excerpts of participant conceptions are physically cut out from the page (Collier-Reed and Ingerman, 2013), the irrelevant text is discarded, and harvested conceptions (termed as 'meaning units of experience') are placed in 'the pool of meaning' which, contains decontextualised fragments of interviews that capture all possible ways of experiencing the phenomenon (Marton, 1994:4428).

Conceptions are analysed in terms of their structural (experiencing) and referential (meaning) qualities. Marton and Booth (1997) theorise this as a possible 'science of experience' comprising an internal and external horizon to the structure of experience; the internal horizon represents the elements of the phenomenon, whereas the external horizon extends beyond the boundaries of the immediate experience to include context. “The two aspects, meaning and structure, are dialectically intertwined and occur simultaneously when we experience something” (Marton and Booth, 1997:99). These points are expanded upon in Chapter 7 (Data analysis) but are reproduced below in Figure 12 to foreshadow the points to come.

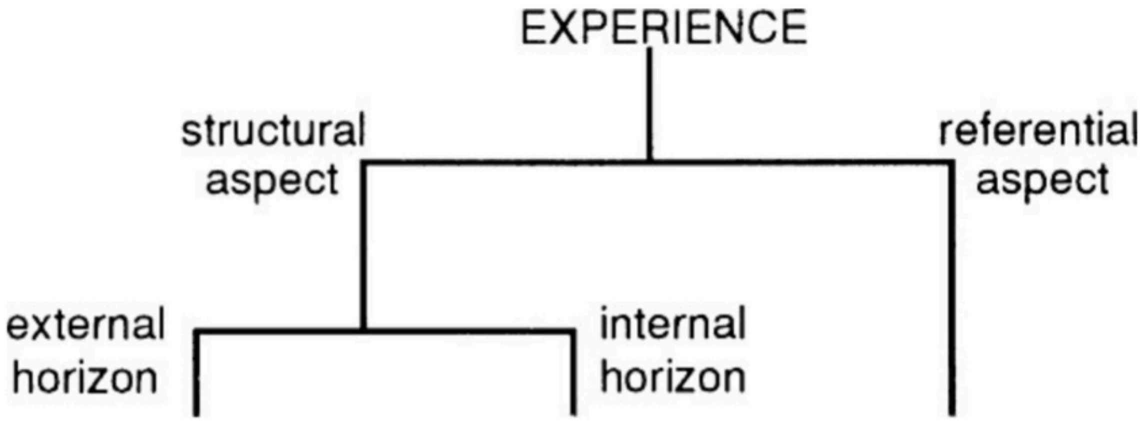

Figure 12. The unit of a science of experience, a way of experiencing something (Marton and Booth, 1997:99).

4.9 Outcomes

The process of phenomenographic analysis postulates ‘categories of description,’ which the researcher forms through examining commonality and, more critically, variation of experience. Once established, these categories of description represent the foundations of the ‘outcome space’. The outcome space is the term used by phenomenographers to describe a hierarchically inclusive set of logically related categories on a continuum of complexity that are qualitatively distinct from each other, representing the full spectrum of variation in which participants have experienced the phenomenon. The categories and their underlying structure are the primary outcome of phenomenographic research and generate the insights that respond to the research questions.

4.10 Criticisms and limitations

Like all methodologies, phenomenography has critics and limitations. An in-depth critical analysis of phenomenography is beyond the scope of this study. However, salient points from the literature are outlined briefly below, mitigations are described at relevant points (with particular emphasis on data collection and analysis).

Despite its many advocates and impactful studies within higher education, and emerging commonalities (Åkerlind, 2004), some consider phenomenography to be a relatively immature and underdeveloped methodology with a lack of consistent approaches and ambiguities (Åkerlind:2004; Richardson,1999; Tight, 2019). Accordingly, it has numerous critics and commentators, see for example (Uljens,1996; Stoltz, 2020; Hajar, 2021). Among the most vociferous is Graham Webb. In his 1997 article 'Deconstructing Deep and Surface: Towards a Critique of Phenomenography' Webb challenged what he described as the "foundation stone upon which much of the research, theory and practice of higher education has stood for twenty years… the canon for educational development" (Webb, 1997a:197). Webb's critique of deep and surface learning is rooted in the observational and interpretive neutrality of the researcher and, in particular, the lack of clarity concerning the researcher's role in the construction of results. Among his numerous points, Webb challenged "the ability for researchers to have pristine perception, make neutral observations, build objective categories, and give neutral interpretations: each of these activities is informed by theory and prejudice" (1997a:201). Two eminent phenomenographers responded to Webb's article in the same journal issue. Entwistle (1997) defended deep and surface learning, while Ekeblad (1997) argued that Webb's challenge to the methodology was based upon a non-representative simulacrum of phenomenography constructed for the purpose of critique. Webb did not accept either argument (Webb, 1997b). Phenomenography has moved on since these exchanges in the late 1990s, but Webb's criticisms, and others (some of which are described below), remain in contemporary debates and discourses associated with the methodology.

Phenomenography is an interpretative methodology that describes manifestations of human experience and qualitative differences between them in relation to a given phenomenon. However, in doing so, it does not seek to understand *why* a person exhibits a specific conception, nor is it a problem whether a subject's verbal expressions are consistent with his or her other activities (Uljens, 1996). Neither does it give regard to "the concept of intentionality, denoting that consciousness must be understood in terms of what a subject is aware of in being aware of something" (Uljens, 1996:106). Additionally, unlike most methodologies, phenomenography pays no heed to the frequency of conceptions, assigning equal value and validity to all described experiences. It also separates the conception from the individual and their context in its final output (Varma, 2019:39). Richardson (1999:53) critiques the lack of scepticism or challenge to interviewee statements and cautions the lack of specificity and explicitness concerning both the methods for collection and analysis of data; highlighting a reliance on participant and researcher interpretations, and risk of "self-fulfilling prophecies" (Richardson, 1999:74).

In its purest form, phenomenography excludes the research topic's historical, social, and cultural elements. These limitations can flatten out the rich data articulated between the individual lifeworld of participants and their relationship with the phenomenon, decontextualising and removing rich, personal narratives and anecdotes (Shreeve, 2008). However, in this study, the inclusion of these contextual points is essential in defining and theorising the topic and has therefore been discussed during the pre-empirical stages. Contextual insights articulated by participants are also reviewed in Chapter 9 (Discussion) where they might impede or enhance the application of insights within actionable strategies.

The abovementioned characteristics of phenomenography are not inherently problematic in generating responses to the research questions. Still, they are acknowledged here for transparency and completeness. Alternative strategies are developed and described when these limitations run counter to the research aim, objective, and questions. Despite its perceived shortcomings, as Entwistle noted in his response to Webb, "For researchers in higher education, however, the test [of phenomenography] is generally not its theoretical purity, but its value in producing useful insights into teaching and learning" (1997a:2).

4.11 Researcher bias and subjectivity

Researcher bias and subjectivity are among the most significant criticisms levelled at phenomenography. Management of these interrelated issues is fundamental to the credibility and the trustworthiness of the outcomes. However, before setting out the approaches and controls used in this study, it is important to acknowledge that the risk of bias and subjectivity are not exclusive to phenomenography, indeed "Any planning of any research should include recognition and scrutiny of the researcher's position, and analysis of its strengths and weaknesses" (Punch, 2009:45). All researchers bring personal biographies, and histories and speak from a particular perspective. However, phenomenography, like grounded theory, is an interpretive approach that seeks to enter the lifeworld of the participants as it exists before, during, and untainted by the research enquiry. The research design must establish and maintain optimal conditions for individuals to describe their experiences, ensuring sufficient neutrality and freedom for interviewees to speak without restriction or inhibition to reflect upon the elements of their experiences. In an idealised phenomenographic study, the researcher would introduce no presuppositions to a study at all. Yet, this is impossible in practice, as without defining the research and the phenomenon, there could be no research, and the interview conversation would be directionless. This “dilemma” (Stoltz, 2020:1086), forms the paradox of phenomenography. Moreover, “the fact that the research interviews have to be introduced to the interviewee as being ‘about’ something introduces a major presupposition” (Ashworth and Lucas, 1998:427) and “Familiarity with the theme investigated is required to be able to pose significant questions” (Brinkmann and Kvale, 2018:62). Marton describes how preconceived ideas should be ‘bracketed’ by researchers “instead of judging to what extent the responses reflect an understanding of the phenomenon in question which is similar to their own, he or she is supposed to focus on similarities and differences between the ways in which the phenomenon appears to the participants” (Marton, 1994:4428).

No consensus exists on what must, should, or could be bracketed or how. Ashworth and Lucas recognise that bracketing is problematic “and can never be fully achieved” (2000:307). And, as Stolz (2020:1086) explains, even if bracketing is employed satisfactorily, researchers are expected to have some knowledge of the subject matter so they can understand the experience for categorising and hierarchically ordering variations discovered. Marton and Booth describe how "At every stage of the phenomenographic project the researcher has to step back consciously from her own experience of the phenomenon and use it only to illuminate the ways in which others are talking of it, handling it, experiencing it, and understanding” (1997:138). Put another way; the researcher must deprioritise their own first-order experiences while seeking to faithfully render the second-order experiences of the participants. This is consistent with the traditional scholarly approaches of distancing oneself from the material (Jalongo and Saracho, 2016:34), but as critics point out, the feasibility is questionable:

> Researchers have a central role in the creation of knowledge in qualitative enquiry, hence they need to look at themselves and their ‘positionality’… Researchers are in the world and of the world that they research. They bring their own biographies and values to the research situation and participants behave in particular ways in their presence (Cohen *et al.,* 2018:302).

Parson suggests, “Positionality prompts researchers to ask if this research should be done and if one is the researcher to be conducting this research” (2019:16). Furthermore, “There is no such thing as a ‘position-free project.’ Even the (supposedly) detached objective external researcher occupies a position with respect to the research” (Punch, 2009:45). Marton explains “even the world described by science is obviously a world described by humans. There is no description without someone doing the describing” (2015:108).

A majority of phenomenographers appear to favour the bracketing approach despite its ambiguity, but others (such as Collier-Reed *et al.,* writing about the trustworthiness of phenomenographic research) suggest phenomenographers should demonstrate “content-related credibility” (2009:7), requiring investigators to have a comprehensive understanding of the research topic to support rigour. Sin argues that ‘quality’ subsumes research rigour, validity and reliability in phenomenography:

> Reflexivity is when a researcher identifies his or her own preconceptions that are being brought into the research at the outset and then systematically questions at each stage of the research process as to how to minimize the effects and whether the effects have been sufficiently dealt with. The researcher should document fully and explicitly each stage of the research process so that readers can make a judgment (Sin, 2010:310).

The research design of this study combines ‘content-related credibility’ with ‘researcher reflexivity’ to establish the authority of knowledge relating to the research topic, combined with controls to operate detachedly to identify, manage, and document possible bias and mitigations. The latter of these approaches can be thought of as a form of bracketing. Still, the point of departure is that it identifies and manages researcher pre-suppositions rather than claiming they might be somehow excluded from conscious thought. Denscombe advocates for a reflexive account of the researcher’s self:

> There is a growing acceptance among those involved in qualitative data analysis that some *biographical details about the researcher warrant inclusion as part of the analysis*, thus allowing the writer to explore the ways in which he or she feels personal experiences and values might influence matters (Denscombe, 2010:303).

Though, as Macfarlane points out, the pressure of self-disclosure can lead to statements of positionality being ritualistic and inauthentic, continuing that they might seek to establish that “the investigator has a distinctive, and even to some extent superior, moral claim to researching the subject since they have personal experience that gives them special insight into the world of their participants” (Macfarlane, 2022:5). He suggests that a good positionality statement is shaped by a reflexively self-aware account of someone’s worldview incorporating their personal beliefs, sense of personal identity and politics, philosophical assumptions, biases, and prejudices. The introductory chapter of this thesis contributed an essential element of this approach by explaining and disclosing my interest in the research topic and describing how my conceptions of the research topic formed at different stages throughout my career.

4.12 Summary

This chapter has introduced the research design by outlining methodological approaches aligned with the research questions, interrogating the ontological and epistemological positions associated with studying conceptions before justifying the selection and use of phenomenography and exploring its origins, usage, methods, criticisms, and limitations with a particular focus on strategies for managing researcher bias and subjectivity. An argument has been presented to favour content-related credibility (Collier-Reed *et al.*, 2009) and researcher reflexivity (Sin, 2010) over the more established methods of ‘bracketing’ (Marton, 1994).

Chapter 5: Data collection

5.1 Chapter introduction

This chapter develops the research design by assessing, selecting, and justifying data collection strategies. This commences by setting out the sampling approaches used to select research sites, the instruments used to identify and approach potential participants, and the chosen methods. The advantages and limitations of the selected methods are discussed, and the chapter concludes by outlining the technological approaches to recording, checking, and verifying data.

5.2 Pre-empirical data collection

"There is no particular moment when data gathering begins. It begins before there is a commitment to do the study… A considerable proportion of all data is impressionistic, picked up informally as the researcher first becomes acquainted with the case" (Stake, 1995:49).

Following the conclusion of my MA Creative Arts Education course in 2017, I set out to contextualise the insights from my research (Savage, 2018a; 2019) beyond my institution by subscribing to weekly job alerts from jobs.ac.uk with search criteria of 'technician', 'creative arts', and 'United Kingdom.' Over a period of five years (2017-2022), I received thousands of vacancies, advertisements, job descriptions, person specifications, and applicant packs harvesting recruitment materials from fifty-nine higher education institutions. Forty-two institutions exclusively recruited to a single role category (Technician), whereas seventeen advertised for two or more technical grades. Once duplicates were removed, seventy-six distinct vacancy types remained.

The recruitment materials contained rich and detailed information about the level and types of teaching required from applicants. Roja (2017) conducted a similar survey of job vacancies for academic librarians to establish their pedagogic competencies. Bell (2010:125) describes how the analysis of documents, and their sources can inform the scope of research and generate questions. This proved to be the case, and the collection provided a rich repository to explore the teaching and learning responsibilities of creative arts technicians as outlined in the expectations of their employers. I focused on information about the teaching responsibilities; explicitly seeking to identify the skills, competencies, knowledge, characteristics, and qualities sought from applicants. This exercise was used to inform the overall research design, sampling, and data collection strategies rather than generate responses to the research questions or contribute to the outcomes.

The lack of a uniform structure proved challenging; each advertisement and role profile used a different format and had been written by a particular employer for their purpose. To assimilate the unstructured data, I read and reviewed each document to identify and isolate elements that could be extracted and compared. These included institution, job title, discipline, department/faculty, reporting structure, salary, and date of advertisement. I highlighted sections relating to teaching responsibilities, extracted them from their source, and reviewed them separately. Additional themes and commonalities emerged from the reading. Notably, the level of education and experience required. Most vacancies required an undergraduate degree as a minimum standard, with post-graduate qualifications preferred. Most also stipulated a requirement for a teaching qualification or willingness to achieve one. Many employers specified a requirement for 'industry-standard' knowledge and experience; others requested that applications be accompanied by a portfolio of key pieces of creative work to showcase technical, creative, and aesthetic abilities.

The language used to describe applicants' attributes and personal qualities deviated from traditional technical roles, including "passion for all that an art school can do" (Cardiff Metropolitan University, 2020) "inspirational in their approach to delivery" (AUB, 2020), "Inspirational, dynamic approach to studio and workshop teaching" (NTU, 2020), "enthusiastic about 'student-centred pedagogy" (Bournemouth University, 2019) and "motivating" (University of Brighton, 2018). Many roles were described as collaborators and co-educators with academic teams, framed as enabling and supporting the academic curriculum. Some were responsible for the practical elements of student learning; others contributed to summative assessment and providing written feedback. Several roles also included a responsibility for contributing to the development of new courses and reviewing existing provision, stipulating a requirement to "work with the academic staff on the design and delivery of course content, including the design and preparation of learning materials, and contributing to the discussion and planning of the curriculum" (UWE, 2020).

I should also note that I did not just observe this phenomenon; I participated. Throughout this period, I led one of the UK's largest creative arts technician teams (120 FTE). I oversaw the recruitment of around a hundred vacancies during the survey period. The trends described above were also reflected in the job adverts and role profiles I contributed to the market.

The insights from recruitment materials supported that technical pedagogies were becoming more sophisticated across the sector, that expectations had moved beyond the ‘induct and instruct’ models, and that universities increasingly recognise these trends and prioritise them within their staff. However, while I completed the exercise with some diligence, informal approaches were used, and a high degree of caution should be exercised when interpreting the results of this snapshot or applying them more broadly.

A secondary aim of this exercise was to establish nomenclature. The seventy-six roles recorded in the sample contained eight sub-categories of positions shown in Figure 13.

Title	Frequency	Percent of sample (rounded)
Technician	32	42%
Technical Demonstrator	14	18%
Technical Instructor	8	11%
Senior/Supervisory Technician	7	9%
Technical Assistant/Officer	6	8%
Technical Specialist	5	7%
Technician Tutor	3	4%
Teaching Technician	1	1%

Figure 13: Titles and frequencies of technician job titles sourced from jobs.ac.uk.

‘Technician’ was the most prevalent role title (42%). A close reading of technician role profiles revealed that most technician roles include the delivery of technical demonstrations. Furthermore, the second most frequently advertised role title was ‘Technical Demonstrator’ (18%), followed by ‘Technical Instructor’ (11%), with ‘Technician Tutor’ (4%) and ‘Teaching Technician’ (1%).

No firm distinction was found between responsibilities and role titles. For example, instructors’ duties appeared generally indistinct from those of demonstrators and tutors. Therefore, a more professionally inclusive term was used to inform the sampling strategy of: ‘technicians who teach’.

5.3 Sampling

"Whilst there is literature available both on the process of using phenomenography, and on research that has been done using it, there is little about the sampling process" (Trem, 2017:4). There are, however, principles that researchers should observe. Trem affirms that phenomenography does not seek a representative sample because there is no claim to generalise findings to a broader population. However, because the variation in experience is the outcome, the sample must be appropriate and relevant to the research question. It should maximise the spectrum of experiences by actively seeking diverse groups with differing perspectives that may contradict each other and capture marginal experiences and non-dominant ways of understanding. If this is not the case, "a justifiable critique from the research community could be the possibility that the full extent of the variation in ways of experiencing the phenomenon is not assured" (Collier-Reed *et al*., 2009:8). However, excessive sample sizes resulting in large volumes of data can lead to superficial analysis or data management problems and they may not necessarily lead to richer insights (Sin, 2010). Trem (2017) directs that for phenomenographic studies (not using focus groups), an ideal sample should be between 10-20. Trigwell (2006) advocates between 10 and 30, while Tight (2019) recommends 20-30.

5.4 Institutional diversity

The number of institutions advertising creative arts technician roles in the vacancy survey (fifty-nine) was too large to include. Deciding upon which institutions to approach demanded a balance between diversity (breadth of data) and practicalities (selecting a sufficient but not excessive number of sites). I excluded my home institution (University for the Creative Arts) because my positioning introduced ethical issues and the heightened risk of bias, subjectivity, or participants guarding or embellishing their responses. I listed the fifty-nine institutions and categorised them by location (England, Scotland, Wales, and Northern Ireland), type, and scale (student population). The next stage was to decide upon a manageable number of institutions. The recruitment materials were used to refine the sample based on learning and teaching responsibilities and salary (the highest and lowest were included). Ultimately, I identified seven institutions that offered what I considered to provide sufficient variation:

- Large Welsh Multidisciplinary

- Large English Specialist
- Small Scottish Specialist
- Large English Multidisciplinary
- Small English Specialist
- Large Northern Irish Multidisciplinary
- Large English Specialist Monotechnic

I identified a relatively senior person at each institution to act as a 'Research Facilitator'. I sent each person a speculative email (Appendix 3) outlining the study and requested they nominate technical staff with teaching responsibilities whom I would approach directly.

I was mindful that facilitators may only select their most capable technicians to participate in the study. Controls to mitigate this risk included emphasising that the research sought variation (rather than excellence) and requesting six participants with an intention of interviewing three (recommendations varied between five and thirteen). In total, sixty-two individuals were nominated by the research facilitators across the seven sites.

The next stage was to ensure that the selected sample of participants was as inclusive and diverse as possible. There is no consensus among phenomenographers on whether researchers should use individual characteristics to influence sampling strategies. Trem (2017) suggests researchers use their judgment to select a sample that enables maximum variation in experience. However, she also draws on the work of Mann (2009), who advocates for a set of specific 'diversity' criteria to ensure variation in experiences that could include gender, age, years of experience, disciplinary background or the type of experience. Sin (2010:313) adopts a middle ground, recommending that participants' characteristics are documented on the basis that the researcher explains how the spread of characteristics is intended to maximise conceptual variations. Sin argues that providing clarity on this point enables readers to judge the data's validity for themselves. I chose to combine Trem's 'judgment' regarding institutions, Mann's 'diversity criteria' concerning individual participants, and Sin's explanation for how the final sample is enriched by ensuring and documenting a diverse sampling universe.

I contacted potential participants who met the sampling criteria by email explaining that their contact details had been passed on by the research facilitator and included information about the study's nature, purpose, and ethical approaches (Appendix 4). The email directed that if they were willing to participate, they should complete a linked Google Form that recorded professional and personal characteristics (Appendix 5). The contact email explained that the purpose of requesting this information was to maximise the diversity of the perspectives (following ethical and GDPR protocols described later). Thirty-seven of the fifty-five individuals contacted indicated their willingness to participate and submitted data via the Google Form. The overall response rate was 67.27%.

The next stage was to reduce the thirty-seven potential participants to a manageable number while maximising the diversity of perspectives. I created a framework of respondents' professional and personal characteristics by institution. Each individual was assigned a score of 1 (when a characteristic was present) and 0 (when it was not). Scores were totalled across the pool to identify frequency bias in the overall group and were used to ensure minority or underrepresented voices were included. The distribution of participant characteristics is shown in Appendix 6. Although described systematically and chronologically, the reality was more chaotic. The overall sample remained flexible and continued to evolve during the early stages of fieldwork, and it took eight months to confirm the research sites.

With seven research sites identified, between three and four interviews per institution appeared to offer an optimum number to achieve a sample size of between twenty and twenty-five participants. However, in qualitative research, particularly with interpretive methodologies such as phenomenography, the sample is not concluded by reaching a particular number but instead by achieving theoretical saturation. This occurs when new data do not show new theoretical elements but confirm what has already been found (Punch, 2009). However, this is not necessarily appropriate for phenomenographic studies (Reed, 2006) as the extent of the variation remains unknown prior to data analysis.

In total, I completed twenty-four interviews. The number per site varied subject to personal and professional characteristics and participant availability. All respondents who completed the Google Form were contacted; those who were not shortlisted were thanked for their interest and politely stood down. One participant withdrew from the study after interview, leaving twenty-three usable interview transcripts.

5.5 Trends

The selected sample contained a relatively high distribution of minority characteristics. For example, thirteen of the twenty-three viable participants (56%) disclosed a disability (compared with census data in England that identities a disability prevalence of 18.7% females and 16.5% males) (ONS, 2021). While this appeared high, it is consistent with the research population, as the proportion of support staff declaring a disability is higher among technicians than among other professionals and support staff (HEFCE, 2010:51). However, while high levels of diversity may be considered problematic for some studies, it is not within phenomenography, given there is no requirement to provide a representative sample, frequency is irrelevant, and the methodology's emphasis is upon variation of experience. Further noteworthy points are the high levels of teaching qualifications (78%), the White/British dominance (91%), the relatively low number of craft technicians (22%), slight female bias (52%), and the relatively long service (56% had worked in a technical role for over a decade). Estimated participant salaries at the time of interviews varied between circa £28,756 and £43,558 (based on vacancy information obtained from jobs.ac.uk).

5.6 Ethical considerations

This study was designed and implemented in accordance with the University's Code of Practice on Research Ethics (UCA:2022). The COP provided a framework, governance, and protocols that informed the ethical dimensions of the research. Ensuring the safety and well-being of the participants was the primary focus throughout. However, the potential for harm can extend to the researcher(s), institutions, groups, and communities being researched, the researcher's own workplace and colleagues, publishers, and those with whom the researcher may not have had direct personal contact (Cohen *et al.,* 2018:127). In the context of this study (being the first of its kind into an under-studied phenomenon), poor-quality research has the potential to contaminate the field and impair future researchers. Additionally, published outcomes could conceivably lead to reputational risks (Wiles, 2013:66) for researchers, institutions, disciplines, and creative arts technicians as a collective. To safeguard the research, I developed a risk assessment to identify and mitigate foreseeable hazards and potential harms, including ethical, health and safety, COVID-19, and reputational risks (Appendix 7). The ethical issues were assessed as 'minimal risk' via the university ethics checklist, enabling the research to proceed without escalating to a complete application for research approval.

The fundamental aim of the ethics approach was to protect the dignity, rights, and welfare of research participants. Parson (2019) writes extensively on the ethical concerns and potential methodological obstacles that can occur when conducting research with underrepresented, marginalised, or minoritised groups (which, in a professional sense, technicians are).

Pointing out that research procedures and reporting can reinforce and exacerbate negative characteristics. It was, therefore, critical to ensure non-maleficence (ensuring that participants were no worse off at the end of the research than they were at the start) while also seeking maximum beneficence (benefits to those involved or the groups and constituencies they represent). Critical controls of non-maleficence (in chronological order) were used to ensure that approaches to participants were carefully managed through initial contact with a research facilitator at the relevant institution and that consent to participate was appropriately informed. While consent must be informed, it must also be freely and voluntarily given. A risk of using a research facilitator is that a potential participant may be referred by someone in a position of relative power, which may carry an expectation for their subordinate to participate. Potential participants were advised that they were under no obligation to take part, that their consent must be given voluntarily and that the research facilitator would not be informed of their choice to participate or not.

All potential participants were supplied with a Participant Information and Informed Consent Form (Appendix 8). These documents explained why the individual had been identified and by whom, confirmed that participation was entirely optional and unpaid, and described the risks and benefits of participation, data management, GDPR protocols, and approaches to anonymity and confidentiality. These protections extend to the data regarding personal and professional characteristics recorded by the Google Form. Responses relating to racial, ethnic, religious beliefs, health, disability, sexuality, and sexual orientation generated special category data (ICO, 2022) were managed in accordance with The UK Data Protection Act (2018) (the UK's implementation of the General Data Protection Regulation (GDPR)) governing the processing of personal data. Though not explicitly required by law, a Data Protection Impact Assessment (DPIA) was completed in the spirit of best practice (rather than compliance) following consultation with the university solicitor (Appendix 9).

The terms anonymity and confidentiality tend to be conflated in research (Wiles. 2013:41) but are distinct albeit related concepts. A participant is considered anonymous when the researcher or another person cannot identify the participant from the information provided (Cohen *et al.,* 2018:129), whereas the duty of confidentiality is taken to mean that identifiable information about individuals collected during the process of research will not be disclosed (Wiles, 2013:6). Total anonymity could not be achieved within the research design because all participants had been nominated through a research facilitator at their institution. Additionally, around half of the participants consented to be photographed (Chapter 6), meaning they were visually identifiable; therefore, their participation could not be anonymous. These participants signed a release form that recorded consent for the photography and determined the terms of usage of the resulting photographs (Appendix 10). However, while anonymity was unachievable within the research design, the participant's right to privacy was respected and maintained through assurances of confidentiality, defined by Cohen *et al.,* as "not disclosing information from a participant in any way that might identify that individual or that might enable the individual to be traced" (2018:130).

Challenges to confidentiality (of participation) are that the individuals have distinct roles, are assigned to specialisms at institutions, and are known by (and frequently managed by) the research facilitators. Participating institutions are anonymised to an extent (insofar as they are described by size and location rather than named), but contextual, disciplinary, and geographic information could conceivably reveal the participating institutions. It would, therefore, be theoretically possible to determine the identity of participants through job titles, institution types, and photographs. However, all other information (relating to participant contribution) remained confidential. An area of potential ethical challenge was attributing interview extracts to disciplinary fields within Chapter 8 (Data analysis). In some instances, the discipline is implicit (for example, a participant speaking about darkroom teaching is likely to be a photography specialist), and there is research value in specifying the disciplines of the speakers. Confidentiality remains assured because narrower disciplines are diffused into broader fields (for example, lithography was subsumed into printmaking, and embroidery into fashion and textiles).

A further control within the ethical design was the 'right to withdraw' at any time without reason or penalty. The requirement and concept of ongoing consent were made explicit in the initial communications with potential participants via the introductory email and continued as the study progressed (for example, at the start of interviews).

5.7 Data collection methods

Numerous methods initially presented as viable, including focus groups, surveys, and participant observation, though none provided access to the individualised conceptions sought. Focus groups offer convenience and interactive dialogue but risk homogenising collective behaviour, loss of nuance, and non-dominant conceptions being unheard or deprioritised. Furthermore, I conducted eight focus groups (averaging five participants each) to explore the experiences of teaching technicians at the University for the Creative Arts in late 2021 to support the development of a university strategy. These demonstrated that focus groups had the potential to generate rich insights, but group discourse can suppress marginalised, unpopular, or unorthodox views.

I also considered participant observation, which is unusual but not unprecedented within phenomenography (e.g., Richardson, 1999; Courcy, 1994), but as Svensson (1994:16) notes conceptions may be expressed in different forms of action, but they are most accessible through language. Moreover, “The methodological underpinning of phenomenography posits that the data collected be a person’s experience of a phenomenon as described by that person” (Reed, 2006:5). On balance, it was clear that interviews provided the optimal method to capture data needed to respond to the research questions.

Interview type

Phenomenography traditionally uses semi-structured interviews as the primary data collection method (Marton,1994; Reed, 2006; Han and Ellis, 2019), with only a few critical questions being predetermined. The intention is to facilitate open and deep discourse to obtain rich, meaningful data from which credible categories of description can be constituted during analysis (Collier-Reed *et al.*, 2009). Although interviews rely on language, they also allow for observing non-verbal responses and expanding narratives through probes and prompts to seek clarity and explore internal and external horizons of participant awareness (Marton and Booth, 1997). The disadvantages of interviews are that they are time-consuming and potentially generate high volumes of data that require transcription and coding (Brinkmann and Kvale, 2018:75).

A secondary decision was whether the interviews should be structured, unstructured, or semi-structured. I rejected structured interviews because they would compromise the scope of enquiry through pre-disposing responses. Conversely, unstructured (non-standardised and open-ended) interviews are better aligned with the philosophical approaches of phenomenography, allowing participants to impose their relevance structures to questions based on their priorities, schemas, and worldviews. However, unstructured interviews can heighten the risk that the definition of the phenomenon under discussion is misaligned (Ekeblad and Bond, 1994; Reed, 2006). Ultimately, I selected semi-structured interviews to establish a common phenomenon of enquiry while also facilitating an open but purposeful exploration.

Interview questions

Semi-structured interviews contain relatively few questions; therefore, their crafting is crucial. Fundamentally, they must derive from and respond to the research questions to generate the variation required to create an authentic and credible outcome space (Cope, 2004). The interview questions were mapped to the research questions (Appendix 11) and written to allow sufficient interpretation for interviewees to choose the elements of the question they wanted to answer. Although phenomenographers jointly construct meaning through interviews (Collier-Reed *et al.,* 2009), concise questioning is preferred to avoid introducing bias or steering responses. As Brinkmann and Kvale put it "The shorter the interviewer's questions and the longer the subject's answers, the better" (2018:112).

In Bruce's article '*Reflections on the experience of the phenomenographic interview*,' she describes how phenomenological rules of bracketing, description and horizontalisation should be applied when designing interview tasks and/or questions (1994:51). The rule of bracketing (discussed earlier) relates to the suspension and exclusion of the interviewer's theories and pre-conceptions. The rule of description focuses on the need to describe rather than explain the experience of the phenomenon, and the rule of horizontalisation requires the interviewer to treat all descriptions or experiences as having equal value. An essential first step is to ensure that both interviewer and interviewee share the phenomenon under discussion "This is often non-trivial as the nature of some phenomena is such that it is challenging to ensure that participants describe their relationship with the same phenomenon as other participants" (Collier-Reed and Ingerman, 2013:1).

The interview questions were structured and sequenced as a "funnel" (Cohen *et al.,* 2018:515), leading interviewees from the general to the specific. One of the specific questions was to ask interviewees to describe an instance of their pre-planned teaching in detail. A related question invited reflections on a particular instance of unplanned reactive teaching. As Trowler *et al.,* (2012:244) note, it is through these vignettes that the phenomenon being described is played out day-to-day. As Åkerlind explains "In phenomenographic interviews, we are trying to elicit underlying meanings and intentional attitudes towards the phenomenon being investigated. Typically, we do this through exploring concrete examples of the phenomenon provided by the interviewee" (2005:65). Another question asked interviewees how they might differentiate their teaching from that of their academic colleagues. This question was informed by variation theory (Marton & Trigwell, 2000), which evolved from phenomenography (Marton, 2015) and has been termed by some as "new phenomenography" (Åkerlind, 2018). Variation theory posits that discerning a critical aspect of the phenomenon results from experiencing a variation. Marton and Booth (1997) explain this in relation to colour. The colour green has no meaning in a world where everything is green. Introducing a second colour (for example, red) opens a dimension of variation, providing contrast to identify and illuminate aspects.

The predetermined questions were written to provide a general starting point for exploration with unstructured prompts and probes to encourage further elaboration and check meaning. I took care to ensure that follow-up questions did not introduce topics or perspectives that had not been previously introduced. In some instances, these were used to check and delimit descriptions of 'what' and 'how', but more frequently, 'why'. Åkerlind *et al.,* point out, "to elicit interviewees' intentional attitudes towards the phenomenon (and thus the underlying meaning of the phenomenon for them) is to ask *why* they go about it in the way they describe" (Åkerlind *et al.,* 2005:80) [author emphasis].

5.8 Pilot interviews

Seasoned phenomenographers (e.g., Åkerlind *et al.,* 2005; Sin, 2010) advocate undertaking pilot interviews before fieldwork. Two such interviews were conducted with Technician Tutors at the University for the Creative Arts, ensuring that these interviewees were afforded the same ethical protections as study participants. A further consideration to acknowledge was the "asymmetric position of power" (Cohen *et al.,* 2018:136). In addition to the authority dynamic of the researcher controlling the agenda, questions, timing, duration, and so on, interviewees were questioned by the head of their department. Accordingly, the resulting data were used to rehearse and refine structure, techniques, questions, and recording technologies but were not used in the analysis of this study.

A challenge identified during the pilot interviews was that interviewees frequently drifted off topic from describing a specific concrete instance of their teaching to more general approaches and beliefs. Drew (2003:76) described experiencing similar challenges as her participants' focus shifted from a particular unit or module to a sense of teaching in general. To manage this risk, I contacted participants and asked them to identify and bring to mind a specific instance of their teaching to reflect upon during the interview.

Another important lesson was to listen actively, remain neutral, and be non-committal to the raised themes. I also found silences and pauses to be helpful. As Trem (2017:16) observes "Phenomenography is reflective, and it is likely that individuals will develop their understanding of the phenomenon during the data collection process; therefore time needs to be included for reflection":

> In the course of an interview, subjects can change their descriptions of, and meanings about, a theme. The subjects may themselves discover new aspects of the themes they are describing, and suddenly see relations that they have not been aware of earlier... An interview may be a learning process for the interviewee, as well as for the interviewer (Brinkmann and Kvale, 2018:37).

Technicians are relatively unaccustomed to reflecting upon and interpreting their teaching experiences in the context of it being a 'phenomenon' and, in some instances, forming and articulating their conceptions for the first time. Reaching this level of "meta-awareness" (Marton and Booth, 1997:148) is not necessarily something that happens spontaneously (Reed, 2006:5). However, it is central to a phenomenographic data collection strategy (Collier-Reed and Ingerman, 2013:4).

The pilot interviews also provided the opportunity to test recording and transcription technologies. Due to time constraints and high volumes (twenty-three interviews of circa 10,000 words each), I engaged the services of a professional transcription service. The audio files were uploaded and hosted securely to prevent unauthorised access, and the transcribers were bound by non-disclosure agreements to protect confidentiality. The service allows the interview audio to be played back, and as each word is uttered, it is highlighted in the transcript on screen. Playback can be paused to correct errors or omissions and add technical phraseology and colloquialisms unknown to the transcribers. This proved a highly accurate process for checking transcripts against the recordings.

5.9 Fieldwork

I planned to conduct interviews between February and August of 2022, but fieldwork extended to January 2023 due to the availability of some participants. By this point, sufficient time had passed since the various lockdowns of 2020/21 for participants to have been teaching in-person for at least six months. Scheduling allowed for one hour per interview and fifteen minutes for photography (for consenting participants). In a minority of cases, for reasons of limited availability or logistics, interviews were conducted online.

I dressed smartly but casually and adopted what I hoped was a neutral and positive demeanour to establish open and respectful interview experiences. As might be expected, the environments, dynamic, atmosphere, and exchanges varied by institution and individual. Interviewees generally warmed up quickly, spoke without inhibition, and appeared eager to tell (and show) their experiences, with many expressing gratitude for the opportunity to share their stories. Narratives were largely unconstrained; most offered rich and detailed accounts. In many cases, interviewees spoke at length and in detail about their experiences, immersing themselves in their reflection and often forgetting the original question that had prompted a lengthy and meandering response. Most interviewees had not considered the 'what', 'how', and 'why' of their teaching before the interview. As Pratt *et al*., note, "We may not be aware of our perspective because it is something we look through, rather than look at, when teaching" (2016:40). Many expressions appeared to me as a constellation of experiences and beliefs that were forming and being articulated in linear (if frequently dis-jointed and self-interrupting) prose for the first time. Surfacing conceptions and reflecting upon experiences were powerful and emotive for some participants. I observed (and recorded) mini-personal epiphanies and awakenings. As Richardson notes, research interviews can be powerful psycho-dynamic encounters for both parties and share a number of characteristics with psycho-therapeutic sessions (1999:69). One participant did withdraw from the study, a few minutes after the (online) interview concluded. Personal reasons were given, though the interview surfaced themes in which the values of the participant appeared to run counter to the educational philosophies of their institution.

Interviews were recorded and transcribed, ensuring that the spoken words were accurately recorded. As Brinkmann and Kvale (2018:48) emphasise, researchers have an ethical responsibility to report knowledge that is as secure and verified as possible. While the transcription service ensured that all words spoken were faithfully rendered in text, a potential risk remained that the transcriptions did not accurately reflect the authentic and considered conceptions of the participants. To reduce this risk, I engaged "respondent validation" (Denscombe, 2010:299), in which transcripts were sent to interviewees for checking, correcting, and approval. The majority were returned with no changes; some contained minor amendments to terminology, while one in particular was returned with 30% fewer words than the original transcript, with much of the free-flowing conversation about the participant's experience and workplace relationships removed and replaced with corporate quotations, generalised philosophies, and bullet point lists of duties that appeared to be taken from participants role profile. The validated transcript had also been modified to include quotes from pedagogic literature, links to websites containing student work, and excerpts from an email from a course leader praising their work.

5.10 Additional sources

The reliance phenomenography places upon interviews to provide accurate accounts about self or the world has been critiqued (Sin, 2010:308). “There is almost inevitably *an element of interpretation*” (Denscombe, 2010:199). Though this interpretation is not necessarily problematic for phenomenographers, the relationship between the interviewee and the phenomenon is the methodology’s signature feature and epistemological foundation but lapses of internal validity (transcriptions being consistent with the speakers’ conceptions) can be problematic. Furthermore, interviews transcribed from verbal accounts to written prose do not capture contextual and para-linguistic elements, such as intonation, posture, gesture, pauses, disposition, demeanour, facial expressions, emotional expressions, sarcasm, and so on. To document these non-verbal aspects of the interview experience, once the interview had concluded I recorded field notes to augment the recording. Cohen *et al.,* advise that researcher notes “are an important part of the researcher’s self-conscious reflection on the data; they have considerable potential to inform the data collection, analysis and theorizing processes” (2018:666). Throughout the study, my notes were used as supplementary materials to clarify, contextualise, comprehend, and enrich transcription checking but did not carry forward (as empirical documents) into analysis.

Phenomenographic interviews have also faced criticism that the conceptions expressed may not represent faithful accounts, through exaggeration, embellishment, misrepresentation, or misunderstanding. The authenticity of accounts can only be genuinely apprehended and verified by their holder; however, to add support and illustrate interviewee accounts, participants were asked to supply teaching materials such as lesson plans, exemplars, and support materials. Kane *et al.,* (2002) advocate using multiple methods to research teacher beliefs, and for Uljens, in the context of phenomenography, “a ‘conception’- may also very well be exhibited by or manifested in cultural artifacts and therefore be revealed by an investigation of these artifacts” (1996:110). The teaching materials interviewees brought to the interviews varied. Examples included physically constructed models, handouts, step-by-step walkthroughs of processes, posters, videos, and interactive content hosted on Virtual Learning Environments (VLE) (a selection of materials provided by participants is shown in Appendix 12). Like the field notes, these documents and materials were used to support inner validity, and were not analysed in the study’s scope, and did not respond to the research questions directly. However, when provided, they were discussed with the interviewee and, in all instances, were found to be consistent with the pedagogical accounts described during the interview.

A further unanticipated activity that supported (in-person) interviewee narratives was visiting the teaching environments with the interviewee (post-interview) to tour the teaching spaces and take the photographic portraits. During these moments, I observed unplanned, naturally occurring interactions between participants and learners who happened to be working in their areas. Witnessing these interpersonal exchanges further supported the authenticity of the approaches and conceptions described during the interviews.

5.11 Summary

This chapter describes how the research design developed through pre-empirical data collection and sets out the approaches used to identify, evaluate, and justify the methodology and methods used to respond to the research questions. The following chapter extends the data collection approaches by photographing consenting participants in their teaching environments.

Chapter 6: Participant portraits

6.1 Chapter introduction

In the introduction to this thesis, I described how 'invisibility' had become the adjective of choice to describe technicians and their practices. With this notion of invisibility in mind, I invited consenting participants to be photographed in their teaching spaces to provide embodiment, visual representation, and identity to contemporary creative arts technicians. My decision to include a photographic element in the study was a methodological choice informed by my photography training and practice. The intention was to bring a visual dimension to a primarily descriptive and textually based methodology. Through doing so, participants can be observed in the studios and workshops where they enact the pedagogies described in their interviews.

Combining photography within phenomenography is not without precedent, for example, in the work of Collier-Reed (2006), but the photographs are not presented as data or subject to analysis and are not produced to respond to research questions directly. Instead, they complement this study by offering visual clues about the environments, equipment, activities, and people that it examines. For Cohen *et al.,* "In contemplating images the researcher has to consider how much they are natural, contrived, arranged, posed or staged" (2018:629). In the following photographs, I asked participants to position themselves as they would while teaching, and I placed the camera in the position usually adopted by their learners. The photographic sessions were brief and collaborative as participants co-created the photographs based on their knowledge of the space, process, and experiences. While the images are representative of props, locations, and models, they are artificially staged and must be viewed as such. Denscombe (2010) terms this as 'procedural reactivity' and notes how taking photographs can alter the natural state of the activity as it may occur authentically. However, clues in the following images support the pedagogies described in subsequent chapters.


SunStar
SunStar
SunStar


NOW
Sit the fuck down and do your work.
NOTICE!
RADIOHEAD
UNDER A BIG TOP FREAKSHOW


AXMINSTER
Opaque & semi O pigmen
Transparent & semi T pigm


KENCO
LOVEHEARTS


3DLAB
Emergency
Stop
makita
A2
FREE MDF
OFFCUTS
FREE TIMBER
OFFCUTS


brother
brother
JUKI


B&W
STEP 1 - Heat Chemicals & Film
STEP 2 - Develop
STEP 4 - RINSE
STEP 5 - STAB
B&W
Colour

Chapter 7: Data analysis

7.1 Chapter introduction

This chapter provides an overview of the development and implementation of the data analysis strategy. It begins by clarifying the aims and objectives before describing the volume, composition, characteristics, and structure of the data subject to analysis. It outlines how analysis approaches were informed by reviewing other conception-based studies to create a custom four-stage process integrating computer-assisted analysis within an adapted ‘double diamond’ framework. The second section of the chapter charts the stage-by-stage execution of the strategy and describes how it was used to identify the qualitatively distinct ways in which participants think about and experience their pedagogies.

7.2 An overview of phenomenographic analysis

As Cohen *et al.,* point out “There is no one single or correct way to analyse and present qualitative data; how one does it should abide by *fitness for purpose*” (2018:643). Fitness for purpose in this instance demanded that analysis accords with the methodological conventions of phenomenography as applied via the research question of ‘How do visual arts technicians in higher education conceive of their pedagogies?’ Focused via three heuristic sub-questions:

- What is it that visual arts technicians believe they teach?
- How do visual arts technicians approach their teaching?
- Why do visual arts technicians teach in the ways that they do?

To remind ourselves, the ‘what’ question relates to the ‘object’ of teaching, and the ‘how’ relates to the ‘act’ of teaching. The final sub-question, ‘why,’ seeks to discover the philosophies of purpose and values underpinning the previous two sub-questions.
Within phenomenography, analysis is the process through which the participant conceptions are collated, sorted, compared, and labelled to form qualitatively distinct categories of description. Categories are defined, described, and illustrated with representative quotations. Fundamentally, the analysis strategy aimed to provide a robust and defensible process to distil and analyse the interview transcripts into a coherent outcome space.

Phenomenography concerns the collective experience rather than the individual. “The objective of a study is to reveal the variation, captured in qualitatively distinct categories, of ways of experiencing the phenomenon in question, regardless of whether the differences are differences between individuals or within individuals” (Marton and Booth, 1997:141). In analysing collective experiences, it is important to remember that the process does not seek to make statements concerning technical teaching in and of itself; instead, participants described their experiences of it because “the way in which a person experiences a phenomenon does not constitute the phenomenon itself. It rather constitutes one facet of the phenomenon, seen from that person’s perspective, with that person’s biography as background” (Marton and Booth, 1997:142). Åkerlind *et al.,* describe how “the set of transcripts as a whole represents a snapshot of the ways of experiencing the phenomenon by a particular group of people at a particular time and in response to a particular situation” (2005:81). Marton (2015:98) conceptualises that the participants’ responses can be thought of as a prism, the collective text can be thought of as white light, while the different ways of seeing it are like the spectrum of the constituent colours. This ‘white light’ contains all that the researcher can hope to find, and the researcher’s task is to find it.

Sin (2010) questions how a conception can be rendered empirically; furthermore, what do conceptions look like in the data, and how does the researcher find them? A logical approach to addressing these concerns is to define the data, its construction, composition, and characteristics. On this point, it is crucial to understand how a conception, referred to by Marton and Booth (1997) as the “unit of experience”, is constructed within phenomenography. To briefly recap Chapter 4 (Research design and methodology), a conception is based upon recollection and reflection of an experience. Marton and Booth discern ‘experience’ from ‘appresentation’; the former relates to phenomena being figural, being held in focus, and making up the core of awareness. The latter describes non-figural aspects beyond the periphery or below consciousness. They argue that something can be experienced in terms of the structure or organisation of awareness at a particular moment and illustrate the unit of experience and ways of experiencing something schematically (Figure 12). They theorise experience as comprising both structural and referential aspects. The structural element relates to the “combination of features discerned and focused on by the subject” (Marton & Pong, 2005:336) comprising an external and internal horizon. The external horizon extends the immediate boundary of the experience by locating it within and distinguishing it from a broader context. The internal horizon relates to the structure of experience itself, the essence of what is experienced, its internal parts and how they interrelate, or as Marton and Booth term it, the “structural presence” (1997:99). The referential aspect of experience relates to the meaning of the experience as interpreted by the experiencer. Marton and Booth illustrate these points by describing the experience of seeing a motionless deer among the dark trees and bushes of the night woods.

> To see it [the deer] at all we have to discern it from the surrounding trees and bushes; we have to see its contours, its outline, the limits that distinguish it from what surrounds it. We have to see, at least partially, where it starts and where it ends. But seeing its contours as contours and as the contours of a deer implies that we have already identified it as a deer standing there, which is exactly where the enigma of what it takes to experience something in some context lies. On the one hand, in order to see something as something (the particular configuration in the woods as a deer, in this instance, and not as a truck or a UFO) we have to discern that something from its environment. But on the other hand, in order to discern it from its environment we have to see it as some particular thing, or in other words assign it a meaning. Structure presupposes meaning, and at the same time meaning presupposes structure. The two aspects, meaning and structure, are dialectically intertwined and occur simultaneously when we experience something.
>
> Thus we can state that an experience has a structural aspect and a referential (or meaning) aspect. To elaborate first on what we mean by structural aspect, we need to point out that to experience something in a particular way, not only do we have to discern it from its context, as a deer in the woods, but we also have to discern its parts, the way they relate to each other, and the way they relate to the whole. Therefore, on seeing the deer in the woods, in seeing its contours we also see parts of its body, its head, its antlers, its forequarters, and so on, and their relationships in terms of stance. The structural aspect of a way of experiencing something is thus twofold: discernment of the whole from the context on the one hand and discernment of the parts and their relationships within the whole on the other. Moreover, intimately intertwined with the structural aspect of the experience is the referential aspect, the meaning. In seeing the parts and the whole of the deer and the relationships between them we even see its stance—relaxed and unaware of our presence or alert to some sound unheard by us—and we thus discern further degrees of meaning (Marton and Booth, 1997:98-99).

I interpreted the aspects of experience denoted within Marton and Booth's conceptual framework to provide an analytical framework of participants' experiences of teaching within this study:

Internal horizon	The discernments of the parts and their relationships; the ‘what’ and ‘how’ of the pedagogies within the described concrete examples and experiences. The internal horizon includes identifying and describing aims, approaches, thoughts, feelings, beliefs, assumptions, and personal understanding of themselves, their learners, and their educational practices.
External horizon	The discernment and differentiation from the broader context (space, curriculum, job families, communities of practice, and other contextual factors described by participants) in which technical pedagogies are developed and enacted.
Referential aspect	The meaning of the experience as interpreted and conveyed through participants’ experiences and levels of awareness. The critical function of the referential aspect is to identify the underlying purposes that participants attribute to their pedagogies.

Figure 14: The analytical framework applied to the units of experience.

7.3 Data composition

Fieldwork generated a sizable volume of empirical data, comprising audio recordings, interview transcripts, field notes, photographs, and teaching materials. The primary data source subject to analysis was the interview transcripts. The twenty-three interviews totalled eighteen and a half hours of recorded audio (averaging forty-five minutes in length each), which, when transcribed, totalled around 170,000 words. Transcripts varied as participants articulated detailed, and textured accounts of their life worlds. The semi-structured questions focused discussion on the research topic; however, the scale and breadth of interviews presented practical challenges to distilling such vast and diverse accounts into a theoretically sound and actionable form capable of responding to the research questions.

7.4 The approach to analysis

My starting point was to review the analysis approaches of highly regarded and well-cited phenomenographic studies and associated research literature. This demonstrated no singular agreed-upon analytical procedure for analysing interview data within the methodology. This same conclusion was reached by Varnava-Marouchou (2007), and Tight (2019). Furthermore, Åkerlind describes how “the analysis stage of phenomenographic research is often not well understood” (2012:321). Marton (credited as the founder of the methodology) noted “We cannot specify exact techniques for phenomenographic research. It takes some discovery to find out the qualitatively different ways in which people experience or conceptualize specific phenomena. There are no algorithms for such discoveries” (1986:42). Yet there are commonalities; Reed (2006) reported that despite variations, different approaches of phenomenographic analysis share the same underlying philosophy. Reed’s conclusion was shared by Han and Ellis (2019), who examined the analysis approaches of Dahlgren and Fallsberg (1991), McCosker *et al*., (2004), and Säljö (1997). Han and Ellis concluded that while the number and name of the analysis elements vary, similarities constitute four key stages in sequence:

1. Familiarising (reading and re-reading the transcripts).

2. Reduction and consolidation (identifying essential parts concerning the research questions and segregating data into ‘pools of meaning’ (Marton, 1999)). The pool of meaning contains decontextualised fragments from all transcripts that relate to the experience of the phenomenon.

3. Classification of responses (comparing and contrasting similarities and differences between pools to generate an initial list of categories).

4. Labelling the categories (applying appropriate descriptors to represent the theme of each category and their core meanings).

Han and Ellis (2019:5) acknowledge that due to the iterative nature of the process, the stages of classification and labelling often take place multiple times before reaching the final set of categories that best represent the qualitative variations of the phenomenon from the participants’ responses. Some phenomenographers include a fifth stage of “Reliability Checking” (Sandburg, 1997) also known as “inter-judge reliability” (Yates *et al.,* 2012:104) during which the analysis is checked and verified by another researcher. However, the involvement of a third-party researcher is by no means universal, as most phenomenographic researchers work in relative isolation during their data analysis

(Åkerlind *et al.,* 2005:69). Moreover, “the large number of existing phenomenographic doctoral theses indicates that high quality phenomenographic research can be accomplished as an individual researcher working largely on one’s own” (Åkerlind *et al.,* 2005:93). Phenomenographic analysis has not evolved significantly since the inception of the methodology in the 1970s. The traditional method involves taking scissors to transcripts and creating piles of commonalities and variations (Marton, 1994:4428) and using a spatial representation of the sense of the degree of similarity/difference between them (Åkerlind 2005:68). This has been described as “lengthy and painstaking” (Burns, 1994:72) and “tedious, time-consuming, labor-intensive, and interactive” (Marton, 1986:43). As Thompson and Ballantyne summarise:

> The trouble with phenomenography is that it generates mountains of raw data and researchers face endless hours of sorting, cutting and pasting. Believe it or not, researchers continue to endure this self-inflicted drudgery as if it were some sort of penance they were obliged to pay in their quest for the truth. Although computer programs have been designed to help speed up the data analysis process, many researchers resist their use (Thompson and Ballantyne, 1994:395).

The volume of data meant that fully manual or paper approaches would be unwieldy. Therefore, an alternative approach was required that maintained methodological conventions while engaging technological advances in computer-assisted data analysis for accuracy, practicality, and expediency. Computer Assisted Qualitative Data Analysis Software (CAQDAS) within phenomenography is not unprecedented. For example, Penn-Edwards (2010) described how the Leximancer software could ‘streamline’ phenomenographic research analysis. Citing her study (2011), she advocates for CAQDAS to review transcripts through sorting, categorisation, and mapping to generate the outcome space. In her study, Leximancer automated coding and lexicological analysis functions. A notable advantage of this automated approach identified by Penn-Edwards is that “it provides a clear bracketing process in identifying the concepts embedded in responses” (2010:263), and therefore, she argues, minimises researcher bias. However, significant limitations were also identified, not least the heavy reliance on the syntactic properties of text as transcribed that omit tone of voice, implied meaning, or non-verbal communication. Despite its shortcomings, Penn-Edwards concluded that Leximancer should be considered a valid investigative tool enabling large amounts of data to be dealt with without bias and with enhanced reliability and reproducibility. However, speed and automation are the core strengths of Leximancer, rather than rigour or depth of insight. This is inconsistent with the approaches of this study, which is more aligned with the perspectives of Cohen *et al.,* "Software does not analyse material; humans do" (2018:650). Furthermore, Penn-Edwards' wrote her article in 2010, and the Leximancer website continues to market itself upon expediency (Leximancer, 2023). On this basis, I rejected Leximancer and evaluated alternative software that would facilitate frameworks for managing, storing, coding, and retrieving data rather than any automated or AI analysis functions. I identified and evaluated four products: HYPER Research, NVivo, SPSS, and MAXQDA. I eventually selected MAXQDA based on the combination of features, ability to semi-automate rather than fully automate, cross-platform functionality, affordability, and relatively accessible learning curve. MAXQDA is not explicitly designed for phenomenography; instead, it is marketed as a methodologically neutral platform that provides a breadth of tools configurable to suit the relevant methodology and methods. I learned to use the software from online forums, tutorials on the MAXQDA website, and eBooks (Kuckartz and Rädiker, 2019; Rädiker and Kuckartz, 2020).

7.5 Development of a bespoke analysis strategy

It quickly became apparent that even with MAXQDA, the quantity of interview data would require a bespoke approach to generate optimal responses to the research questions. While Han and Ellis's (2019) four stages provided a framework and sequence to develop the finer tools, I reflected that a more iterative approach would be required to facilitate cycles of exploration (divergent thinking), with focussed consolidation (convergent thinking) needed to create the categories. I adapted the double diamond design process developed by the UK's Design Council (2004). The Design Council model also describes four stages: discover, define, develop, and deliver, broadly corresponding with Han and Ellis's four-stage model. Figure 15 illustrates the sequencing of divergent and convergent stages. The areas at the top and bottom of the diagram (professional practice and non-doctoral research and theory) denote activities that ran concurrently but separately from the analysis process. The impact and outputs are described later in Chapter 9 (Discussion).

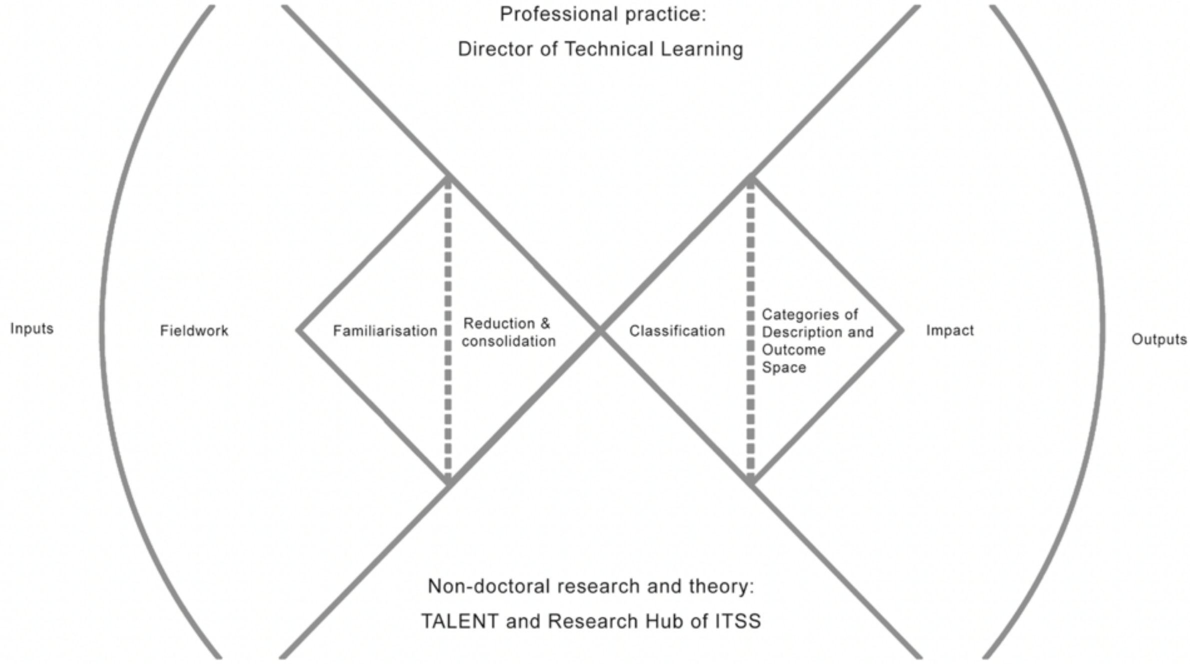

Figure 15: Adapted double diamond design analysis process based upon the Design Council model (2004).

The steps shown in Figure 15 (read from left to right) and the integration with MAXQDA are summarised below in bullet points, and then expanded in detail.

- Inputs: this corresponds to the pre-empirical work and research design (Chapters 1 to 4).

- Fieldwork: the process of data collection (Chapters 5 and 6).

Outline of Analysis Approach

Stage one: familiarisation

- Ingestion of data (field notes and interview transcripts) to MAXQDA.

- Initial reading of transcripts.

Stage two: reduction and consolidation

- Second reading of transcripts applying open and inductive coding to identify and cluster key utterances and adding memos of initial impressions.

- Third reading of transcripts with a deeper focus on coded areas and refinement and aggregation of codes concerning the research questions.

Stage three: classification

- Fourth reading (of coded sections) differentiating the critical units of meaning from the non-critical.

- Construction and population of a content-based matrix from abridged interpretations of the critically coded sections to what/how/why sub-questions, emphasising structures of experience, meaning, and seeking variation.

- Analysis of the content-based matrix to tentatively draft qualitatively distinct categories.

- Fifth reading applying 'digital highlighters' to test and stabilise the emergent categories using the full transcript data. Refining descriptions, boundaries, and examining and categorising borderline conceptions.

Stage four: categories of description and outcome space

- Assigning representative labels that represent the finalised categories and the generation of the categories of description (this chapter) and outcome space (subsequent chapter).

Stage one: familiarisation

I installed and configured MAXQDA, ingested the data, and read each transcript to become reacquainted with the data. Although I had already read the transcripts several times (to check the transcription and again following respondent validation in many cases), fieldwork had taken eleven months, the data set was vast, and my recollection of early interviews had faded and was comparatively impoverished when compared with the deeper understanding that I had developed as fieldwork had progressed. This first ‘fresh reading’ was to re-immerse myself within the interviews individually and collectively. Rädiker and Kuckartz describe this process as an “exploration… becoming familiar with the texts, discovering anomalies and patterns, and at the same time looking at the cases as a whole, without already slipping into a categorizing view of individual topics” (2020:28).

Stage two: reduction and consolidation

The next stage was re-reading each transcript applying open and inductive coding. I established a ‘loose’ framework for the unstructured data by identifying areas of interest, content relevant to the research questions, and articulations relating to the structure (internal and external horizons of experience) and underlying meaning (referential aspect) of described experiences. Coding is not universal or frequently explicit among phenomenographers; many favour “the Constant Comparison Method of Qualitative Analysis” (Glaser and Strauss, 1967) commonly associated with Grounded Theory, in which excerpts of raw data are sorted into groups according to their attributes. However, coding is consistent with the aims of phenomenography. Codes are described by Miles and Huberman as “tags or labels for assigning units of meaning to the descriptive or inferential information compiled during a study” (1994:56). In her conceptions-based study, Varnava-Marouchou (2007:122) describes how coding begins the process of selecting what is meaningful from the rest of the data and helps seek out what is significant and how to make relationships and create patterns. Thus, coding provides us with a set of lenses through which data can be viewed in a given situation. Furthermore, Sin describes how she used “coding, revision, and recoding” after her initial readings of transcripts to look for qualitatively different global meanings evident in data (2010:315). I used the coding process to apply a structure, identify and interpret meanings, and reduce and consolidate the data (un-coded sections were excluded from further stages).

I assigned descriptive codes to words, sentences, and paragraphs of interest. At this early stage, the process was relatively uninhibited, emphasising exploration. All codes used were inductively drawn from the raw data; none were pre-determined or imposed. At the end of this process, I applied 241 unique codes (in 1,995 instances) that identified areas of interest, patterns, and trends. While phenomenography does not focus on the number of occurrences, recurring codes ensured that frequently held conceptions emerged prominently. The most observed codes at this point (measured by the number of instances (n) and percentage of the total dataset that coded utterances comprised (%)) related to the 'boundaries' (n=70:3.51%), 'collaboration' (n=39:1.95%), and 'distinction' (n=37:1.85%) with academic pedagogies.

In the third reading of the transcripts, I adopted a more intensive approach to coding. The slower pace and attention to detail formed part of a more comprehensive strategy of immersion in which I read field notes, viewed photographs, and reviewed the examples of learning materials (where they had been provided) before re-reading the coded sections of each transcript. I engaged in a process of finer coding in which early codes were re-examined in detail, aggregated (where similar codes had sufficient congruence), and segregated (where differentiating factors were found).

I found the familiarisation, reduction, and consolidation stages effective. However, the number of codes, breadth, and detail within them remained vast and unfocussed; further reduction and analysis were required. This was partly because coding had encompassed a more comprehensive range of experiences of interest that extended beyond the scope and boundaries of the current study. Åkerlind *et al.,* caution that focusing on erroneous detail can lead to going off on tangents and warn the primary purpose can be lost while following interesting side-lines:

> …a key challenge in the interpretive process is drawing a distinction between critical and non-critical variation in experience. 'Critical' variation is that which distinguishes one meaning or way of experiencing a phenomenon as qualitatively different from another. 'Non-critical' variation in meaning is that which occurs within a particular way of experiencing, and does not distinguish between different ways (Åkerlind *et al.,* 2005:82).

Before the classification process could begin, the number of codes needed to be reduced. Rädiker and Kuckartz (2020:51) describe a process they call "Flowers by the Wayside" in which codes that present as interesting to the researcher but not directly relevant to the research questions are side-lined in a separate category (visible in the MAXQDA but de-activated in terms of analysis and data retrieval processes). They point out that these non-critical aspects may still be important later in the analysis process or may serve as a foundation for future projects. I reviewed the codes based on whether they were critical to the research questions or simply of interest. Only the relevant aspects of experiences remained when the non-critical codes were side-lined.

Stage three: classification

At this point, transcripts had been read multiple times, coarsely coded, refined via fine coding, and the critical sections differentiated. The next step was to transition from a generalised mesh of unstructured codes into a format that could facilitate the classification of the utterances to tentatively develop categories of description. To achieve this objective, I created a "content-based matrix" (Rädiker and Kuckartz, 2020:83), a method also used by Bowden and Walsh (2000) listing individual participants as rows and the research questions of 'what', 'how' and 'why' as columns (Figure 16).

	What	How	Why
Participant 1			
Participant 2			
…			

Figure 16: The content-based matrix of experiences and meaning in relation to the research questions.

I re-read the critically coded sections emphasising variation in experience and qualitatively different ways of understanding. Rather than extract the coded sections of transcripts verbatim and in full, I summarised key sections as abridged 'micro abstracts' to populate the matrix. This reading entailed looking beyond the linguistic properties of the transcripts, carefully interpreting the structure and underlying meanings and intentions expressed.

Åkerlind describes how phenemenographers "co-constitute meaning and structure through constant iteration between focusing on each of them, rather than trying to focus on both simultaneously" (2005:68). This approach was successful while populating the matrix. However, while Åkerlind *et al.,* (2005) describe not being interested in the detail of the described examples, within this study, the activity and its context are integral to the recalled experiences' structural aspects.

As in Marton and Booth's (1997) deer analogy, the conceptions of experiences contain dialectically entwined structural and referential aspects. The experiences' structural aspect comprised both internal and external horizons. The internal horizon was relatively straightforward to discern insofar as it relates to individuals' awareness of their experience in recalled examples of teaching and supporting learning. The external horizon in which the contours and characteristics of the phenomenon are differentiated from the context is primarily related to curriculum, learning environment, and distinction from, and relationships with, academic pedagogies. The absence of clear definition, knowledge, and understanding of technical pedagogies posed challenges in delineating the contours and the periphery of experiences. Continuing the deer analogy, this required that the deer (technical pedagogies) be distinguished not just from the foliage (institution and curriculum), but from other similar creatures that shared many contours and characteristics (academic pedagogies).

The interview questions addressing the 'what' and 'how' of teaching prompted the articulation of structural conceptions, whereas referential elements of experience were more closely associated with the 'why' field, which surfaced the underlying meanings and purposes apprehended and articulated by participants. In some instances, the structural and referential elements of individual participants' experiences varied during the same interview. Reed (2006:6) points out that experience "is not necessarily constant… It may vary, and possibly even change, as aspects are brought into focus and become figural (and others move to ground) during the interview conversation" As I read each transcript to identify and extract critical information and transfer it into the content-based matrix I was able to observe the experiences both within the context they were described and alongside others to seek commonality and variances. Booth (1997) describes this process:

> The researcher emerges himself or herself in the material, trying to see the total meaning in what the research subjects said and did, resolving apparent contradictions, knitting together as whole a picture of the meaning of the phenomenon as possible, not only for individual subjects but also for the group. Eventually a spectrum is seen (Booth, 1997:138).

Interpreting the content-based matrix

When populated, the content-based matrix generated a 'low-resolution' summary of the critical aspects of interview data (10,000 words rather than 170,000) that could be understood and processed relatively quickly. It also enabled the abridged data to be approached and analysed in two directions. When reading the rows horizontally, the matrix articulated a brief abstract of each transcript based on the individual participant and their context, whereas when the columns were read vertically, analysis became possible across the data set in relation to the sub-research questions. At this point, the individual human voice became subsumed into the collective:

> The boundaries separating individuals are abandoned and interest is focused on the 'pool of meanings' discovered in the data. Thus, each quote has two contexts in relation to which it has been interpreted: first, the interview from which it was taken, and second, the 'pool of meanings' to which it belongs (Åkerlind, 2012: 325).

The matrix provided the basis for the drafting of the categories. However, as Reed (2006:8) notes, "Phenomenography has no prescribed method for how researchers make these categories of description emerge through a process of construction and discovery from the data." He describes a tension between using terms of 'construction' and 'discovery' in this context, identifying that if a category is 'discovered' then it must exist prior to the study, whereas he also argues that if the process is seen purely through construction, it introduces the possibility that the researcher can impose their framework onto the data and pre-conceived ideas into the categories. This perspective is consistent with Åkerlind (2012), who suggests that the categories or meanings that result from the analysis are not determined in advance but 'emerge' from the data in relationship with the researcher. The role of the researcher is critical to acknowledge, as "the categories of description are intentionally constituted through the researcher's interpretation" (Sandburgh, 1997:208). This can be viewed as problematic in terms of bias for some (Webb,1997a; 1997b; Tight, 2019), though, as Uljens (1996:122) argues "Previous knowledge as such is by no means a hindrance to being open-minded both in gathering data (e.g., by interviewing) and in analysing data." This is consistent with Cohen *et al.*, (2018:722) who identify that the researcher has, and needs to have, prior knowledge to understand the field, to be sensitive to the issues and to be able to reflect on the research.

Marton and Booth (1997:142-3) dictate that the categories should fulfil three distinct criteria:

1. Individual categories should each stand in clear relation to the phenomenon of the investigation so that each category tells us something distinct about a particular way of experiencing the phenomenon.

2. Categories have to stand in a logical relationship with one another, a relationship that is frequently hierarchical.

3. The system should be parsimonious, which is to say that as few categories should be explicated as is feasible and reasonable, for capturing the critical variation in the data.

Svennson (1994:17) describes category formation as “a reduction of data to a limited and pregnant form, the aim is to reach a summary expression of the content or meaning of the data as possible.” I combined discovery (analysis and interpretation of the columns) and construction (clustering and classifying the qualitatively distinct ways of experiencing). I analysed the matrix from the perspective of the analytic framework applied to units of experience (Figure 14) to establish five hierarchically inclusive categories. In this process, the three sub-questions concerning ‘what’, ‘why’, and ‘how’ were superseded and replaced by the structural (internal and external horizons) and referential aspects of experience, having served their purpose in focusing the research design, data collection and analysis strategy.

The five qualitatively distinct ways of experiencing technical pedagogies had been derived from abridged data (albeit from the empirical source complied in the matrix) and Trowler (2016:31) cautions of the danger of “premature cognitive closure.” Therefore, the draft categories of description were treated as provisional until they had been structured, populated, tested, refined, and illustrated using the full-resolution transcript data. This process was undertaken within MAXQDA, where each category was assigned a different coloured digital highlighter. The coded aspects of each transcript were re-read for a final time, and utterances corresponding to one of the five categories were marked with an assigned colour. The categories were tested, adjusted, and tested again as this process progressed. Outliers emerged that needed to be incorporated, and as the categories were adjusted, their contents and internal and external relationships evolved and updated. Åkerlind *et al.,* (2005:87) suggest that it is in the conduct of this iterative process that phenomenographers most clearly establish their interpretive rigour.

As my reading and highlighting progressed, interview transcripts took on the corresponding hues of the interviewees’ predominant conceptions. Åkerlind *et al.,* remind us “It is easy to confuse, or equate, the category with the individual. That is, mistakenly believe that a single category should equate fully with the perception of a single individual” (2005:81). The overall focus remained on the "domain of the collective" (Collier-Reed, 2009:5). However, the multi-coloured transcripts illustrated visually that participants held a range of conceptions that informed their approaches in different contexts.

When the final reading and highlighting had been completed, I used MAXQDA to create a full content-based matrix using the colour-coded quotes within their entirety (a digital equivalent of the 'Martonian scissors' but with the benefit of enabling illustrative quotations to be viewed both in context (within the transcript) and within the category). The full-resolution data was used to robustly refine the categories and surface previously unseen continuums that follow through to the outcome space. The rigour of the process increased my confidence that the categories were structurally and referentially distinct, logically related, and parsimonious.

Phenomenographic categories are typically hierarchical. However, the hierarchy does not seek to assess better and worse ways of understanding. Instead the position in the hierarchy is "indicated by an increasing breadth of awareness of different aspects of the phenomenon being investigated" (Åkerlind, 2003:378). Being hierarchical, the categories are nested, meaning that participants who share conceptions in category five, also adopt conceptions one to four, but not all participants who adopt conception one would adopt conceptions in categories two, three, four and five. All conceptions were regarded equally, and no value judgements were assigned to the categories.

It is also important to acknowledge that phenomenographic analysis is messy, like all qualitative research. Yet, as Åkerlind *et al.,* (2005:77) note, the categories of description present an apparent neatness due to their focus on constituting key aspects of collective experience rather than the rich detail of the individual experience. They also point out that while categories are described in terms of critical qualitative similarities and differences, there is room within these descriptions to include some of the non-critical variations in experience. This is particularly important within this study because interviews generated such an array of experiences and insights.

Stage four: labelling the categories

In congruence with the fourth stage of Han and Elllis's (2019) model, I assigned appropriate descriptors based on the core meanings of the categories. These descriptors are set out in the next chapter as part of the outcome space.

7.6 Construction and composition of the outcome space

I used the categories of description as an initial framework to generate the outcome space, and it is through the outcome space that this study responds to the research questions. It is essential, therefore, to outline what an outcome space is, how it is created, and how it advances this study. In brief, an outcome space encompasses and describes the full range of experiencing a given phenomenon. Ekeblad and Bond (1994:155) describe it as a "span of generative possibilities" for relating to the phenomenon. Reed describes the outcome space as "a robustly constituted set of logically related categories comprising distinct groupings of aspects of the phenomenon" (Reed, 2006:9). This is accurate and consistent with definitions used by other phenomenographers. However, this is also true of the categories of description. The fundamental difference between the two is that the outcome space, or as Marton describes it, the "collective intellect" (1986:198), is more expansive. It moves beyond the level of description to provide a mapping system for the "qualitatively different ways in which people experience, conceptualize, perceive, and understand various aspects of, and phenomena in, the world around them" (Marton, 1986:31). Marton describes the outcome space "as a structured pool of ideas, conceptions, and beliefs underlying the possible interpretations (or possible constructions) of reality" (1981:198). Varma describes how it provides a means of "examining the experiences in a collective and holistic manner, that was empirically derived, rather than one that is hypothetical or philosophical" (Varma, 2019:98).

Like the categories of description, the outcome space is organised hierarchically within an inclusive architecture in relation to the level of sophistication and awareness. The least complete conceptions are presented first, and progressively more developed categories follow. To evolve the categories of description into a phenomenographic outcome space, the analysis strategy extended to:

- Providing a detailed elaboration of each category.

- Identifying and describing the structure and meaning between and within each category.

- Illustrating each of the categories through quotations.
- Examining the similarities, differences, and relationships between categories.

7.7 Summary

This chapter has advanced the thesis from the pre-empirical and data collection stages by presenting the design and step-by-step implementation of the data analysis strategy. It has set out the aims and objectives of the process before describing the volume, characteristics, and composition of the data subject to analysis. Although described as a relatively coherent sequence of activities, this was a lengthy, extensive, and iterative process that took many hours of reading, sorting, comparing, re-reading, and resorting. In conclusion, this chapter has outlined the analysis process; the following chapter focuses on presenting the outcomes of that analysis.

Chapter 8: The outcome space

8.1 Chapter introduction

This chapter sets out the outcome space that provides the framework for presenting insights that respond to the research questions. It introduces the five qualitatively distinct ways of conceiving technical pedagogies, as identified using the analysis strategies set out in the previous chapter. Each category is presented in terms of its structural and referential components, supported using interview extracts that place the voices of the participants at the forefront. The utterances are selected to illustrate the categories and add credibility and authenticity. Excerpts are drawn from a broad range of disciplines with variations in processes, materials, and detail but are brought together through commonalities in structure and meaning. Each category is introduced before being described in detail and summarised at its conclusion in a table highlighting its key aspects.

Before introducing the outcome space it is important to repeat that the categories were developed from the pool of meaning and detailed ways of thinking of the collective and do not necessarily relate to an individual. Expressed conceptions are not assigned to individuals, and the relationships participants have with their pedagogies are of a dynamic nature, which also involves the dynamics of the situation (Ekeblad, 1994:156). However, the individual voices do portray the lived experiences and different perspectives within the categories. Conventional phenomenography decontextualises individual voices, separating them from the individual lifeworld in which they appear (Uljens,1996). However, each category can be thought of as a mosaic, comprised of multiple tiles (decontextualised fragments of interview conversations). In this study, each 'tile' has a disciplinary specialism. Some excerpts offer clues to these and to ensure these are consistent for the reader each quote is labelled with its disciplinary origin.

It is also helpful to recall that the definition of pedagogy used in the study goes beyond teaching, extending to "any conscious activity by one person designed to enhance learning in another" (Watkins and Mortimore, 1999:3). A final point to note is that the category descriptors reference conceptions rather than activities. Hence, the term 'Demonstrator' (the title of the first category), refers to a particular way of thinking about pedagogies expressed by a participant at a particular time and context rather than a job title, individual, strategy, approach, or method(s) of teaching, though these can also correlate.

8.2 Category one (Demonstrator): Internal horizon

Demonstrators aim to introduce and induct their learners to a fixed body of knowledge concerning the operation and conventions of equipment, tools, processes, environments, materials, software, or techniques:

> *I give them an item to build and I give them the knowledge and the resources and the tools and the instructions to be able to build that. I step them through every step of the way [Metalwork].*

Their emphasis and focus are on the content to be taught rather than their learners, who they generally regard as a collective rather than a group of individuals (assuming no prior knowledge and deprioritising any intended application). They believe that all content must be covered and seek to follow the same structure and processes each time with the same outcome.

Fundamentally, Demonstrators believe that the aim of their teaching is to develop confident, competent, and independent learners who can work autonomously and safely. They seek to achieve this aim by converting and consolidating their understanding of the subject into cogent and logical step-by-step processes that can be clearly articulated, taught, repeated, stored, and retrieved:

> *I always demonstrate everything I want them to do because I think it's really hard to learn unless you've been shown [Photography].*

The quotes above contribute to what is presented here as a five-phase sequence for pre-planned delivery:

1. Preparation
2. Orientation
3. Context
4. Show and tell
5. Supervised practice

This sequence was consistently described across all disciplines. It is illustrated here (through participant voices) to reveal the framework through which Demonstrators think about and enact their pedagogies.

Preparation

It is important to Demonstrators that learners are taught appropriate content in pre-determined sequences that enable them to have a consistent and predictable experience. To ensure lessons run smoothly, Demonstrators decide what and how to teach, prepare the physical spaces, and ensure relevant resources are available. While the decision of what to teach is largely determined through the academic requirement and the available resources, Demonstrators exercise significant autonomy in the detail of what is taught and how, prioritising what they believe to be the most helpful and enabling knowledge for their learners. The following extract relates to a participant being asked to teach necklines:

> *But there's like a thousand different necklines… I have to decide what is going to be the best one for them, because they don't have an endless amount of time on this course to make their garments. So, what's going to be the one that they're probably most likely going to use most frequently… that's going to work really well for a lot of designs? [Fashion and Textiles].*

Regarding the environment and resources, Demonstrators prioritise accessible and inviting spaces. This is consistent across all disciplines but heightened when describing high-risk processes or hazardous machinery:

> *I try to make my workshop an inspiring place to be, somewhere where people feel comfortable and fairly informal. So, there's an emphasis on professionalism and attention to detail, but also, just feeling comfortable, feeling like they belong in this environment… without that starting point, a student might not engage at all [Painting, Printmaking, and Mixed Media].*

Demonstrators believe restricting choices within taught sessions is important to ensure learners follow the same path and have comparable experiences (albeit with aesthetic or style variations). To ensure a consistent experience, they prepare resources in advance; learners are provided with a 'flat pack' experience containing the instruction, tools, and materials required to create the knowledge needed to achieve the outcome. Demonstrators of physical processes typically ensure that materials are prepared, cut to size, labelled, laid out at workstations, etc., removing the requirement for the learners to make choices that might lead to unforeseen or undesirable outcomes. Demonstrators of digital media ensure that the relevant artefacts are centralised:

> *The stock is already there… They don't even need to create the project folder, because it's all on the learning space, ready for them to download [Illustration and Graphics].*

Orientation

Demonstrators described valuing the initial orientation through which learners are welcomed into the space and introduced to their teacher and topic of learning. Demonstrator pedagogies are frequently deployed early in the learner's mode of study (often as an introduction or induction to a discipline or process). The primary aim during the orientation stage is to put learners at ease and prepare them for learning:

> *…when they come in, I'll introduce myself, show them around the workshop, give them a general feel where everything is…then I'll explain to them what we're going to do…I have always felt that my job is to foster a sense of belonging in the students…So, before they get going with something, it's important to me that I'm approachable and that students at varying levels feel that they can come to me. [Painting, Printmaking, and Mixed Media].*

Another critical aspect of orientation described by Demonstrators is health and safety (H&S):

> *First primary objective is always that students can use things safely. Is it safe for them? Is it safe for the equipment? [Filmmaking].*

The intensity of focus on H&S varies according to the subject, but within the Demonstrator category this is paramount, particularly when working with inexperienced learners in potentially hazardous environments. Demonstrators describe themselves as the responsible authority for imparting and enforcing safe working practices:

I don’t want to be their best friend, but I want to be approachable. I also have a degree of authority, obviously. I do have to discipline occasionally and add a gentle bollocking if something's being done unsafely, and I will do that. But I want them to feel comfortable coming to me and I want to enjoy being there as well [Metalwork].

Participants described how important it was that the mandatory safety training is recorded to protect the learners, themselves, and their university:

We’ll do the complete health and safety induction that’s a walkthrough fire exits, how to use the equipment safely and that sort of, if you like, tick box exercise, but the core skill, we need them to prove that they have achieved a certain level so that we can sign it off, and that we’ve achieved our requirements as part of our health and safety remit [Fashion and Textiles].

Context

Like all categories, Demonstrators believe that their pedagogies are best engaged when they are aligned with the learners’ requirements. Sub-optimal experiences were described where taught sessions were delivered without context, purpose, or perceived relevance:

I’m the expert in the process, so I’m going to teach them about the history of the process and show them examples of prints so they can learn something about the history of the fine art world, but also learn about commercial background. So, I’m teaching them some history to put it in context of the work that they’re going to make in the workshop [Painting, Printmaking, and Mixed Media].

Demonstrators also believe it is important for their learners to be inspired, to connect purpose, and aid them in envisioning future usage of the taught subject. It is common for them to use exemplars of accomplished artists or successful commercial practitioners, the work of former students and, in some instances, their own. Autobiographical narratives to reinforce the value of more mundane conventions can also be used:

I worked at the BBC… I did an animation for the news… the next day they wanted the same animation, but with a slight difference… because I hadn’t set up a project folder on my Mac all of the files that I was using in this After Effects composition were dotted all over the place… it was about an hour before broadcast… my life for that *one hour became an emotional roller coaster… I use that quite a lot with the students… all of the boring bits that you have to try and juice up a little bit by going, look, they're really important. That's going to make your creative life a lot more interesting along the way [Illustration and Graphics].*

Show and tell

The defining characteristic of the Demonstrators' approach is to show (physically demonstrate) and tell (verbally explain) how to do something. Throughout these activities Demonstrators generally regard themselves as active (teaching) and their learners as passive (observing and listening). Learners are expected to accept the ready-made constructs of the Demonstrator's knowledge without challenge. As the process advances, learners are invited to become more active through dialogue (clarifying, checking understanding, and questioning) and participating in structured and supervised exercises to repeat what has been demonstrated:

For everything I demonstrate, I'll also get them to do it. I'll show them how to set up an easel, and then we'll all set up their easels together. I'll show them how to cut the paper in the dark, and then they'll cut the paper in the dark. So, it is a lot of repetition, but I think for those manual skills, that's the best way to learn and the way that they'll remember it… [Photography].

The sequencing and structure of lessons are important for two reasons; firstly, because many processes must be completed in a particular order, and Demonstrators consider it essential that learners grasp this:

You can't just put the whole thing together and then put the zip in. Sometimes you have to do the zip before you've put the collar on, for example, that kind of thing, depending on the garment… It's more getting them used to the order of things. [Fashion and Textiles].

The second explanation given by Demonstrators for controlled sequencing is efficiency. Learners follow the same linear path at similar speeds. They frequently reinforce teaching sequences by creating learning materials such as recipes, instructions, bullet point lists, step-by-step handouts, presentations, or video walk-throughs. These can be provided in advance or during sessions, and several participants reported using them in place of lesson plans:

> *The step-by-steps enabled them to come back at different times and say, "Well, I'm at this stage and I've forgotten. What do I do?" I put them up on the wall. They could go and have a look and compare where they are with the stage they should be at on the step-by-step guides. That's been a big help… [Fashion and Textiles].*

Throughout showing and telling, Demonstrators emphasise the most critical or challenging aspects. Several participants described encouraging learners to take notes, photographs, or record aspects of taught sessions on mobile phones:

> *I'll say, "Right, okay. Each of you individually come up and just film a tiny bit of this really difficult bit." …I don't want to have to be repeating the same thing from start to finish ten times, which if you don't get it across properly in the first go… [Photography].*

For tactile or haptic processes showing and telling is insufficient and Demonstrators describe the importance of modelling tacit knowledge:

> *…that's something that you can explain to them, but you can't in a sense teach them because it's about feeling how tight the screws have to be on. I'll do one side and then I'll get them to do another and then I'll check it and say, right, you just need to go a little bit tighter with that... It's really important that you get that right because if you don't, you'll break the machine [Fashion and Textiles].*

Supervised practice

The learner's ability to repeat what they have been taught is a critical success indicator for Demonstrators. The shift from showing and telling into supervised practice is experienced as an important push/pull transition. Learners are afforded greater autonomy as they successfully practice and reign back as they deviate from the taught example:

> *I do it step by step, I'll show them a little bit, I'll get them to do it themselves and then I'll show them a bit more and they do that [Painting, Printmaking, and Mixed Media].*

They aim to provide learners with an authentic experience of freedom but ensure that the freedoms are located within the parameters of a regulated framework. For example, in high-risk environments, Demonstrators prioritise safety:

> *It's allowing them to have what they deem as free access to an industrial workshop, but I'm keeping quite a close rein on them… So although they're manipulating metal, I'm controlling them without them knowing. I'm controlling them to keep them safe [Metalwork].*

Demonstrators also feel a responsibility to protect the facilities:

> *I try to let them be as free as possible. But I've got to have a certain cut-off point because if they break the machine, then we're really stuck [Fashion and Textiles].*

Throughout supervised practice, Demonstrators describe lessening the intensity of supervision as learners gain confidence and competence. They aim to become reactive through providing corrective feedback:

> *I stand back and allow them to ask questions, allow them to come to me with problems when they hit the roadblocks, rather than dictating or giving them specific instructions, asking them to work through step by step… by the end of it, they were all reasonably confident to at least do simple operations on this equipment [3D].*

During supervised practice Demonstrators identify learners who require additional support:

> *I'd do a demonstration and they would then go away and perhaps 70 or 80% had run with it. And, there'd perhaps be 20 or 30% would be scratching their head. Then you'd move round in small groups… Gather them somewhere else and step through it and show them a bit more personally and enable them to go off and hopefully do it [Metalwork].*

However, despite the dominance of step-by-step sequencing, Demonstrators believe allowing learners to make mistakes is an important element of learning:

> *What I've found is really important is that you just leave them to make the mistakes. Be there as a guide and someone that can rescue a situation, but really let them have fun with it. I think the worst thing that I've done before is just really hover...*

> *That's not how they learn. They learn through doing [Painting, Printmaking, and Mixed Media].*

Holding back and providing space to practice is a core element of the Demonstrators' strategy to check and reinforce learning:

> *If you get to a point with someone where they're really struggling… it's very tempting to try and just do it for them so that they get an outcome. But that's not actually an outcome for them… I try to be as supportive but hands-off as I can, so that when they do get it, they know that they've got it and that they're able to come back in [to use the equipment being demonstrated]. I think the main purpose of my job is that they should be able to use the facilities independently [Photography].*

Demonstrators describe 'signing off' that learners have attended and completed their session. They think of this as a form of assessment in which they are required to judge whether the learner has sufficiently understood and evidenced their ability to work competently, independently, and safely. In instances where learners fell short of competence, Demonstrators described offering one-to-one support or additional developmental activities. Furthermore, Demonstrators are advocates for their facilities and promote maximum participation:

> *You want to encourage them to use the spaces because that's our job, to get people using the technical facilities and assisting them to use it [Photography].*

Demonstrators frequently describe their teaching as single orientation or induction events, but participants also described how progressive demonstrations developed frameworks of foundational understanding over time. The following participant quotes a learner's realisation that the techniques they had been taught at different times could be combined to create something new (not demonstrated):

> *"Oh, hold on a minute. So that's how you do the bottom of your sweater. Hold on a minute. So that's how you shape your sleeves. Hold on a minute. That's how you link together all your seams"… It's making it digestible for them... when I'm doing the sock demo, I say this seam here on the sock is the one that goes down the side of your sweater. And this seam here at the end of the sock is the one that goes on your shoulders [Fashion and Textiles].*

Demonstrators describe having significant freedoms in what and how they teach describing almost complete autonomy in many instances. They sometimes attribute this to a combination of what they perceive to be superficial knowledge of the equipment or processes from lecturers, increased academic workloads that de-prioritise practice, and feeling trusted to teach relevant content. However, while the Demonstrator establishes the detail of content, the overall approaches are consistent with the five-stage model to the pre-determined outcome. Participants described repeating identical sessions, with variations in delivery related to managing group sizes by varying the quantity of content and pace:

> *Our department has three full-time technicians. We've got nearly 600 students. How can we ever give them really what they need? I suppose, within the limitations of what we can, we try to provide the best service we can. It's all about balancing the time. You also don't want to be teaching too much because the facilities are quite small. If you're always teaching in them, then the students can't get in to use them [Photography].*

Demonstrators prioritise clear and consistent teaching of foundational subject knowledge. Content is seen as something that must be delivered consistently:

> *You forget what you've said, and I'm not working off a script… The lesson plan is like a shopping list. It's what we need to get through. But if I need to react or deviate, I have to, but then for the next group, have I done that the same way? You need parity, they need to get the same [Illustration and Graphics].*

It is also important to Demonstrators that learners are taught basic studio etiquette, such as cleaning up:

> *…which is really important because they need to tidy up after themselves, and some of them are dreadful at it. But it's really important to keep the workshops ticking over for all users [Painting, Printmaking, and Mixed Media].*

Many described reflecting upon their delivery and changing approaches over time (frequently in relation to evolving or emerging technologies) however, where content remained static, some Demonstrators described feeling unfulfilled, as these extracts illustrate:

I've run so many inductions that I could run them in my sleep. They're very formulaic in certain ways… We've changed it gradually and tried different things, but the process is the same [Painting, Printmaking, and Mixed Media].

…it's just that repetitive over and over again… we're running hundreds of the same inductions, just to get everyone inducted. That can be quite mind-numbing [Photography].

It is draining, especially when it's the hundredth time you've taught someone how to cast a machine on… you just want to like shoot yourself on a Monday morning… You can kind of sort of go into autopilot with it, certainly on the easier stuff [Fashion and Textiles].

Outside of pre-planned teaching, Demonstrators also described providing reactive support and troubleshooting to learners. In these instances, participants typically assumed no prior knowledge:

You might get a call, I'd wander in and say, "Hey, how are you doing"? ...And they go, "Oh, the camera's here, blah, blah, blah, blah." Generally, you've just got to go right back to the beginning because they'll say, "Oh, I've done this and I've done this and da, da, da..." All the usual checks. But you have to kind of disbelieve them a little bit because there's probably something they've missed. The wise thing is usually to take the long road and go right back to the beginning and then go through it [Photography].

Demonstrators also described referring learners to other technical specialists where appropriate:

We'll give them advice on what we consider to be the best processes. If we don't know what those processes are, we'll try and point them to people within the technical department who do know [Metalwork].

Furthermore, in a broader sense, they see themselves as aiding learners to navigate institutional systems and processes:

We often have a lot of knowledge on little incidental things it's knowledge of maybe *booking practices, it's knowledge of working practices, it's knowledge of what's available within the campus. And I think sometimes we have conversations with other technical staff and get to know what's available across other campuses and we just have knowledge, I guess maybe not necessarily just of what's available, but also who to ask [3D].*

8.3 Category one (Demonstrator): External horizon

A relatively straightforward way to differentiate technical teaching from its background is through the physical spaces in which it occurs. In most instances, Demonstrators (indeed all categories of technical teachers interviewed) teach and support learning in specialist environments (workshops and studios). However, they can also occupy other environments (such as computing rooms) or virtual spaces (prevalent during the Covid-19 lockdowns). For Demonstrators, space is an essential aspect of their pedagogies. They believe that maintaining an attractive, accessible, safe, and inclusive environment is one of their core purposes. Demonstrators describe feeling responsible for the aesthetics, housekeeping, maintenance, safe operation, and general functioning. However, their awareness of space can extend beyond these fundamentals of the practicalities into the potential and possibilities, as this participant explains:

I've always had this thread of we're a custodian of space. And magical things can happen in this space. You can really have fruitful learning journeys facilitated in space [3D].

Another way in which Demonstrators (and all categories) delineate their teaching is through connection and integration with the academic curriculum and associated job families. Indeed, the relationships and boundaries with academic teaching are the most significant aspect of this study's external horizon in all categories. Demonstrators locate their pedagogies within the broader university pedagogic eco-system but are the least likely to experience their teaching in the context of the curriculum or academic outcomes. They describe having limited knowledge of what their academic colleagues are teaching but are able to discern and differentiate the anatomy and function of their pedagogies with relative ease. They are clear that their primary purpose is functional and technical, as these extracts show:

The massive bulk of what I do is very much the technical, this is how this camera works, and this is how this light works, and this is what you would use it for, rather than the creative side of it [Filmmaking].

I won't start changing their minds and their thoughts. That's the academic side of teaching. I might change their minds on material and look, but I will point out that it's for making purposes, not artistic purposes [3D Workshops].

The Demonstrators' focus is on increasing their learners' awareness in relation to the subject being taught and ensuring they are safe and competent to engage. The learner's level, unit, module, or discipline is of minimal significance. The boundary of the Demonstrator's concern is predominantly within the studio, workshop, or facility in which their teaching occurs. For some Demonstrators, the lack of integration with the curriculum was described as problematic:

It's difficult sometimes because they will often quickly know what they're being assessed on and what they're not being assessed on which can lead to non-attendance… students will ignore my briefing of criteria related suggestions if they know it's not assessed [Painting, Printmaking, and Mixed Media].

Demonstrators can conceive of their pedagogies as simplistic, undervalued, and held in relatively low esteem (by their academic colleagues rather than learners):

We're not just saying, "Okay, come in here. There's a hammer, there's a press. That's how it's maintained. Off you go" [Painting, Printmaking, and Mixed Media].

As this participant describes:

We're not in friction with the tutors; they just do their thing. But a lot of the time, they're just not interested [3D].

Furthermore, most participants described a lack of recognition/acceptance that they were teaching. The word 'teaching' (when used in relation to technicians) holds powerful and emotive sensitivities for Demonstrators (and in all categories – albeit diminishing at Category 4 (Collaborator) and Category 5 (Transformer)). The volume and strength of feeling from participants around this point cannot be overstated. This point is not expanded here but is echoed in later categories and discussed in greater detail in the following chapter. As a participant explains:

> *You sort of feel a little bit like you're being gas lit… everyone keeps on telling me that I'm demonstrating… no one will say teaching [Fashion and Textiles].*

Participants described how they believed their teaching could be improved through focused and two-way conversations with academic teams:

> *Sometimes the academic staff will come to me and say "Oh, can you just do an induction in oil paint," for example, it's a very simplistic view of what it could be and not as expansive as it should be. I actually want to tease out more from them - what do you want your students to learn from this? It can be quite frustrating [Painting, Printmaking, and Mixed Media].*

Many described how they had experienced a shift from being reactive to proactive in their pedagogies in recent years. This point is amplified in later categories though the following extract is from a participant responding to a question about the academic direction within their teaching:

> *There's not much input… the academic tutors had a lot of input in what happened in the workshops and that's disappeared, and we've taken on that role [Painting, Printmaking, and Mixed Media].*

Some Demonstrators experienced and described their teaching as a form of filtration. While they often teach introductory content to high numbers, many find a deeper value in inspiring the few that will go on to more expansive learning and form longer and more meaningful relationships:

> *[in a demonstration] you're only scratching the surface, so we try and just give them the basic tools to start and to be able to make something, learn these rules… some students will do it and they'll go, "That's not for me… I want to do something else" but some people, you just know when they get quite excited [Painting, Printmaking, and Mixed Media].*

They generally perceive their teaching as introductory, establishing the basics at the beginning of the learners' exposure to the subject or facility. Though, over time, as additional and more advanced demonstrations are completed and connected, they take satisfaction from the minority who develop affinity for their discipline and develop as practitioners.

8.4 Category one (Demonstrator): Referential meaning

Demonstrators conceive the core meaning of their teaching to be centred upon providing an awareness and experience of the subject. Their pedagogies are not concerned with finessing or finishing work. Instead, they provide an initial experience through which some learners gain sufficient awareness and understanding of their purpose. A key indicator of success is whether students continue to engage:

> *From my perspective, the true test that they have gained some competence and confidence, is that they return to the facility [Painting, Printmaking, and Mixed Media].*

'Returning' is not time bound, and Demonstrators acknowledge learners assimilate their experiences, and reflect upon them, as these participants explain:

> *Some of the stuff you tell them in the first session won't make any sense then. But then, maybe a month or two months' time, that will suddenly click in, and they'll suddenly think, "Oh, that's why that is, or that works" [Photography].*

> *I get quite a great deal of satisfaction when they come back two or three years later and they say, "I remember doing something in the first year." And, this is often nearly four years previously… That, to me, is what we've achieved. They've remembered [Metalwork].*

Another important source of meaning for Demonstrators is that their learners become autonomous:

> *My goal as a teacher is that the student can do the task without me… they shouldn't need me anymore, they should just know how to do those things if we've done our jobs properly…in an ideal world I feel like I go from a teacher, to a support, to almost being redundant by the end of it [Filmmaking].*

However, for learners who choose not to develop their learning in the subject beyond the taught session, Demonstrators value awareness as a valid outcome in and of itself. Participants described the value of material engagement for both design and commercial practice:

> *They could go away and design anything. But, if you don't know the processes that are going to go into it, then you are going to struggle. I think that's where we are important, in the design school anyway, to give them an overview of all the different processes in the workshop. We're not turning out tradesmen. We're turning out people with a limited understanding of the different processes they're going to use and go into making things [Metalwork].*

> *If one of the fine artists left here and had a commission and went to a fabricator, and fabricator said, "two bits of metal, it'll take me about two weeks. I'll need about 600 quid," and they'll say, "Whoa, whoa, whoa. That's about a 20-minute job and about an hour's work" [Metalwork].*

In conclusion, the meaning Demonstrators assign to their pedagogies is as these participants describe:

> *Our goal is to get students competent, get them excited about a process, make them feel welcome in a workshop and they could feel like it's just an extension of their studio [Painting, Printmaking, and Mixed Media].*

> *They're immersing themselves in processes and it's their imaginations that will change these into something else… It's jump in, use it, experience it, and keep that knowledge for when you will need it [3D].*

8.5 Demonstrator summary

Demonstrators describe adopting teacher-centred/content-oriented approaches to their pedagogies and teach pre-determined and fixed bodies of knowledge in controlled and structured sequences. They introduce learners to equipment, tools, processes, environments, materials, software, or techniques through demonstration and explanation. Learners are often perceived as passive recipients, receiving, and repeating the taught content, with feedback

being primarily corrective. Their core meaning is to promote subject awareness and developing learners' confidence and competence, to enable them to engage in independent and safe self-directed study.

Key structural and referential characteristics

Epistemologies (what is taught and learned)

- To operate equipment, tools, processes, environments, materials, software, or techniques competently and safely.

Teaching style and structures (how it is taught)

- Teacher-centred/subject-oriented approaches (transmissive and didactic).
- All learners are taught the same content in the same way.
- Consistent, predictable, step-by-step sequences of activity to ensure content is articulated with sufficient clarity for it to be apprehended and repeated.
- Feedback is used to correct deviation from the teachers' example during supervised practice.

Conceptions of the teachers' role

- Plan and deliver a fixed body of knowledge.
- Provide a safe, accessible, and inviting environment in which to learn.
- Promote access to the process or facility.
- Protect the equipment from damage.
- Be the expert and authority figure within the space.
- Reduce contact with learners as they become proficient.

Conceptions of learners

- A collective of undifferentiated people, rather than individuals with prior knowledge or creative ideas.
- Passive (to receive, understand, and repeat taught content).
- Potential for progression in subject area based on affinity with the content.

Conceptions of the curriculum

- Pedagogies can be experienced as adjacent to the curriculum.
- Limited knowledge or integration with the academic curriculum.

- Managing throughput (delivering narrow or shallow content frequently).

Relationship with academic pedagogies

- Clearly distinct and easily distinguished.
- Unconcerned with content being taught by academic staff.
- Belief that academics are unclear on what the technicians are teaching.

Core meaning

- To increase awareness, confidence, and competence in the use of specific equipment, materials, or processes to enable independent and safe practice.

Figure 17: Summary and key aspects of the Demonstrator category.

8.6 Category two (Instructor): Internal horizon

Instructors share similarities with Demonstrators but with the critical distinction that their emphasis is upon building the knowledge and skills of their learners and supporting them to apply and develop them in new directions and contexts:

> *We try and get them to consider how they might further develop those skills themselves, how they might apply those skills in a manner that is unique to them [3D].*

Rather than introducing learners to use a particular resource through a sequence of rules, conventions, and best practices to a pre-determined endpoint, Instructors' intent is on the application of knowledge, to enable learners to construct their understanding of the tools and techniques taught to create new and unprecedented (to them) outcomes:

> *The main thing of the technical role is allowing them in their project work and in the academic work that they're set to explore different ideas so that when they have projects, they're not just creating the same work over and over again. They need to be challenged so that they understand that there's so many different outcomes they can create [Photography].*

While Instructors can utilise demonstrations as teaching methods (and hold Demonstrator conceptions at different times) as an element of their pedagogies, their aim is for learners to personalise and experiment (divergent) rather than replicate their example (convergent). Through their teaching, Instructors aim to develop how learners think about (and through) the tools, materials, or techniques. Their pedagogies aim to enable and empower learners to create original work or problem-solve and develop their personalised practice rather than increase their knowledge or repeat what they have been shown. Instructors employ approaches that teach a combination of skills and mindsets, personalising and adapting teaching strategies and delivery styles to suit the requirements of learners, their level, prior knowledge, and discipline. They are more likely (than Demonstrators) to be practitioners or artists, and several described how their practice outside the university informs their teaching within it:

> *All the technicians I work with are practitioners outside… they're coming with experiences. Having dealt with artist designers throughout the UK, throughout Europe, coming with to Uni with this vast experience… teaching students at the coal face [Fashion and Textiles].*

> *…it all just fades in, my working life in here and my own art practice, just all mingling to one. And it's just what I do in here is what I would do to produce things for my own business [Fashion and Textiles].*

They regard learners as individuals who learn differently, assign different priorities to the various aspects of their teaching, and who will apply their learning in new and unique ways. They describe learners as users and constructors of knowledge rather than recipients. Successful outcomes for Instructors are described through innovative application rather than information-recall or 'signing off' competency.

While Demonstrators usually have a clear endpoint (the learner being able to repeat the taught action), Instructors describe no such endpoint. Their relationship with learners typically extends over more prolonged periods promoting deeper and more complex engagement with the content and monitoring learners' progress, aptitudes, and understanding while providing personalised feedback.

Like Demonstrators, Instructors conceive of and plan their pedagogies as sequences of activity that enable them to organise their teaching and support of learning. Their sequencing initially follows that of the Demonstrator but diverges as learners become more autonomous, introducing more sophisticated ways of working. Instructors also prepare, orientate, and assign context but deviate from ‘show and tell’ and ‘supervised practice’. The sequencing model commonly espoused by Instructors is set out below.

Preparation

Preparation of space and resources is important to Instructors, and they employ many of the same strategies used by Demonstrators to create accessible and welcoming spaces. Also, like Demonstrators, they experience a high degree of autonomy with what they teach and how. The point of departure is that Instructors’ pedagogies must serve learners in acquiring the skills they will require to develop their learning in new ways in accordance with academic outcomes. For Instructors, this is a core feature of their pre-planned teaching activities, which they seek to inform through accessing module handbooks, or liaison with academic colleagues. They adapt their approaches to their learners’ stage, experience, and aptitudes:

> *I will repeat the brief and try to get them [learners] to link it in some way to that, but they [academics] are in charge of that and I’m there to aid the physical making [Painting, Printmaking, and Mixed Media].*

Consensus among participants was that curricula are written to be broad and non-specific (in terms of technical outcomes or practical skills), and they feel empowered to develop, distil, and deploy mini-technical curricula progressively delivered concurrently with the formal academic curriculum:

> *…in terms of autonomy, I’m allowed pretty much to teach whatever as long as I can prove that it aligns with the learning outcomes… I’ve found, the best way to do this is to come up with a class and explain it, talk it through to them [academics]. They go, “That sounds perfect. Brilliant, fantastic. Go with it” [Illustration and Graphics].*

Instructors generally described welcoming autonomy:

> *They don’t mind what I deliver. So, it gives me a lot of freedom. I think I’ve got a lot more freedom in what I can deliver than the academics [Illustration and Graphics].*

However, Instructors consider it essential (rather than desirable – as expressed by Demonstrators) that their instruction aligns with their learners’ requirements and the broader context of learning:

> *It's important that the students, when I'm teaching them, know why they've come to me. So, I do a bit of reading around their project briefs, their module descriptors, and I try and feed that into what I'm delivering. So, in terms of the teaching, I think, it's really important that it's not just a standalone block of, "learning to paint in a certain way, learning to make a piece of sculpture with plaster." It's, why am I doing this, in the first place and how does it relate to contextual context? [Painting, Printmaking, and Mixed Media].*

Another critical departure from Demonstrators is that Instructors describe teaching beyond 'how to do or use something', instead, they aim to teach learners to think with and through tools, processes, and associated possibilities. The following participant describes designing and creating a programme of instruction through which learners transitioned their ideas through 2D and 3D spaces, analogue, physical, and digital formats to challenge and expand learners' perspectives of animation:

> *I was asked, could I deliver a workshop that would help them explore this transitional space between the physical and digital? And so, I said, what about this kind of phenakistoscope idea. And they said, "Yeah, that sounds great. Do that" [Digital Arts and Creative Software].*

While Demonstrators assume no prior knowledge, Instructors are more likely to pre-record learning materials and make them available to their learners before teaching:

> *I have all folders in Blackboard now for digital embroidery that basically goes through every single aspect of different bits of how to use the software. I get students to watch all of that before they come, and then I'll have a little session where I'll talk them through again anyway and just chat through it [Fashion and Textiles].*

Orientation

Orientation is important to Instructors during the early stages of teaching, but this aspect reduces as the instruction progresses over time and learners become more experienced and familiar with their tools and environment.

Context

Instructors direct their pedagogies to incentivise and enthuse learners into deeper learning by explaining how engagement will improve their creative practice or employment prospects:

> *I like to bring in real life anecdotes… I've worked in this industry professionally… I'm not asking you to do this for the sake of asking you to do this, I'm asking you to do this because it's actually really important and will help you get a job, or it'll keep you safe on your shoot, or it will generally be helpful to your life to have a little bit of these skills [Filmmaking].*

Perceived linkages between pedagogies, skills, and employability run through Instructor pedagogies. These aspects are described later in terms of their meaning in the referential section of the Instructor category.

Teaching (skillsets and mindsets)

During initial phases, Instructors describe adopting similar pedagogies to Demonstrators insofar as facilities are taught and explained using similar approaches. However, once learners reach the required basic competence and confidence, Instructors adopt semi-structured strategies through which their learners advance, apply, and build upon their knowledge to create unique and increasingly sophisticated work. It is important to Instructors that learners personalise and construct their understanding. Accordingly, while they ensure that the required content is covered, they also believe it is important to allow learners to deviate and experiment rather than follow rigid pre-determined exercises:

> *I might have a set of expectations for what they're going to achieve, but that's not necessarily what they want to achieve…I'm used to that now. I've been doing it for 20 years…I always find it kind of surprising what people do [Digital Arts and Creative Software].*
>
> *There are different ways of achieving the same final outcome. And some people find that they prefer one way over another… [Illustration and Graphics].*

The unanticipated ways in which learners apply their teaching and ‘mini-break throughs’ were described as critical success indicators:

> *I find what and how I deliver, is rewarding for myself and the students this being confirmed by observing students’ Eureka moments… Once they start engaging and asking questions to progress something further, I know that the penny has dropped. Now we can move on to the next level [Fashion and Textiles].*

These epiphanies of practice are highly valued by Instructors; several described curating and planning ‘Eureka’ moments. In these instances, they teach skills, then establish problems, briefs, and opportunities for learners to apply and develop them. The problems set by Instructors varied from requiring relatively simplistic solutions (apply the taught skills) to more advanced challenges requiring complex reasoning, social interaction, or mini briefs that play out over extended periods requiring agile, flexible, and exploratory approaches.

As alluded to, Instructors generally consider learning to be a social activity. Whereas Demonstrators configure groups to manage student numbers or, based on the nature of the activity. Instructors actively seek to engage their learners in the social aspects of learning. They create opportunities for sharing knowledge and critical reflection to facilitate group and individual learning. In the following extract, the participant describes responding to the unit outcome of collaboration in their teaching (a lesson on exhibition curation and on physically hanging work):

> *I actually planned it so that there would be interaction, participation and collaboration right from the start between the students… [Painting, Printmaking, and Mixed Media].*

While Instructor pedagogies are predominantly tutor-led, social elements and interactions permeate. As the following extract illustrates, Instructors promote and facilitate group learning:

> *I’ll get them to go and do a design and then we’ll come back together again with each person’s design… I get an overhead projector… and I’ll go through everybody’s design and pick out things that are wrong… We’ll talk to everybody’s design and usually pretty much in each person’s design, you’ll get all the different aspects that I would want to talk through in terms of editing [Fashion and Textiles].*

Sharing and reflecting on work in progress is an important element of learning. While Demonstrators support learners to achieve the same outcome, Instructors support learners in more expansive applications, and they believe that sharing these individual applications, their successes, and limitations, is a valuable learning strategy for the wider cohort:

> *And at the end of the session, we all came back together, and I showed on the projector. I showed everybody so everybody could see everybody else's work and we could see what worked, certain things worked better than others [Digital Arts and Creative Software].*

Instructors' aim to develop both skillsets and mindsets. Skillsets are taught to acquire knowledge, abilities, and technique enabling learners to outwork their ideas, while mindsets expand thinking, aptitudes, and awareness enabling ideas to be created and developed through practice. For Instructors, skillsets and mindsets are dialectically entwined. While the subject of learning is frequently a tool and its potential applications, at the forefront of Instructor pedagogies, it is understanding of the tool and its possibilities that develops and influences ideas and modes of thinking and making.

Skillsets

Instructors value skills and technique for their own sake and as the language, syntax, and grammar of creative practice. They seek to provide their learners with the means to visualise, express, and advance their individual creativity as real-world artefacts and outcomes:

> *They've usually had their process of research, they know what their problem is, they've defined what they want to do for the solution, but they need the mechanical and technical knowledge on how to realise that final solution [3D].*

> *You can design like the most crazy, amazing thing. It's only ever going to remain a drawing, an idea, an impractical kind of 2D thing, unless you really know how to make and to be able to visualise… they almost need to be able to kind of close their eyes and visualise… I know exactly the machine I do that on. And I know exactly how the needle layout is… it's about giving them the confidence to get away from that 2D*

thing and their sketchbooks and their little drawings on the computer, and get into the nitty gritty of making [Fashion and Textiles].

Interiors is an interesting subject because you don't make the thing, you only ever simulate it, you only ever represent it, you only ever draw it, so rendering 2D drawings in 3D space gives them a kind of level of visualisation they haven't had before [Architecture and Interior Design].

Mindsets

Instructors' aspirations go beyond showing or telling learners how something works or how to use it. They seek to develop the habits of mind, sensibilities, ambitions, and self-criticality that practitioners adopt when thinking about or developing their practice. While a sequence of demonstrations can build skill and competency in equipment and processes over time, Instructors aim to teach learners to evaluate their tools within a given context and to think with and through them. The following extract (relating to teaching Layers within Adobe Photoshop) illustrates how Instructors' approaches differ from Demonstrators:

It's the first session I teach for the first years. Literally, session one, "Hello, this is what I'm going to be doing with you, and here's how it's going to help you." We look at transformation tools and warping and fill bucket and selection because they're all key skills that are useful to Photoshop, but mainly the process of this is to play with scale… we create this little fox. I say, "Right, no Wacom tablets. We're drawing freehand with the lasso tool. Using a mouse is like putting eyeliner on with a bar of soap. It's going to be horrific for you." You try and make them laugh… it's that icebreaker… I draw the worst possible fox with this lasso tool, and then I fill bucket it. And I go, "Whatever you do, do not fall in love with your fox because he's going to change now. We're going to scale him. We're going to play with him. He is only a placeholder for your actual visual language, for your actual character." And then, I call the fox a name (Bertram), and I name the Layer… we squish him. We look at placing him on the page, flipping him. His story changes across that page. If he's small, and he starts here on the left-hand side, his journey is going to take place across this page. And it leads you to want to turn the page. So, we're talking about all the juicy things that make illustrators' work wonderful, to have these conversations with your audience… if you make Bertram very small in his forest, he's quite on his own, and you are scared for him. And when you make Bertram bigger, he feels a bit *more sort of in charge of his own space. What if we tip his path downhill, literally going downhill fast, is he going to have a journey to the page turn that's going to be quite terrifying? What if the trees are too big and blocking him in, or what if it's actually he's bigger, the trees are smaller? The path is more straight? We change the story, and it's those ideas of composition and iteration. And we trial, and we screenshot, and we use the Layers panel to capture different snapshot iterations of different layer arrangements. And we just have a Bertram party for like 25 minutes, half an hour, just to see what we can gather and how we can change those compositions. And then we share them all… because your story means something completely different to so-and-so's, and you can see the changes and why those changes make sense and why scaling makes sense, why positioning and direction makes sense. And it gets key skills into them for Photoshop. And it gets key skills into them as compositional artists, and they can't get precious about it because once you get precious about your work, once you've done a beautiful picture and an art director tells you to change it, you get really upset because you poured your heart into that. So, if we do it with a crappy fox we don't care about, it's much easier to divvy it up, start again, delete the layer, move him, change it to a bird's-eye view looking down on Bertram. Now, how does that change the story? I love this session because it completely reframes illustration for them. I think it's super important to get them not worried about their visual language, but to think about the underpinning before they start panicking about the way things are supposed to look, because they've seen some beautiful work on Instagram… the key focus of that is not actually digital skills. It's realising that the world opens to you when you don't pin everything on that first idea. And you may come back to it later… There is no right answer…and then it's up to you to bring your voice, your vision to it, your visual language…it's really important that they learn layers. Really important. That's the fundamental [Illustration and Graphics].*

As the extract shows with eloquence and clarity, Instructors aim to teach more expansively than showing and explaining how tools work; their focus is on developing learners thought processes of how, why, and when to apply the tool in the broader context of their creative practice.

Free practice

While Demonstrators afford time for learners to repeat what they have been shown, Instructors value the time and space within and between their formal teaching schedules in which learners practice and develop their skills and ideas. For Instructors, free practice is for skill building and experimentation. They structure their teaching, but their learners are not bound to follow examples or sequences:

> *I'll always say, "If you want to do it a different way, you do it a different way." And if they're asking me, "Hey, is this right?" I'll say, "Well, do you think it's right? Do you like it?" So we are not just saying this is how you do it steps one, two, and three. We're much more open around that to whatever the student is and what they're bringing to it as well… [Photography].*

Through their presence in the studios and workshops, Instructors observe and track learners' developmental trajectories over time. Their pedagogies of free practice are reactive, facilitative, and student-led, and during these experiences they oversee, observe and actively listen (rather than demonstrate or explain). It is important for them to understand the learner's aspiration (or issue) to ensure they offer optimal support:

> *I will be going around each student, observing students whilst they're weaving… each project will be individual… one student couldn't do what their colleagues are doing, because that's not the way their work's going… each student has to have an understanding of their specialist chosen technique [Fashion and Textiles].*

In free practice, Instructors perceive their pedagogies as reinforcing what has been taught and supporting learners to apply their learning. Their focus is on developing skills and autonomy through expanding awareness and understanding. As this participant explains, they hold back from offering solutions to build aptitudes, resilience, persistence, and analytical thinking:

> *When people present a problem to you, you want to fix it. But actually, when there's a bit more of a complexity to it or a dilemma, actually what you need to do, is just help people float until they find meaning… It's actually how that journey is held [3D].*

Emphasis is upon developing the learners' thought processes extending from problem-solving to decision-making and accountability for their decisions:

If a student says I want my film to look like this, I wouldn't necessarily tell them which light they should use for that, I'll tell them what those lights do, and they need to decide [Filmmaking].

Instructor pedagogies can also be student-led. In the following extract, a participant describes how their teaching practice (what and how) can be dynamic and subject to the evolution and direction of the work:

Often students will look at their scripts and tell us exactly what it is they need to do… it takes years to be a fully-fledged Steadicam op, but you can learn to do one or two movements very quickly. So, if what you need to do is film somebody getting out of a chair and going through a doorway, practice that five times and you probably can do that… essentially we teach the skill to fit what they actually need to do on the film they've been selected to be the camera op for [Filmmaking].

Aside from the technicalities of creating an artwork, Instructors described aiding and advising their learners to manage time, scale, and aspiration to achieve deadline:

They have no sense of how long it takes to physically knit things. So I'll be like that's not an hour's work. That's like a morning's work [Fashion and Textiles].

Despite their pragmatic nature, Instructors' core focus is on developing the learner's abilities rather than the artefact they happen to be creating with them. The two are frequently interlinked as skills are built through practice, and the artefact represents the physical manifestation of learning for assessment, but Instructors aim to create capable practitioners rather than polished outcomes.

With their focus on learners, Instructors are more likely than Demonstrators to support learners in managing the emotional aspects of creative practice:

Whenever, they're like, "It's all gone wrong." You're like, "Oh that's totally fine. That's completely fixable" And then you see them kind of going, "Is it?" And you're thinking it's not really but trying to calm them down... You're kind of that point of contact for

> *their emotions as well [Fashion and Textiles].*

Instructors describe reframing their supportive and enabling advice as critical feedback as their learners develop capability, confidence, and resilience in their practice:

> *I'm often someone who's very practical, which can often mean that it appears negative when I immediately spot all the flaws and all the barriers in the way of using a particular process or using a particular piece of equipment to get to their end outcome. But then I think it's trying to knock those down with the student and trying to bring them on that journey to remove those hurdles and pull them with me and hoping that eventually I push them out in front and let them be the person who leads it [3D].*

They describe using formative feedback to refine practical abilities and promote reflection in action and self-critique:

> *It's teaching them how to critically analyse what they've done already and look for the flaws in their work, look at what they need to do next for the next step. And often we a have far more critical eye than perhaps they're used to. And it's trying to get them away from the idea that, I haven't got it right and get them into that process of, I want to improve on what I've done thus far [3D].*

At the higher levels, some describe a departure from what they experience as 'technical teaching' instead, identifying as 'practical teachers'. Moreover, one participant described themselves as a 'practical educator'. They experience these modalities as interconnected but distinct approaches. For Instructors, technical instruction is conceived of as introducing and developing the principles and mechanisms of the equipment and process (in the disciplinary context). Or put another way; the systematic approach to acquiring knowledge of equipment and how to use it. In contrast, practical instruction emphasises applying and extending knowledge to create an outcome or artwork. Instructors (and later categories) conceive of these approaches as a continuum rather than a binary. As the depth of instruction and expertise of the learner increases, Instructors can adopt coaching approaches (located at the boundary with the third qualitatively different way of experiencing technical pedagogies). In this philosophical space, Instructors think of their pedagogies as extending both the skillsets and mindsets of their learners, which, through the expansion of possibilities and ideas, impacts and influences the development of the learners' practice.

While Demonstrators focus on the equipment or process, Instructors locate their pedagogies on the learner and their work. Accordingly, Instructors described instances where they influenced and impacted the aesthetics of student artworks:

> *We really do help direct and get students on the road to creating their work through all different ways. Whether that's on the aspect of teaching them, how to use the kit and cut, and what different elements to use, or whether it's picking fabrics or thinking about the design, thinking about the output of what's going to look like… I do a lot of the teaching in terms of the practical and that also feeds in the ideas… I'm the one directing all those ideas of how you're going to interpret that image into stitch… [Fashion and Textiles].*

8.7 Category two (Instructor): External horizon

Instructors occupy the same physical spaces as Demonstrators but are more likely to describe their pedagogies having greater prominence within the curriculum, via alignment with learning outcomes and formal timetables. They also describe proposing lessons:

> *We are able to propose to academic teams to say what might be useful. For instance, we have an animatronics unit with our technical arts students, called Animating a Household Object… we just realised there were beats that we could put in, to help them out a bit more… we had a technical skill session looking at deconstructing objects… and got students to take part an object and then observe that and document it [3D].*

Where able to do so, they describe aligning their teaching to the curriculum structure and flow to facilitate pragmatic and achievable outcomes for learners in the broader unit:

> *My academic will be like, "Oh yeah, I was thinking… I could do this." And I'm usually thinking ahead and thinking "God, if they don't learn X, Y, Z, at this point, I'm going to be screwed later on with them for that deadline" [Fashion and Textiles].*

Additionally, Instructors value learner input, as this participant explains:

The students will come and say, "Oh, we want to do a workshop in that." Then you can devise a workshop program to do that… we'll ask them in course committees what they want to see more workshops of [Photography].

Instructors, like Demonstrators, have experienced their teaching methods becoming more sophisticated and respected by learners, academics, and themselves over time. Whereas technical teaching roles were originally established to deliver basic, repetitive instruction of fundamentals to release academic time, Instructors do not perceive their teaching as bringing learners to the point of handover (with academic teachers) because they are likely to be the subject expert (in the skills or technique being taught) within their institution. This contributes to what Instructors experience and describe as a blurring of roles and responsibilities:

I don't know where the line is between what I deliver and what the academics have been delivering for the last 20 years. Things like colour and composition, visual studies, conceptual thinking, mark-making, printmaking. These are all taught as academic pursuits… So there is a blurred line that is never fully understood by the academics, what their own role is. And I think how can they understand what we do if they don't really understand the value of what we do alongside what they do?... I don't know if this is sector-wide, but certainly at [my institution] there is an 'us' and 'them,' which is problematic. I don't think it's helpful. And I don't think it helps the student experience either [Illustration and Graphics].

The following participant described the impact of their commercial practice (on popular television shows), and how they believe it elevates their influence:

I think it massively affects the students because they go onto my Instagram and they often see my work… that leads them to go, "Oh, who are you?" Whenever they come in and then they get to know my work outside and they follow me online… it definitely influences them… some of them pick techniques that I like and stuff like that. It kind of comes across as inadvertently influencing them [Fashion and Textiles].

Another participant described how they explain their teaching activities to others who work outside of HE:

They're like, "Oh, you're a lecturer." I'm like, "No, no, no, I'm not a lecturer." …it's not really official teaching. It's a little bit like a fully grey area, my job…I don't lecture on *the thoughts or the designs or the ideas, but I teach all the how to. So I'm a practical teacher. I kind of I guess identify as a teacher, but as a teacher of practical skills [Fashion and Textiles].*

Another highlights the sensitivity of using this terminology:

I try not to say 'teacher' because it bends tutors' noses out of joint [Illustration and Graphics].

The core distinction many Instructors use to differentiate their pedagogies from academic instruction is that technical relates to 'how to use tools' rather than the 'what to make' or 'why it should be made' (which they can deem to be academic):

I'm here to give them the technical skills to be able to create the things that they want to create. Now, whether those things are good or bad, that's not a judgment for me… they develop their aesthetic sense and the sense of who they are as designers, an artist. But I think for me, that's not my job. My job is to give them the skills to be able to do what they want, or to support them as they develop into the designers they want to be [Digital Arts and Creative Software].

The following participant puts it succinctly:

The tutors will be talking about the theory, the idea, the concepts. Then it's our turn, when they come to us, to turn that into possibilities [3D].

Instructors regard their pedagogies as 'skills' focussed, and they value skills highly:

I bring the skills to the course that other lecturers wouldn't have, students certainly wouldn't have. And I suppose, within that, I can prepare them for industry, but other members of staff can't. Yeah, so those skills can't be taught by anyone else because they don't have them [Illustration and Graphics].

As these extracts indicate, Instructors carefully restrict their feedback to the practicalities of making rather than directly influencing the idea or artwork being developed and enacted. Some perceive this as 'a line' to be carefully traversed:

I'm always conscious not to step upon the academics' toes. Because often the students will come to me and be like, "Well, what do you think? What do you think is this? What do you think of this colour? What do you think of this… does this design go with my collections?" [Fashion and Textiles].

"Teaching to the line" was a phrase used by several participants, referring to the distinction between how they see their own teaching and what they considered to be academic teaching. They believe this 'line' is unimportant to their learners:

Students ask us, certainly when we are working one-to-one, they want to know our opinions. They actually seem to prize technical opinions quite highly [Painting, Printmaking, and Mixed Media].

While Instructors are infrequently involved in the formal process of summative assessment, some do contribute to grading, while others are included in a peripheral sense (through attending crits and offering commentary on the learning involved to create the artefact). Still, as this participant explains, when excluded they perceive their lack of involvement being detrimental to the rigour and credibility of assessment process:

Although the academics will see a finish piece, they don't really know how much work's gone into making that. And there's a bit of a disconnect [Painting, Printmaking, and Mixed Media].

Though they also acknowledge that academic teachers have greater accountability for the outcomes of learners:

If they come out with terrible knit wear collections, it's not really on me. It's not my fault. I didn't really teach them. You know what I mean? So you're not as responsible. You're only responsible that the thing doesn't look like it's going to fall apart or the buttons aren't hanging off it [Fashion and Textiles].

8.8 Category two (Instructor): Referential meaning

For Instructors, the function of their pedagogies is to introduce tools and techniques to learners so that they can internalise them, develop them, think with them, and apply them in new, and meaningful ways as they build and develop their skills and establish their identities as practitioners. Like Demonstrators, they strive to provide accessible, safe, and inclusive environments within which they ensure learners feel comfortable and at ease:

> *I think they feel they can be more honest with me in terms of problems they're having, but possibly also a bit more open to failure, learning from something and maybe making something out of that rather than, "Gosh, I've got to make sure that I hit these assessment criteria. Am I spending too much time on this thing." I think they're a bit more open to experimentation [Painting, Printmaking, and Mixed Media].*

In a similar way to Demonstrators, Instructors think of their pedagogies as predominantly two-fold: knowledge acquisition and knowledge application. In knowledge acquisition, Instructors introduce tools, techniques, approaches, and possibilities, exposing learners to new opportunities to extend their practice. It is through successful and divergent knowledge application that Instructors locate their core meaning:

> *The main goal is to pass on my knowledge and to inspire students to then develop from that, and investigate from there, and just to be curious in their approach to things, not to sort of feel there's a way, a method that has to be applied to everything. And then secondly, be inquisitive to look beyond those foundations, and investigate, and draw in other ideas to create something new. So it's kind of looking at the standard to then evolving for the future [Fashion and Textiles].*

In the following extract, a participant described how they aspire for their teaching to enable learners to develop their unique voices and characteristics:

> *It's how to go beyond being able to safely use a piece of equipment [Demonstrator pedagogies] to the point where you can actually develop your own style and develop your own practice [3D].*

Learners can exceed the knowledge and abilities of the technicians who teach and support them. Several participants described experiencing this inversion of the capability hierarchy as a critical indicator of their success:

> *Success for me is the end of the final year, them having some truly impressive work, technically well executed, well thought out. I like to see designs that are well resolved because that means that the technology hasn't hindered them, it means that they've*

become fluent in affinity but it hasn't been the main focus of their work. I like to see diversity in what they produce. If we were to look at a degree show here and there was a house style, I'd feel like that's not what I'm aiming for, because I think it's important for students to be able to develop their own personal styles and personal techniques within the kind of boundaries of what the program outcomes demand, but they are very, very broad. Another way I see success is when students begin to bring techniques and ideas into the studio that I don't know about yet. So they begin to share not only with me, but with their colleagues, things that they've picked up and they actually begin to add to that knowledge base themselves as well. So that's, I think, job well done as if there's enough enthusiasm and confidence to go out there and not only gain their own knowledge, but to actually think, "You know what? This is part of the bigger picture and I'm going to bring this in and share it" [Architecture and Interior Design].

As extracts already presented show, a further meaning that Instructors assign to their pedagogies is that they offer value and relevance beyond the academic curriculum and, indeed, their institution. Skills to flourish as a practitioner, and gain meaningful employment was a reoccurring theme, as these participants explains:

My goal as a technical teacher is to teach students technical skills that are useful to know for their chosen professional practice and can help them with employability [Digital Arts and Creative Software].

I suppose the base of what they need from me is to teach those basic skills that enable them to actually produce the work, because they have all the ideas in the world but if they can't produce it, they won't get picked up for jobs [Illustration and Graphics].

While reflecting upon how taught skills might be contribute towards employability outcomes, Instructors described not just the value of the taught skill, but aptitudes and ability to learn new skills and technologies to thrive in complex, evolving, and unknown futures:

Whenever they go into the industry, they're going to have to hit the ground running. So those software skills just have to be second nature, like using pen and paper... They need to be able to put their creativity into action without really thinking about the software skill that's necessary [Illustration and Graphics].

The ability to problem-solve, develop affinities for the technologies of the relevant discipline, and intrinsic commitment to continued learning is another key attribute Instructors hold in high esteem:

> *I'm very, very aware that the world that our students going out into is very unpredictable and rapidly changing… there's a balance to be struck between giving them the kind of specific skills needed to produce projects to a high standard, with the need for them to be, it's an overused phrase, but to be autonomous, and to have an interest and a confidence when faced with new technologies… the software and technologies that our students will be using in five years' time don't exist yet, and I would love for them to be leaving here quite happy with that [Architecture and Interior Design].*

8.9 Instructor summary

Instructors adopt teacher-centred/skills-oriented approaches to their pedagogies. They teach comparable content to Demonstrators in greater depth and progressively for personalised application and experimentation rather than repetition. Their teaching allows flexibility and locates learning in a social context. They conceive of their pedagogies as developing both making and thinking, promoting and valuing experimentation and problem-solving. Feedback is personalised, and learners are thought of as individuals who are active in their learning. Instructors aim to align their pedagogies with academic outcomes. They see their core meaning in teaching the skillsets and mindsets that enable learners to express and develop their ideas through divergent practice.

Key structural and referential characteristics

Epistemologies (what is taught and learned)

- Comparable subject matter to Demonstrators, but progressive, in greater depth, and for personalised application.
- Skillsets and mindsets. Skillsets develop knowledge, abilities, and technique enabling learners to outwork their ideas, while mindsets expand thinking and awareness of how to think, identify, and act as a practitioner.

- Problem-solving (reconstituting taught content in a new context) to realise a creative outcome.

Teaching style and structures (how it is taught)

- Teacher-centred/skills-oriented (transmissive but participatory).
- Semi-structured delivery, in relation to a constructed problem or creative brief. Content must be covered, but learners are taught to apply knowledge in ways meaningful to them.
- Learning is a social activity enhanced by peer feedback and critical reflection.
- Feedback is personalised (to the application rather than the fidelity of repetition) and becomes critical rather than corrective as learners develop proficiency.

Conception of the teachers' role

- Plan and deliver developmental and progressive teaching that exposes learners to new knowledge that can be adapted, developed, and applied in new contexts.
- To adapt teaching approaches to the learner's level of learning, progress, and understanding and provide support, reassurance, and encouragement.
- To create and hold space for learning to be decontextualised (from taught examples), recontextualised (in the context of application), and to hold back from offering immediate solutions or interventions.
- To be a practitioner teacher with credible subject expertise.

Conceptions of learners

- Individuals who receive, appraise, apply, test, build upon, and personalise taught knowledge differently.
- Consumers (users and constructors of knowledge rather than passive recipients).
- To interpret, evaluate, and evolve taught content through practice to develop individual voice and style as a practitioner.

Conceptions of the curriculum

- Pedagogies are experienced as being within or related to the curriculum.
- Recognised and reified in course documentation and timetables.
- Informs the curriculum delivery (duration, sequencing, group sizes).

Relationships with academic pedagogies

- Distinct and partially integrated.

- Aims to align with academic teaching and values input on content and sequencing.

Core meaning

- To equip learners with the abilities to experiment and express their ideas per the requirements of their programme of study, and to become competent, capable, and employable practitioners.

Figure 18: Summary and key aspects of the Instructor category.

8.10 Category three (Consultant): Internal horizon

Conceptions located within the Consultant category pertain to supporting, teaching, and advising learners to problem solve as they reach the limit of their knowledge in the creation of new, original, and often unprecedented work. Consultant pedagogies are student-led, adopting a problem-centred/outcome orientated approach and are reactive rather than proactive (bespoke knowledge at the point of need rather than general information for future usage). This differs from Demonstrator and Instructor approaches that conceive of their purpose being to create and deliver pre-planned structured knowledge or skills-building programmes to known outcomes (albeit for application and extension).

Consultants describe their approaches as being personalised to individual learners, their unique needs, problems, level of learning, and the direction and aspiration of their practice. Accordingly, they think of learners as active rather than passive, and their pedagogies are dynamic and spontaneous and are less reliant upon preparation or planning, however, as this participant explains:

> *I can predict things just from even listening or hearing noises, hearing how it is being rolled out and a student will come, and I'll just know straight away, before they ask, I'll know what the question's going be or what the problem's going to be [Painting, Printmaking, and Mixed Media].*

Consultants aim to reinforce what has been taught and assume learners have prior knowledge. Their focus is aiding the learner to extend and develop their knowledge in a particular situation and context of their choosing. Consultants are solution-orientated, and their strategies are described as having three core components. Firstly, it is important to them that they understand the problem or question that the learner is trying to respond to; secondly, they must ascertain the level of understanding that the learner currently has; and finally, to be aware of any resource (time, cost, space) constraints. The first is the most important of these elements. The most common problem Consultants described being asked was “is this possible”? or “how do I….”? or “what is the best way to…”? This can also take the form of learners presenting an example and asking how to achieve a similar outcome:

> *They might have a random pattern off the internet or something, or they might have a fabric that they want to copy, and they’d say do you know what this technique is and how do I do it? [Fashion and Textiles].*

In these instances, Consultants draw upon their knowledge and offer explanations and advice on how the learner might approach a similar work. Participants did not always experience this as teaching, several described thinking of this as a form of consultancy:

> *Is it teaching or is it guiding? It’s not really teaching. It's more a consultant if you like. They’ll come and ask you. And, you don’t always know the answer… [Metalwork].*

However, as the following participant explains, not knowing the answer is unproblematic. Their deep knowledge of the domain, and ability to ask the right questions can enable them to identify answers and articulate solutions expediently and at a level appropriate for their learner:

> *Students can spend ages on the internet trying to find an answer because they don’t really know what the question is. They don’t know what the right terms to use are… I can quickly find the answers to questions that students are asking me, even if I don’t know the answer, which is really common, I can find the answer much more quickly than they would be able to [Digital Arts and Creative Software].*

When responding to enquiries where a learner has an idea that exists exclusively within their mind (according with Witkin’s (1981) concept of a “holding form”), Consultants describe how important it is for them to assist their learners in articulating their intention for the work. Participants described questioning and probing in the first instance and sometimes requesting sketches, models, prototypes, or physical formats:

My role is to get their ideas from their head, ideally onto paper, and then from paper, the reality of what they can make that in the time, the money, and their skillset [Metalwork].

This process evolves the intent, or problem, into a tangible and shared brief that can be discussed, interrogated and critiqued. As the following participant recalls, questioning is used to develop the learner's understanding of their ideas as they could be realised as an outcome:

You ask questions so that they start to think technically, there's a tendency, from a design perspective with students, to just design this thing and think, "Okay, it's going to magically happen or be possible" [Fashion and Textiles].

This evolves through dialogue:

When a student comes to us, it is them by themselves with an idea. And we'll take them through… first of all, in our minds, we'll create the object and then do the storyline, how it could be made to their skillset after asking questions. We will also question… "Do you really want it that way? Artistically, is that what you're after?" We'll also fish… because there may be cheaper ways, easier ways… sometimes the thing they're fixed upon, doesn't necessarily work out [3D].

A characteristic of this approach is a focus on skills, but also advising and coaching learners towards pragmatic and achievable outcomes from their ideas:

It's about just providing that bridge, I guess, from 2D thinking and procrastinating and abstractly kind of thing to actually get into an actual finished product [Fashion and Textiles].

In the following example, the participant identified that a learner had difficulty envisaging 3D forms, and taught how 2D layers could be laser cut and stacked, to build up to 3D from their 2D level of confidence and comprehension, the process (laser cutting) having:

…a far shallower learning curve than something three dimensional. But from taking that two dimensional design, they can stack and assemble what they've done, potentially, into a three dimensional shape… after a conversation about the outcome

create two dimensional graphics which would then be cut out to create a stacked layer that they would then be able to take back to their ceramic practice to be able to create molds and be able to cast into to get a three dimensional outcome afterwards [3D].

Participants described thinking of these 'bridging' conversations with learners as both problem-defining and problem-solving. 'Problem-defining' is a critical stage through which they elicit information about the proposed work. For Consultants, it is through dialogue and questioning that they, and their learners are brought to an awareness of the specific nature of their creative problem and possible solutions or alternatives:

One student recently came in with a product design problem. He just couldn't understand how he was going to make his prototype work. He had created a very, very complicated model in CAD that looked amazing. What he hadn't realised was just the huge amount of complexity meant that physically building it was going to be exceptionally difficult… I was able to look at his CAD model and immediately start to question him about how he might simplify it… it was an opportunity to work through it with him, to ask him questions about, has he seen this mechanism? Has he tried this?... he was able to work in space and come back with questions when he hit those blockages… working through it together, the two of us alongside one another and him explaining the problems and me… being able to give him a point to go away and to start learning… I think that's what I get the most of in my role, is being able to get them through those problems and get them to the other side of it [Digital Arts and Creative Software].

Consultants described examples related to planning work or decision-making mid-flow, but also described supporting learners at the point of failure:

…he'd been working with bronze casting quite a lot and he wanted to etch a design on a sword. So, he had a go at it (unsuccessfully)… I found that he hadn't degreased the metal before he'd grounded it, even though he'd been to us for etching before, he'd just forgotten about that… we smoked the ground afterwards, which turned it very, very black which meant he could draw his design really easily through it because he could see what he was doing, but also made it much more acid resistant in the etch, so it was much more successful… I brought another process to him that he hadn't been aware of and didn't know existed which improved his experience and

connected with some of the elemental interests within his practice [Painting, Printmaking, and Mixed Media].

Consultants think of problem-defining as a means to assess the learner's level of understanding, awareness, and ability to comprehend and engage with possible solutions (the second element that informs the Consultant's approach). While described as two elements, they run simultaneously rather than sequentially. Consultants adapt their approaches, advice, and ambition as learners become more autonomous and increase proficiency:

Up until the end of the second year, they're asking questions about just about everything and can I, can I, can I? Coming in the final year, they say I want to, I want to, I want to… you facilitate them rather than guide them… In the first two years, you're definitely guiding. In the third year… you're there as a sounding board and a consultant if you like… that's when you see the massive jump [Metalwork].

Consultants need to ascertain the level and aptitude of their learners as they weigh options and combine their diagnostic assessment with foreseeable resource constraints (the third element) to inform the scale and complexity of the advice offered. It is also critically important (and success indicator of their pedagogies) that their guidance supports the learner to realise an achievable outcome. In the following extract, a participant described supporting a learner in creating a wall-mounted bicycle rack:

He came in with some rough fag packet sketches, pencil sketches of what he wanted to create… I steered him to what I thought he was capable of doing… but, also the outcome that he was best able to achieve… he wasn't a metal worker… We changed his design to simplify it so that there was less complex work on it for him. He went away, thought about it, came back with final pictures and I said, "Yes, that's achievable"… I stress, you are making something out of material. It's important it will withstand the forces and stresses upon it…"Go away, do the research, come back with the calcs (calculations)... Justify the material you are using." So, he would go away, come back a couple of weeks later with the calcs… now, you need to source the material and look at fabricating it. He did… coming to me for pointers along the way [Metalwork].

Asked to describe how this interaction would appear to an observer:

We'd be sitting here with a computer in front of us. He'd be sitting there with his pen and paper. We'd be doing sketches. Out there (in the workshop), you wouldn't see an awful lot of me unless he asked my assistance. I would float past every half an hour… [Metalwork].

Consultants value the trust and responsibility that learners place in them and their advice, and it is important to them that they are perceived as enabling:

We want to move away as much as possible from saying no. As soon as students present their ideas. It's like, oh, trying to be as opening and welcoming as possible, in terms of that first moment of, "Well you've got these ideas. Okay, great. Let's look at them and actually provide a way of going forward with them" [3D].

However, the detail of the problem, the learner's ability, and resource constraints combine to temper the advice and ambition of the solutions or responses offered:

Sometimes I have to clip their wings. Students come in and they've had a very positive tutorial with a printmaker who wants them to make something in copper, and when I say "You can't join copper" (in the way described). I'm always the one who dashes their ideas slightly [Metalwork].

Though Consultants also described negotiating with learners to locate a viable solution through compromise, alternatives, and managing expectations:

…she had these amazing ideas, some of them which I was like, "We can definitely fulfill" and some of them which I was like, "We're not going to be able to do that." I think sometimes, although you don't want to limit students' ideas, when you get to work with them one on one, it's about making them realise what's possible in a timeline, what's possible financially… "If you haven't got that budget, that's fine. Let's look at other ways you can do that" [Photography].

Consultants frequently experience their interactions with learners as an iterative negotiation. An essential characteristic of this negotiation is scale. In some instances, Consultants will downscale (size, cost, time (their own and the learner's), materials, and complexity) and introduce alternatives to ensure an outcome can be delivered on time and within budget, but at other times (subject to aptitude, abilities, resources, and time) Consultants advocate for heightened ambition and enlarge frameworks of understanding by introducing experimental or aspirational approaches to develop the practice beyond the learner's current thinking:

> *They feel like they can only do a certain level of things. And you're like, "Actually you could be ambitious here"… It's that keeping possibilities open, but walking with them to an end point [3D].*

As with Demonstrators and Instructors, the Consultants' pedagogies focus on the technical, material, and practical implementation:

> *They're not talking to me conceptually about things. They're really just saying, "Well, what if I used this material? What if I used in that way? How could I do this?" Then I will work with them to hopefully solve that problem and produce something that they're happy with [Painting, Printmaking, and Mixed Media].*

However, while some Consultants experience their contribution as short-term problem-solving to overcome an immediate barrier, the following extract shows relationships can extend over longer periods:

> *Some students you can spend a long time with and they suck the knowledge out of you. Constant emailing, constantly knocking on the door, and I love it because they want to learn. Other students just want that job done and they want it quickly, as quickly as possible… [Metalwork].*

Consultants who teach and support learners over an extended period are more likely to perceive themselves having influence beyond problem-solving and offering solutions:

> *I'm involved in the whole process of discussing students' ideas, concepts, through to finished product. I'll be thinking from the outset right through to finished product and all the processes involved. I'll be knocking some of the corners off their ideas and going, "Right, we can do this, 'ABC', but we can't do 'D' and these are the reasons why…" [Fashion and Textiles].*

Some described instances of how dialogue and options analysis influenced the nature, aesthetic, and creativity of the work. In the following extract (describing an exemplar piece that was shared on their university social media), Consultant pedagogies expanded the possibilities of what had originated as a static image into a 3D animation:

> *I suggested to them, "You could use After Effects for this," I kind of give them an idea first and they ran with it… I would be getting messages back all the time, "What about this? How do I do this?" Each time, it was that next step. And then it led to 3D space… and that was a wow moment from them [Illustration and Graphics].*

Like Demonstrators and Instructors, Consultants differentiate academic and technical pedagogies and ensure that their focus is upon expressing and realising the learner's ideas and intentions (while 'bracketing' their own):

> *I will try to help them achieve, whether or not I feel like it's going to look good or be creatively successful… it's quite an interesting one, putting that to one side and shelving that while you're supporting someone else on their creative journey [Architecture and Interior Design].*

However, at the higher levels of Consultant pedagogies, when working with proficient learners, on unprecedented outcomes, at the edge of their own knowledge, Consultants' pedagogies reached the boundary with those of Collaborators (the next category). In these areas, Consultants described how their involvement can influence the direction and aesthetic of the outcome:

> *Students come with things that maybe haven't been done before. There's not a formula… when they start stepping outside of the standard, that's where your role changes slightly. You venture into almost like a problem-solver in a creative sense. It's kind of a tricky balance because we've been told in the past not to say anything that will influence the design, but that's normal in industry that the technical person will say, "We can't achieve this unless we do this," so then they feed that into the design side and say, "Okay, we'll do this." Or it could be the technical people are given the freedom to interpret the creative idea how they see it. So, they are being creative in a sense, but also technical. It's kind of like a tricky balance that we have [Fashion and Textiles].*

The 'what' and 'how' approaches of Consultants can be thought of as a form of problem-based learning (PBL), but rather than the learner using a problem set arbitrarily for the sake of a learning exercise (such as the Instructor), the Consultant engages with the learner based on a problem set by, and with authentic and intrinsic meaning for the individual.

8.11 Category three (Consultant): External horizon

Like all categories, the primary location where Consultants enact their pedagogies are specialist studios and workshops; however, dialogue-based interactions can also occur within offices, tutorial rooms, online, and via email correspondence. These can be reactive:

> *…we'll have people knocking on our door to talk through projects that they might want to develop or to seek advice. We actually have created the room that we're sitting in now, called diagnostics and planning for fabrications. So, it's inviting students into that space. We often have students who will come in, particularly asking for advice on development [3D].*

And timetabled within the curriculum:

> *I do have times that I'm scheduled, especially the final year, just to give them skills tutorials. In those they're almost like surgeries they'll bring me their work, they'll say, "There's this drawing here that I want to model something like this, how do we go about it?" And we actually sit down and we have a chat about the different approaches we can take [Architecture and Interior Design].*

While Demonstrators and Instructors generally teach to larger numbers, Consultants develop fewer learners in a narrower but deeper element of their specialism:

> *I suppose the amount of students that we have a personal relationship with are smaller, but every year, a group emerges that you see. You can really help them develop because you're seeing them every day [Photography].*

Many Consultants described themselves as the leading expert in the practical elements of their discipline within their institution. Some described observing a 'deskilling' of academic staff that they believe challenges existing hierarchies and creates a new, sensitive, and semi-political pedagogical space that they must take care to navigate:

I'm very careful not to step on the lecturers' toes but… the academic said to the student "put it all together first and then put on the trims." And I was like, "No, no, no, listen… I am a designer maker I've had to produce and make it myself, I've got into the quickest way, the handiest way to physically do the work." I think that really helps. The making side of what I do kind means that I know they're under pressure. I can be like, "No, that's going to take twice as long… just do it this way" [Fashion and Textiles].

Another participant communicated this sentiment through recalling advice they had recently given a learner:

"The academic will show you how to do it, then I'll show you how to do it properly" [Fashion and Textiles].

8.12 Category three (Consultant): Referential meaning

The core meaning Consultants assign to their pedagogies is to enable and advance learners who have reached the limit of their current knowledge, confidence, or understanding. The level and complexity of their engagement and approaches are informed by questioning (to clarify the problem), diagnostic assessment (defining the learners' aptitude and capability) and achievability (resource limitations). Using these principles, they adapt and personalise their advice and guidance.

Consultants believe it is essential for learners to articulate their requirements, envisaged outcome, or knowledge gap, in order to explore and appraise options, and be confident the learner can be brought to the level of capability to implement an optimal solution. Their pedagogies are frequently engaged in the short-term, often concerning a specific problem with an artwork or seeking assurance of feasibility, but the underlying meaning is for these interactions and approaches to develop practitioners by thinking, speculating, negotiating, compromising, and problem-solving within constraints to deliver a successful outcome to a creative brief.

8.13 Consultant summary

Consultants adopt problem-centred/outcome-oriented approaches to their pedagogies. Teaching is focused upon identifying and responding to problems meaningful to individual learners to develop and extend their knowledge and skills to realise a tangible and successful outcome. Approaches can align to pre-determined academic outcomes but also expand into new areas, often unanticipated within the curriculum. Learners are viewed as individual practitioners with prior knowledge, differing aptitudes, ambitions, and pedagogies are deployed dynamically according to the Consultant's assessment of these variables. The core meaning is to support and guide learners to identify, understand, and resolve problems to expand their practice beyond their current level of knowledge.

Key structural and referential characteristics

Epistemologies (what is taught and learned)

- To identify, define, and articulate the problem or knowledge gap; to appraise, implement, and test potential options to resolve it.

Teaching style and structures (how it is taught)

- Problem-centred/outcome-oriented (personalised to individual learner's problem (PBL), their level of learning, unique requirement, and aspiration of their practice).
- To supporting learners in building, developing, and applying learning in new and untaught domains that extend beyond the curriculum.
- Teaching is reactive and solution-orientated, dynamically developed at the point of need (bespoke rather than general information that might be needed in the future).
- Deployment is based upon an understanding of needs and diagnostic assessment and is subject to resource constraints.

Conception of the teachers' role

- To be approachable, solution-focused, accessible, and listen and understand learners' individualised problems or requirements, ascertain knowledge gaps, and negotiate options and advice for potential approaches, techniques or resolutions.
- To offer advice and support concerning the scale, complexity, and aesthetic of the learners' ambition, upscaling to promote greater ambition, or simplifying to enable a pragmatic and achievable outcome.

- To have sufficient subject expertise to resolve common issues, with abilities to locate the problem in a broader domain to identify solutions to more complex issues.

Conception of learners

- Learners as active (articulating challenges, selecting, and testing solutions).
- Assumes and values prior knowledge in learners.
- Relationships can be short-term for a single issue or iterative over time for more complex issues.

Conceptions of the curriculum

- Ad-hoc (located within untimetabled self-directed study periods, or skills tutorials). Teaching is aligned with supporting learners in achieving the learning outcomes within their module or unit.
- Pedagogies and content can reach beyond the curriculum.

Relationships with academic pedagogies

- Complementary to academic teaching. Understanding of units, creative briefs, and required outcomes.
- Prepared to challenge academic advice within areas of expertise.

Core meaning

- To support and guide learners to identify, understand, and resolve problems to expand their practice beyond their current level of knowledge and advance to towards deeper understanding.

Figure 19: Summary and key aspects of the Consultant category.

8.14 Category four (Collaborator): Internal horizon

Collaborators share similarities with Consultants, but they have crucial distinctions; Consultants seek to provide advice, answers and solutions (convergent), whereas Collaborators work alongside learners, engaging with them and their practice while speculating, identifying, appraising, and testing potential responses (divergent). In contrast to Consultants who predominantly draw upon their storehouse of knowledge and experience, Collaborators think of their pedagogies as a mutual exchange of joint exploration, investigation and endeavour. These approaches can be described as student-centred/outcome-orientated. The term 'outcome' is used here to describe both the 'act' of learning (development of knowledge) and the 'object' of learning (the artefact through which it manifests). Collaborators, like Consultants, aim to support and facilitate learners as they develop their ideas and practice beyond conventions and established practice:

> *I enjoy working with the students who are motivated and they want to push the boundaries out. And I go, "Right. So, we're going to do something here that, to my knowledge, hasn't been done before"… it pushes my boundaries… there's lots of Eureka moments for those students... I'm also learning to enhance my own skills [Fashion and Textiles].*

Consultants aim to advance their learner's knowledge and their own. While their questioning is focused on responding with a practical and pragmatic solution to a specific problem, Collaborators seek to support learners in uncertain, divergent, and dynamic practices. To do so effectively, they believe they must understand the meaning, aesthetic, function, form, or feeling and overall intent of their work, extending through and beyond practical and technical approaches:

> *I'll say, "Well, I haven't done it before, but let's try it out if it's safe… I quite enjoy challenges like that… They went to France to the Calais refugee camp and dug up lots of soil and brought it back and said, "Oh, can I make this into ink" I said, "Let's get the recipe out and get some oil and round it down." But make them aware that I've not done this before so we need to test it and test it and test it again… work around it, try it out, and if it works, great. If it doesn't work, then try something else [Painting, Printmaking, and Mixed Media].*

Teaching and supporting learning in the context of an uncertain outcome is the defining characteristic of how Collaborators think about their pedagogies. In these exchanges, technicians and learners operate at the limits of their knowledge. Collaborators assist with the search rather than the discovery; they may propose methods or directions that are untested, may not work, and, in doing so, expose their own vulnerabilities and knowledge gaps. While operating as a Collaborator, participants see themselves as peers, but (in most instances) with a deeper understanding of the associated technical domain:

I find it easier to still maintain that kind of we're figuring it out together approach, but with more of an air of authority almost. So, when I say like, no, that's not going to work, I feel like I can back it up a little bit more [Fashion and Textiles].

While they retain authority within the studios and workshops, it is important to them to remain subordinate to their learners in terms of the conceptual direction of the work, combining the push/pull strategies of the Instructor with the Consultant's expertise and problem solving. However, of all categories, the Collaborator holds the most significant influence on the development and direction of the work. They describe how it is important for them to maintain an open mind and to be receptive and accommodating to the ideas and envisioning of their learners; rather than impose their ideas, they adapt their thoughts and approaches to accommodate the collaborative process:

You're running alongside them, and you might have a little bit more foresight. But you're trying to give them as much ownership as possible over that process [3D].

In the following extract, a participant recalls supporting a learner as they struggled with designing stairs. The approach illustrates how Collaborator pedagogies can initially resemble the Consultant's but diverge as solutions present. The participant becomes engaged with the learner and their work through testing, interpreting solutions, and re-testing:

I get called over… "How do I work this out? It's absolutely impossible. Do these stairs work? Are they legal?"… You have to explain the logic of what you are checking… I'll ask them to cut sections at various points and we'll have a look at it and go, "Right. Okay. So if you're walking up here, you've got a problem with the head height there, so what you need to do is possibly make this floor opening bigger"… you begin to look at the different perspectives and help them understand what I'm looking for and why I'm assessing that and what it is that I'm noticing that might not be working and how they remedy it… they also don't have a lot of confidence in maths. So, if you're trying to work out the angle of the stairs… I actually have to end up sort of running through with them a lot of the time. Again, we just take the different views, the different perspectives, and we start going, "Well, okay. So, we're going to measure this. You're not just going to sort of draw these in the abstract. You're going to measure this. This is what you've got to begin with. Let's have a look at the difference between that floor height and that floor height, what's the distance we need to clear here. And then we look at the building regulations as well and we look at what's allowed and what's not. And we'll just run a calculation, let's say to go three *meters, let's try it with twenty steps. Okay. What does that come up with? Is that number okay according to the regulations? Yes, no? And then we take it from there. And it's just about walking through that process and through the decision making and not being afraid. I think it's really important to not be afraid of making the mistake in front of them or trying something that doesn't work and going, "Okay, so that's given us these results. We need to get closer to another result, so let's do this see what happens" [Architecture and Interior Design].*

The extract relates to a design discipline (architecture) with constraints and conventions, though other participants described comparable approaches being used for exploratory, conceptual, and material-based outcomes:

I had a student who was wanting to make an installation and they wanted to make a plaster cast of a pillow. So, they came to me, I had an idea of what they were doing with their work on a conceptual level as well, and it also helped that it tied in with interests of my own. Together, I'd say, we researched how we might go about casting this pillow. She also wanted an indent in it without it looking too contrived, so we worked through that together… I explained that it would be a really lengthy process just to make the mould in itself, let alone get a good cast. I think I allowed for a fair amount of autonomy, but because she wasn't really that familiar with casting large objects, I had to have quite a bit of input… we talked about the fact that it was interesting as an object in its own right… it evolved as it should do, really. The process dictated where the work then went… I think that's quite important to feel comfortable with someone, and that's how it was between us… it's not like that with all the students, but that's what I strive for [Painting, Printmaking, and Mixed Media].

8.15 Category four (Collaborator): External horizon

Collaborators' pedagogies are not explicit within the curriculum or timetable and like Consultants, they are engaged at the point of the learner's requirement, and approaches are individualised (tailored to the learner's needs and aptitudes) and personalised (meaningful to the learner's intrinsic motivation, aspiration, and goals). Collaborator approaches can be short-term and reactive to a specific enquiry:

Somebody will come to me and go, "I need to make a lenticular picture in Photoshop. Is there a possible way we can do this?" And we have to work it out together [Illustration and Graphics].

Richer collaborative encounters can occur over extended periods and in greater depth with proficient learners. Participants who expressed Collaborator conceptions described the final major project in the third year of an undergraduate degree as the most productive and rewarding (particularly for learners whose courses include industry placements or a professional practice year). As learners develop their abilities, the technician does not become redundant (per the Demonstrator category); but evolves to become a Collaborator:

By the third year, they should be not completely, but as independent as they can be, and that your involvement is more collaborative than you doing and showing. It's you looking at what they're doing and then exchanging some ideas [Fashion and Textiles].

Collaborator pedagogies have low visibility, are time intensive, and do not scale. Accordingly, Collaborators perceive student number fluctuations and workforce efficiencies as threats to their individualised approaches. As the following extract illustrates, Collaborators think of their pedagogies as supporting scale and ambition and pushing learners to exceed their expectations of themselves:

The longer I've worked, the less students I've been able to individually help. There's always students that want to go all out for their final major project. You end up working on them quite a lot with it because they'll be either trying to learn a really difficult skill, or it would just be something that they need a technician to assist them with. But there's just so many of them now that I think, in one way, they're not trying for those goals because they almost don't expect that they'd be able to get the help. … now I think, because they're so used to not having as much face time, to not having as much support, they hold back from those really big outcomes… there's less and less of them doing that. I think that's a result of the fact that they just have less time with us, which is a shame [Photography].

Collaborators described having a broader view of learners and their practice over extended periods. Whereas academic staff lead units or year groups that the students pass through, the technicians remain present in the studios and workshops consistently and work with learners as they develop their ideas and practice over their course or courses (in the case of internal progression). As noted previously, Demonstrators can think of their pedagogies as filtering those who will progress in the discipline or process. Those who continue their learning in the domain are the pipelines to Collaborators (indeed, the Demonstrator and Collaborator can be the same person adopting different approaches in different contexts). As relationships are forged over time, learners build more productive and individualised relationships than other categories:

> *They'll pick a technician to ask and then they'll just keep coming back to that one technician, which is quite useful in a way, because it means that you don't have "oh, so, and so said this, that I should do this, but you said to do this" [Fashion and Textiles].*

Collaborative relationships are founded and developed on the technical and practical aspects of the discipline. Teacher/student hierarchies of capability fade as learners increase proficiency. Collaborators work with relatively few students and can build mutual respect and trust over time. Participants described how dialogues and exchanges could extend into broader (non-technical) elements of the learners' educational experiences. The following extract illustrates how collaborative relationships can be perceived as a 'safe space':

> *I think because we foster a slightly different relationship with the students, it does make us party to a slightly different side of them and their understanding. And there have been instances where certainly a student has come to me rather than speaking to their personal tutor perhaps, because they felt more comfortable [3D].*

While all categories include some aspects of pastoral and study support, the most significant aspects were reported by those who had developed more meaningful relationships formed around practice. Participants expressing Collaborator conceptions described building deeper rapport than other categories:

> *I'm also here as someone for students to talk to who isn't that scary academic. There's most definitely a level of, shall we say disclosure, that students are willing to have perhaps with technical staff, that they won't with academic staff… I've had some students who will come in often quite upset. They've had a bad tutorial, and they feel it hasn't gone the way they wanted. They've put everything into taking their work down a specific path and the academic member of staff perhaps has said to them no, I don't think you should do that. And they'll come and question and maybe rant and talk… it gives us an opportunity to have a conversation and quite often, just*

> *to either reinforce the point of view or I try and be impartial and just question it and say, "how can you evidence this? Where's your point of view? If you really believe this, what's your belief based on." And give them an opportunity to go away and think about it [3D].*

The following extract illustrates a specific instance spanning learner, academic, and technician:

> *A student came to find me at the beginning of last year, who'd been told to throw out all his narrative ideas and just purely concentrate on editorial… he was very, very glum about it. I said, "Let's recompose your idea several times"… reframing what I thought was unhelpful academic advice without saying, "Don't go to your academics"… That's not what I'm there to do. I'm there to support my team as much as I'm there to support my students, but there are going to be conflicts. I could have just told him how to do it… but I felt that wasn't what the kid needed at that point… I hope that's made him feel better about what he could do and what he could achieve [Illustration and Graphics].*

As these extracts suggest, Collaborators see themselves as 'on the side of the learner.' They think of their pedagogical positioning as a safe space (physically and philosophically) where learners can expose their lack of knowledge, misunderstanding, underdeveloped technique, or failing work openly without detriment or judgment. They describe how they believe learners are less willing to divulge gaps and insecurities within their learning to academic teams, preferring to present resolved work for appraisal, feedback, and assessment. The following extract describes how a Collaborator supported a learner 'behind the scenes' in advance of presenting their work for academic assessment:

> *She spent weeks working and planning… then certain things were going slightly wrong. And I was like, "you just stitched another bit in there later or another bit in there. Nobody's going to know that wasn't meant to be because it will all look great" …you're trying to like to get them to not panic [Fashion and Textiles].*

8.16 Category four (Collaborator): Referential meaning

Collaborators value working side-by-side with learners as they develop into areas beyond their joint experience and knowledge. Through doing so, they hold the challenges of the artefact or outcome in focus but also seek to role model the aptitudes and approaches of a practitioner. They regard their experience as providing a broader knowledge base to troubleshoot from and to provide clearer foresight. However, this is not an essential or defining characteristic:

> *There's percentage of the students who are better than me and already have a clear ambition about the kind of designer or artist they want to be… I become a collaborator… because they've got really quite advanced skills in a certain area. And I will sort of work alongside them, I learn from them as much as they do for me [Digital Arts and Creative Software].*

Unlike other categories, Collaborators overtly experience the meaning of their pedagogies as dualistic, developing knowledge in both the learner, and themselves:

> *There's absolutely a kind of selfish part in it, in that you are kind of vicariously learning the whole time and being involved in something that's usually, not always, usually of interest to you… there are mutual benefits [Architecture and Interior Design].*

Collaborators develop through their pedagogies as both practitioners and educators:

> *Every year we get different projects… they'll come in with processes that I've not come across before… it is beneficial to us as well as to them. We learn from them [Metalwork].*

Within these personalised and progressive interactions, Collaborators describe becoming more invested (than Demonstrators or Instructors) in learners' ideas, processes, and outcomes (contrasting with the 'mind-numbing' repetition described by some Demonstrators):

> *I enjoy one-on-one working the most because you can really get into their project. You really understand the project they're doing and get to work with them, developing it. Then, when they get to the end, it's so great to see their final piece*

[Photography].

Collaborators generally identify as ‘learners’ rather than ‘knowers’ (this was also found in other categories to a lesser extent but is prominent here), and they believe their curiosity and developmental perspectives are an essential element of their professional identity that informs how they approach their teaching and model behaviours:

> *Often, I find that my brain is being stretched and I’m really thinking about things and I’m working stuff out and I think this is good, but this is what the students should be doing too. And I think for me, to be able to offer that to my students… surely this should be what we should be offering them. So, for me, that’s always the rub, the struggle. And that’s always the thing that I’m trying to do more of, I guess [Fashion and Textiles].*

Like all categories, Collaborators conceive of their approaches as preparing learners for the uncertainty of the world beyond university. They describe how their exchanges represent authentic opportunities for learners to interact with others and expand their practice to create work beyond their current abilities. They perceive the core meaning of their pedagogies as influencing how learners think and problem-solve:

> *There are often times when they’re using materials that we’ve not used before, so we’re figuring it out… in an ideal world, I would want that for my students, that they would have all these core skills. It’s almost like you have to know the rules to break the rules [Fashion and Textiles].*

Meaning, for Collaborators, can also be to enable learners to think, act, practice, and challenge conventions and boundaries within and beyond their discipline:

> *I would like them to become autonomous. Autonomous, curious, confident, but always pushing the boundaries of what printmaking might mean… I like to work with students… as partners to hopefully progress what modern printmaking is, and that gives it a contemporary relevance. I don't want to create little carbon copies, which I suppose is quite odd for a printmaker [Painting, Printmaking, and Mixed Media].*

8.17 Collaborator summary

Collaborators adopt student-centred/outcome-oriented approaches to their pedagogies. They focus on exploration and discovery and encouraging learners to expand their understanding of practice. They actively engage with students, supporting them in pursuing uncertain outcomes and facilitating the sharing and testing of ideas. They see their role as peers rather than experts, assist in assessing and managing risks in the work and help learners interpret and respond to feedback. Learners are perceived as active, self-directed joint investigators, taking the lead in the conceptual elements of their work, and collaborating in the technical and practical aspects with their teachers. The core meaning is to nurture learners' curiosity, build resilience and ambition while also advancing their own knowledge and abilities.

Key structural and referential characteristics

Epistemologies (what is taught and learned)

- To expand the boundaries of practice, sharing and testing ideas collaboratively and iteratively with peers (working it out together) to create unprecedented outcomes.
- Teaching prioritises approaches to be tested rather than solutions to be implemented.

Teaching style and structures (how it is taught)

- Student-centred/outcome-oriented (personal to the learner, per Consultant, but focused upon their broader creative ideas rather than their specific problem, the outcome is both learning and artefact).
- Teaching approaches emphasise exploration and discovery, where the journey and outcomes are unknown and are attained through mutual exchanges and joint endeavor.

Conception of the teacher's role

- As a peer rather than an expert (teacher/student hierarchies recede as learners' proficiency increases and the teacher exposes their own vulnerabilities and knowledge gaps).
- To co-manage risk and uncertainty and to provide reassurance with greater foresight of outcomes.
- Subordinate (to the learner) on conceptual aspects but understanding ideas, to be active and influential on aesthetics and outcomes.

- To provide a safe and secure space for risk-taking and failing 'on the side of the learner' and to provide encouragement, motivation, and pastoral support.

Conception of learners

- Learners as joint investigators (articulating their ideas, requirements, and appraising options).
- To have significant experience and domain knowledge and be motivated to advance beyond their current level of understanding.
- Developing extended and more meaningful relationships with technicians through practice (frequently towards the end of their course).

Conceptions of the curriculum

- Ad-hoc (located within untimetabled self-directed study periods). Teaching is aligned with supporting learners in developing their practice in support of and potentially beyond learning outcomes.
- Teaching extends (builds upon) the curriculum.

Relationships with academic pedagogies

- Complementary but distinct. Brokering and translating to support learners to interpret and respond to academic feedback.

Core meaning

- To collaborate with learners in their processes of exploration and discovery in creating new knowledge.

Figure 20: Summary and key aspects of the Collaborator category.

8.18 Category five (Transformer): Internal horizon

The Transformer category embodies the most complete and developed conceptions of technical pedagogies found within the pools of meaning. To 'transform' is to bring about meaningful change. While other categories can be thought of as primarily operational, Transformers think of, and act out, their pedagogies strategically, extending them beyond the conventional boundaries of studios, workshops, equipment and processes. Transformers seek to challenge and transcend traditional stereotypes of technician roles; rather than facilitate and deliver didactic pedagogies of showing and telling, they seek to create optimal learning conditions, empower learners to think critically, to engage actively in their learning, and develop a broader understanding of the world and to change it through their practice. Transformers describe how their approaches and philosophies influence learners (through transformative pedagogies), the curriculum, their institution and world beyond.

Transformative pedagogies

Transformers are typically practitioners but often think of themselves primarily as teachers or educators. Their approaches include, but reach beyond the development of skills or techniques. Instead, they focus on fostering deeper, reflective thinking and cultivating intangible habits of mind that inform practice:

> *My passion is, how do you expose the approaches to making, to help the student understand how they might approach any given situation? Or any given process that they have to enter into... sure we can teach students carpentry skills. We can teach them metal skills. But how do we teach them when to choose a carpentry skill or a metal skill? And trying to expose our thinking is part of that process, as well… it's putting the language to the intangible… as technicians, we always talk about tacit knowledge, don't we? About knowledge that's felt and sensed and developed through touch, smell, and physical judgment, in some senses. And so, it's actually spending time and trying to articulate those [3D].*

The same participant articulates how they think of themselves:

> *I could say… I am a trained carpenter, I'm a trained fine artist. I could give you specifics of all those things, but I'm not either one or all of them, really. I think in the large meta frame, I'm an educator. And the way that operates is out of a split vision on the practical, the physical environment, as well as the materiality and what you're facilitating, in terms of the actual making processes [3D].*

Like the preceding categories, Transformers teach disciplinary conventions and standards to support curriculum delivery but actively and routinely encourage their learners to challenge them. As the following extract illustrates, they acknowledge the importance of elementary and systematic approaches (associated with the Instructor category) but combine them with more sophisticated philosophies that challenge ways of working, question established practice, and regard making and materiality as a form of thinking:

> *Technical skill sessions can take the shape of, say, carpentry 101. Looking at marking up, cutting, that sort of thing. Could look at induction to welding. It could be thermoplastics, looking at laser cutting and 3D printing. So, we can target quite specific skills for each unit. We've got something that we've been developing, called making literacies. These are really approaches to making that help to come alongside courses, and their approach to making. The mandate between that is thinking through making, it's trying to flip or alleviate the relationship between design and then make. It's breaking those down and going, "Actually, what can we make that then challenges our design?" [3D].*

Transformers are able to define and differentiate their approaches from those of the other categories (and academic colleagues). In the previous (and following) extract reference is made to 'making literacies', which is a theorised approach to teaching practical and tacit knowledge developed and led by the technicians at one of the research sites. These technicians have documented and shared their approaches through the university's website, explaining the term as:

> *…the ability to play, explore, understand, interpret, create, communicate. And make sense of the world using materials and processes across digital and analogue fabrication. Being literate in making involves but is not limited to; thinking through making and prototyping; understanding materials and their properties; ability to investigate how things are made and work; being able to problem solve; able to communicate and transpose concepts and ideas into physical outcomes [website of research site].*

Within these modalities, Transformers aim to challenge and disrupt conventional epistemologies:

> *…the workshop spaces are a place of thinking and designing, as much as they are realising and fabricating. So it's breaking down that differentiation of what studio space is, what workshop space is [3D].*

Enabling accessible and inclusive practical spaces is of high importance for Transformers. Indeed, for some space is conceived of as a pedagogy in its own right. Participants described contributing to (and sometimes leading) the design and refurbishment of capital works projects to create and remodel learning environments within their discipline.

Transforming the curriculum

Within the preceding categories, the curriculum is a constant, beyond significant influence, and technical pedagogies are either omitted, adjacent, reactive, or complementary. In contrast, Transformers conceive of themselves as contributors to curriculum development. In simple terms this can relate to the scheduling and sequencing of sessions (as per Instructors, but as a co-creation with academic teams):

> *Course leaders have units of delivery that need to have a certain type of making outcome. And so, we help plan technical skill sessions to be a series of beats of making, so that actually by the time they hit a certain point in their course, they've got enough real practical skill in order to achieve that unit [3D].*

In the following extract, the participant describes reducing the bottleneck on demonstrations through shifting culture to encourage elective and individualised approaches to curriculum planning:

> *We're trying to develop of a culture of technical staff having more ability to influence how they teach, not just in the classroom, but before that point as well. Suggesting formats and even down to examining whether, let's say, an induction session is actually a core part of the learning for that group. Or whether it is actually perhaps something that would be better as an opt in, and they provide the opportunity rather than having this kind of everybody forced through this machine kind of approach [Architecture and Interior Design].*

More significantly, changing the design of units with technical input:

> *We were having a lot of students that were designing for six, eight weeks and then coming to make in the last two weeks, and then having very difficult conversations with us because we had to let them know that certain things weren't realisable… we're all about enabling, but sometimes those discussions are quite hard if we aren't involved in curriculum development. And so, over a number of years, we've closed that gap of that and actually, we're involved at point of briefing… [3D].*

And contributing to the development of learning activities within units:

> *I've jointly designed some of the projects, not just the actual workshops that go alongside them. Sometimes when that working relationship starts that far back in the planning process and it's positive and it's constructive, then you kind of get involved from that ground level and I really enjoy that [Architecture and Interior Design].*

Transformers describe having a broader perspective than other categories, and their pedagogies are influenced by and have traction beyond their department and institution. They feel it is essential for their teaching to be informed, current, and relevant to the world they are preparing learners for. Several participants described using their external networks to influence curriculum development and create external opportunities for learners and their institutions. The following extract describes how a participant instigated a series of talks from external makers to expand discourses of making, raise the profile of technical pedagogies, and promote practice as research:

> *Just before the pandemic… I started to think through this richness of what workshop spaces offer… The tacit knowledge gained and explored. I wanted to somehow unpack that in a way, or shine a light on it. So, I started these things called 3D lab guest sessions, where it was just an opportunity to bring in a maker or a practitioner in any level of sector or industry… for them to discuss their approach to making. Or to help expose the tacit knowledge that they might have… one of our colleagues, who's an artist and had a show at the time, came in and discussed… his making process, by welcoming people in to make the things that he makes… and then COVID happened, and I moved these online, so for a good two years we had probably a speaker every month or two months, where we could talk to them about their approach to making. And it was a bit freeing because, actually it wasn't to feed a particular course. It was really just to unpack any approach to making. We had a VR artist who had been commissioned to recreate a medieval German town in the VR environment. And we got to speak to him about how he did his research, and how he did his prototyping. I spoke to a sculptor from Amsterdam who'd been creating massive roller coasters, and involved a lot of students in the making. What does that look like? What's the approach to that? Had a textile designer who was also into food design, and they unpacked their approach across these several different sectors. But all about prototyping and proximity to material and thinking through making… we've got this archive now, of just this wonderful richness of people exploring, making for making's worth. But, without being discriminative to the*

context that it's placed within. So, what can we learn from engineers? What can we learn from puppeteers? What can we learn from digital makers to physical makers? ...there's these golden threads that run through them, that are actually really rich and enhancing to the student learning. So, it's looking at how technical resources can be sites of research… It's just, they're not deemed as such. I guess what we can be seen to be doing is in inverted commas, cerebral. But, is exposing the practice for the research that it actually is. And why not create spaces that are making as well as research based? They're one and the same thing, no? We research materials that are appropriate for the task at hand and how to develop that and hone it. All of those elements are within a research mentality. So in a way, we're trying to expose that, really [3D].

The same participant responded to a follow-up question enquiring about the level of academic involvement in bringing in the speakers:

All of it came from us (technicians). And I'm very much like, "Let's experiment. Let's try these things out." Because sometimes people need to see them before you advocate for them. And if they don't work, then let's not use them again. But in that particular case, we found out that it was highly successful in a number of different directions. The exercises have now become embedded in the course language… we have validated and we've spotted language of making literacies, an approach to making, understanding material properties and thinking through making in the course documentation. That philosophy has… embedded itself, actually, within the course [3D].

This example illustrates how the pedagogies of Transformers can influence and impact both the written, taught, and learned curriculum across disciplines and courses. Transformers are also more likely than other categories to contribute to conventionally academic institutional functions and forums. Participants described membership of institutional committees and other decision-making forums concerning academic quality assurance and enhancement:

I've been invited into a research group that is all about learning and teaching pedagogy right across the campus. I'm working alongside the head of the school, course directors, and other academics [Illustration and Graphics].

They are also more likely to contribute to educational monitoring and governance activities. In the following extract, the participant explains the importance they assign to their inclusion within course governance processes:

> *I have colleagues who've never been in a meeting with an external examiner… for me, it's fundamental. It's about understanding the point of the programs we run, what the graduate outcomes are, and then all of the frameworks that are put in place to support that. And how academic staff are trying to address that, what that means in terms of their work, what it means in terms of my work. I think it's pretty fundamental to be able to see the landscape that you're operating in [Architecture and Interior Design].*

8.19 Category five (Transformer): External horizon

Like the other categories, Transformers are located within the physical making spaces of their institution but conceive of their pedagogies in a broader philosophical and educational space that extends beyond the boundaries of the specialist facilities. Participants described how they perceive their contribution to education is not well defined or acknowledged, but is a developing area:

> *There's this term that's been bandied about called the hidden curriculum within the technical family. And it's used in different ways. Sometimes it's highly negative. Sometimes it's positive. For us, it's not about creating a separate curriculum. It benefits no one and it confuses the student. So whatever we create, whatever we are developing, whatever we deliver, needs to be integral to course delivery. And if it's not already identified to the course, we have autonomy to propose to the course what we think might be helpful in unit delivery. And we've got quite a good working relationship with a lot of our academic course leaders. Sometimes it's more difficult to have those conversations. But on the most part, there is a trajectory of collaboration, integrating delivery. Whether people see that as co-creation of curriculum is yet to be seen. I think that would be the most helpful place to get to… sometimes we are designing backwards with our delivery. We spot the gaps and go, "Oh, you don't know that. Okay, well, we then need to run these sessions in order for you to go through that." And sometimes that's one to one with the student. Filling students back in and giving them the steps and the beats that they need to get to where they're at [3D].*

The terms ‘collaboration’, ‘integration’, and ‘co-creation’ used by the participant elucidates how Transformers think about their professional relationships with academic teachers. They acknowledge the distinctions and boundaries between academic and technical pedagogies and generally perceive them as complementary, interconnected elements of a single (academic and technical) educational community that must be unified and synergistic and symbiotic to be highly effective:

> *The general process here is that as modules are being timetabled, module leaders approach technical staff and give them an outline of the module outcomes, give them an outline of what sort of technical skills they would like to develop alongside that module that they need, any inductions they might need to have, et cetera. And then they jointly negotiate those workshops and what they look like… because it’s co-planned with the module leader, they’re very aware of what they should be doing in terms of technology, I’m very aware of what they should be doing in terms of the project… what’s the word? Symbiosis. But that’s not by accident, that’s by years of developing it that way and sort of moving those things closer together over time [Architecture and Interior Design].*

The same participant was asked how they might differentiate their pedagogies from those of their academic colleagues:

> *That’s difficult… my students know me as a central part of the course team, how do I differentiate it? It’s a hard balanced strike between saying to somebody, “Don’t ask me about that, that’s a X person thing,” but also making sure that they know when they need a particular line. So let’s say, especially things like pastoral support or questions about marks or assessment, et cetera, that those get referred to the right place… even if I know how to advise somebody in a particular instance, sometimes I have to say, “Well, I think this is the resource you need, but I want you to go and check, I want you to talk to the module leader about this.” But that said… there were periods (academic resignations, retirement, and sickness) where I was the only point of reference for those students [Architecture and Interior Design].*

This extract is indicative of how Transformers blur ‘the line’ with academia. Other participants described working on academic contracts within the same institution on different days from their technical contract or accepting short-term acting-up contracts to cover academic duties. They observe and respect the function and purposes of the different roles but, through their hybridity, feel confident and capable of transitioning across and between domains. The following participant describes how they believe these approaches can also be experienced as positive by their colleagues:

> *Course leaders love it… we're speaking their language, in terms of how they're wanting to enable the student. It's a win-win for us because they see us as more diversified in terms of being technical tutors really. And the opportunity they have because we are here Monday to Friday, we're fully available. So, it develops our relationship with them, as well [3D].*

Transformers acknowledge a blurring of lines within their teaching:

> *I feel that what I deliver is probably very borderline academic for a lot of its parts because I'm not just teaching the 'how', it's the 'why'. And there you go, there's the line [Illustration and Graphics].*

Despite their transgressions into what might be thought of as academic domains, like all other categories, Transformers describe experiencing a disparity of esteem and lack of opportunity (compared with academic colleagues) centred around recognition. The following participant describes how they believe high-functioning technical pedagogies are perceived as a threat by some, but also believes that integrated approaches benefit learners:

> *Sometimes you can be seen as a threat if you are able to innovate and develop and deliver. And that's not our reason for being, at all… when you work in an institution with a very high established hierarchy, we might be operating from a level that challenges the nature of the hierarchy. Not by any intention at all… if we could alleviate the limitations, perceived or otherwise, on the relationship between technical family and academic family… we are all here on the same thing, I think sometimes people might perceive us to be different teams working on completely different objectives. But actually, we are really not. We're all here for the same reason. So, the more that we can be celebrated for that and actually involved on that level, the better for the student, really [3D].*

> *I'm going along with the learning outcomes that have been decided by the course and trying to bolster them, not take over the academic teaching, but to support that academic teaching [Illustration and Graphics].*

8.20 Category five (Transformer): Referential meaning

Transformers possess a broader and elevated perspective regarding the meaning of their pedagogies compared to other categories. They view their pedagogies as integral to the wider social and institutional context, seeking to facilitate profound and transformative change in learners, the curriculum, their discipline, and themselves. They aim to design and co-create experiences that empower learners to question conventions, make decisions, take risks, build resilience, collaborate, and foster personal growth through their practice. They experience the key significance of their pedagogies as contributing to developing an environment within their institution where learners flourish, nurturing their curiosity and equipping them with aptitudes and skills for their lives beyond HE. They reject the traditional technician stereotypes described in the introduction to this thesis:

> *If we think that our role is a fixer, an expert, a silo of where all the information is held, that doesn't necessarily serve the student. Because really, what we're trying to do in a world with such diverse knowledge practices and disciplines and jobs that aren't even created yet, you've got to create a dynamism within the student to be able to approach several different environments and different approaches [3D].*

Moreover, Transformers think of their learners as individuals on a journey they help shape. Their values of inclusivity, accessibility, and social justice, inform and model their approaches and priorities. As the following extract illustrates, Transformers adopt a 'head, heart, and hand' approach to their pedagogies to promote self-belief, confidence, and curiosity and to facilitate the development of the 'whole person' rather than exclusively hand skills, technique, or know-how. Pastoral elements permeate all categories but are explicit, proactive and strategic for Transformers:

> *Pastoral is a massive part our role… it's about that inclusivity and enabling space… it's not about the physicality only. It's about the intangible, emotional space that comes with everything else, really. In order to really enable the physical work. So it's about confidence… we actually just had a few students come and see us after the show, and they were just like, "We're going to miss this space." Because it's an enabling space to them. And, it's a space of growth, you know? Success is when students are stressed out of their minds and they come here in order to be restored or to talk through what's troubling them… I think the measure of its success is seeing the student enabled to make decisions, make choices, and then realise work that's*

really successful. And success is not necessarily in the aesthetics of the piece. It's the whole entirety of it. Seeing where they started from and seeing them achieve something that's manageable and appropriate for the situation [3D].

Transformers think of themselves as positive 'change-makers' who bring authentic and under-represented experiences from the studios and workshops to inform and influence how practical teaching and learning are regarded, planned, and delivered. And, while their pedagogies are deployed internally, preparation for life beyond university is a core focus. Several participants described the meaning of their teaching as preparation for learners to enter communities of disciplinary practice:

If I can get students excited about it and lead them in an accessible way that it will spark a progression, not with all of them but hopefully with a body of printmakers that then hopefully would, after they graduate, become part of that community [Painting, Printmaking, and Mixed Media].

Another participant described how they believed that through their teaching, they were safeguarding and protecting the future of the discipline that they are passionate about:

I want them to love lithography. I love it. It's such an amazing, magical process. And, there's not many expert lithographers out there, for fine art lithography and stone lithography. I want them to be really passionate about the process and I want to show them the potential of it. There's so much potential… we want them to be able to learn as much as possible while they're here so that when they do leave, they can work independently or further develop their skills and promote it. A lot of these things that we teach in an art school are not dying art forms, but a lot of them are only taught in art schools… I'm protecting the process [Painting, Printmaking, and Mixed Media].

Ultimately, Transformers see themselves as facilitating and guiding learners through a transformative creative education (that they co-create and share with academics) to deliver life-enhancing outcomes.

8.21 Transformer summary

Transformers adopt student-centred/transformation-orientated approaches. They aim to bring about profound and positive change in learners, their institution, and themselves. They set out to achieve these aims by focussing upon the intellectual, affective, and intangible aspects of making; curating and facilitating learners' experiences and thought processes as they assimilate theory and practice to realise conceptual outcomes. Transformer focus is less about technique or technology, and more aligned to the learner and how they think about and through their practice.

Transformers aim to blur binaries of academic/technical, theory/practice, and expand what is referred to as technical teaching into the broader domain of practical teaching. They think of learners as practical scholars within disciplinary communities of practice and perceive themselves as educators, devising, enacting, and advocating for innovative educational approaches while informing and influencing curricula. They seek to collaborate with academic teams, contribute to quality assurance and enhancement initiatives, and describe how their pedagogies can be synergistic and symbiotic to academia (or perceived as a threat depending on context and local factors). The core meaning of Transformer pedagogies is to advance and develop conceptions of technical and practical learning in learners and institutions to prepare graduates to flourish beyond university.

Key structural and referential characteristics

Epistemologies (what is taught and learned)

- To question, challenge, and transcend disciplinary conventions.
- Engagement with the intellectual and intangible aspects of practice.
- Assimilation of theory and practice to pursue and evolve conceptual objectives.

Teaching style and structures (how it is taught)

- Student-centred/transformation orientated (personalised and transformative).
- Planning and facilitating experiences that change and expand (transform) how learners think about, with, and through their creative practice.
- Facilitating the inception of new ideas through making and practice-based research (rather than expressing pre-existing plans).

Conception of the teachers' role

- As an educator. Devising innovative pedagogic approaches, experiences, spaces, and methods to disrupt and expand conventions of technical teaching.
- A change-maker (informing and influencing curricula, contributing to decision-making processes and governance forums).
- An advocate (transforming perceptions of practice within and beyond HE).

Conception of learners

- Practical scholars.
- Advocates for and pioneers within their chosen field.
- As members of disciplinary communities of practice, within and beyond their institution.

Conceptions of the curriculum

- Pedagogies pro-actively inform, develop, and deliver the written curriculum in collaboration with academic teams.
- Contribution to quality assurance and enhancement.

Relationships with academic pedagogies

- Distinctions between pedagogies are blurred.
- Symbiotic and reciprocal (in high-performing teams).
- Can be perceived as a threat by some.

Core meaning

- To facilitate profound and meaningful transformations in learners' knowledge, skills, attitudes, perspectives, world views, and relationships with their practice through creating and enacting whole-person pedagogies (cognitive, affective, and practical).
- To instil confidence and curiosity empowering learners to enter and evolve disciplinary communities of practice.
- To challenge and change archetypes and paradigms of technical and practical pedagogies by contributing to discourse, curriculum, and decision-making.
- To change the world through their own development, and the contribution of graduates.

Figure 21: Summary and key aspects of the Transformer category.

8.22 The dimensions of variation

As set out above, the process of analysis identified five qualitatively different ways in which visual arts technicians conceive of their pedagogies. In addition to discerning and describing these distinct categories, Marton and Booth (1997) direct that it is an essential element of phenomenography to explore the structural composition and relationships within the different ways of experiencing. Collier-Reed and Ingernman (2013:3) suggest that without structure and meaning, relationships within ways of experiencing the categories of description are, "…fairly meaningless. It is in the *relationship* within and between these categories that the richness of the results is manifested."

The categories' fundamental elements are distilled and presented as a "Taxonomy of Technical Pedagogies in Creative Arts HE" in Figure 22. This taxonomy summarises the outcome space and responds succinctly to the research question of this thesis: "How do visual arts technicians in higher education conceive of their pedagogies?" The final chapter provides additional discussion of the taxonomy and how it responds to the research questions.

The taxonomy can be read by column as a concise summary of the relevant category, or by row to facilitate analysis of the relationships, commonalities, and variations on the structural and referential elements

	Demonstrator	Instructor	Consultant	Collaborator	Transformer
Epistemologies (what is taught and learned)	Awareness of the subject, safe and competent usage.	Skillsets and mindsets concerning the subject.	To identify, understand, and articulate knowledge gaps, seek solutions, and evaluate, select, and implement solutions.	To collaborate in exploration and discovery to co-create unknown or unprecedented artefacts or outcomes.	To question and challenge conventions and boundaries and assimilate theory and practice.
Teaching styles and structures (how it is taught)	Teacher-centred/subject-oriented. Transmission of structured knowledge for replication. Feedback is corrective.	Teacher-centred/skills-oriented. Transmission of structured knowledge for application by learners to their creative problems. Feedback is divergent.	Problem-centred/outcome-oriented. Personalised to individual learner's problems, their level of learning, unique requirement, and aspiration of their practice.	Student-centred/outcome-oriented. Personalised to individual learner's ideas their level of learning, unique requirement, and aspiration of their practice.	Student-centred/transformation - orientated. Changing and expanding how learners think about, with, and through creative practice.
Conceptions of the teachers' role	To plan and deliver knowledge within a safe and learning environment. To protect equipment and promote access.	To devise and create opportunities for learners to acquire, develop and apply skills.	To understand the knowledge gap of the learner and to provide expertise, advice, guidance and problem-solving.	To understand the learners' ideas and support their expression and development through practice.	To expand and transform learners' conceptions of their practice through innovative pedagogies and influencing curriculum design.
Conceptions of leaners	Passive collective.	Individuals with different levels of prior learning, aptitudes, and aspirations.	Individuals who are active in their learning.	Joint investigators (Collaborators).	Individual practical scholars on the periphery of communities of practice.
Conceptions of the curriculum	Separate and occurring adjacently.	Within (via units/modules).	Ad-hoc. Primarily located within self-directed study.	Ad-hoc. Primarily located within self-directed study.	Animator, contributor, and co-creator.
Relationships with academic pedagogies	Disconnected and distinct.	Distinct and partially integrated (teaching content often aligned to academic aims).	Complementary (providing known information and guidance to enable learners to achieve academic aims).	Complementary (collaborating in new forms of knowledge to achieve or exceed academic aims).	Integrated and indistinct. Synergistic and symbiotic.
Core meaning	To increase awareness, confidence, and competence in the use of specific equipment, materials, or processes to enable independent and safe practice.	To equip learners with the abilities to experiment and express their ideas per the requirements of their programme of study, and to become competent, capable, and employable practitioners.	To support and guide learners to identify, understand, and resolve problems to expand their practice beyond their current level of knowledge.	To collaborate with learners in their processes of exploration and discovery in creating new knowledge.	To expand learners' skills, perspectives, and conceptions of their practice, challenging pedagogical norms to facilitate individual and institutional transformation and improve the world through graduates.

Figure 22: The Taxonomy of Technical Pedagogies in Creative Arts HE.

In the summaries of each category, the key structural and referential characteristics are outlined, denoting conceptions of what is taught and learned, how it is taught, the roles of teachers and learners, and the curriculum, relationship with academic pedagogies and the core meanings. Collectively, the categories span a continuum from teacher-centred/subject-oriented conceptions in which structured knowledge is transferred to passive learners for repetition to student-centred/transformation-orientated conceptions where learners are active in transforming their practice and ontologies.

Epistemologies (what is taught and learned)

The categories illustrate a continuum of sophistication from showing and telling conventions and transmitting fixed bodies of knowledge (Demonstrator) to questioning and challenging these foundations and assimilating theory and practice (Transformer). Demonstrator conceptions focus on competence, whereas for Instructors, the focus switches to thinking with and through the subject as it is applied in new contexts. Demonstrators and Instructors teach and support pre-planned content (within the teacher's knowledge), whereas Consultants, Collaborators, and Transformers see their pedagogies as beyond the scope of pre-planned content. Consultants are predominately orientated to problem-solving, whereas Collaborator pedagogies are of exploration and discovery. Transformers challenge pre-existing knowledge and conventions seeking to transform learners' perceptions of their practice and the world, how institutions produce and enact practical curricula, and how HE perceives technical teaching.

Teaching styles and structures (how it is taught)

Fundamentally, categories vary between teacher-centric (Demonstrator and Instructor) and student-centric (Collaborator and Transformer). At the midpoint (Consultant), the teacher adopts problem-centric approaches. While the content is comparable between Demonstrator and Instructor, the teacher is subject-orientated in the former, whereas in the latter, they are skills-orientated. Demonstrator teaching is primarily convergent, whereas Instructor teaching is more likely to be divergent (skills to be decontextualised and recontextualised by the learner through application). Consultant conceptions can be presented as learner-centric (because the problems are student-led); however, the teacher's primary focus is the learner's problem rather than the learner's learning, and their aim is for a successful outcome. For Collaborators, the aims are similar, but rather than focusing on supporting learners to overcome the problems of practice (Consultant), teachers are concerned with supporting the development of the learner's ideas, and knowledge generation via practice. Transformers' approaches aim to create innovative pedagogies and opportunities to expand how learners think about, with, and through creative practice.

While all categories are qualitatively distinct, style and structure relationships are logical, hierarchically inclusive, and contiguous. For example, a sequence of Demonstrator pedagogies shares commonalities with the progressive skills-based teaching of Instructors. As learners apply taught skills in new fields, teaching extends beyond taught knowledge, and learners require support in solving problems (Consultants). As problems extend beyond known (to learner or teacher) knowledge, technical pedagogies can extend to collaboration (Collaborator). For Transformers, pedagogies focus on innovation in teaching and learning, influencing conditions and curricula to transform experiences and perceptions of practice-based teaching.

Conceptions of the teachers' role

Technical teachers conceive of their role on a spectrum from an authority figure transmitting knowledge of a particular facility, tool, process, or technique (Demonstrator) to supporting and facilitating learning that challenges and changes how learners think about their practice, worldview, and sense of self (Transformer). Demonstrators think of their role as providing safe, accessible, and welcoming environments and planning and delivering subject awareness and operational knowledge. For Instructors, the conceptions evolve to the teacher's role in facilitating the acquisition and development of skills. For Consultants, this extends to supporting and guiding learners as they identify and seek solutions to problems of practice. Collaborators aim to construct new knowledge with learners. Transformer pedagogies influence beyond learners into the university structures, curricula, decision-making forums, and monitoring.

Conceptions of learners

Participants' conceptions of their learners vary between passive-collective (Demonstrator) to active individual practical scholars (Transformer). For Demonstrators, learners can represent empty vessels into which knowledge is poured (Freire, 1996). Prior knowledge is not considered, and the application to which the teaching will be applied is deprioritised. For

Instructors, learners are also generally considered passive, though they are thought of as individuals, and their histories, characteristics, and aspirations are more likely to be engaged. For Consultants, learners are active, leading their journeys and building their learning through problem-defining and problem-solving. For Collaborators, learners are joint investigators; they actively negotiate their ideas and collaborate to develop and execute them through practice. At the most sophisticated level (Transformers), learners are perceived as practical scholars or practitioners who advance and advocate for their fields as peripheral, but increasingly legitimate members of disciplinary communities of practice.

Scale is also a factor. As categories progress from Demonstrator to Collaborator, the number of learners taught or supported reduces, but Transformer pedagogies are conceived of more inclusively and impact more significant numbers through institutional and cultural change.

Conceptions of the curriculum

Demonstrators describe an awareness of the academic curriculum but are not always clear about its content or how (or if) their pedagogies contribute. They consider their activities curriculum-adjacent activities (i.e., running alongside). Instructors are more likely to describe greater awareness and a clearer sense of how their pedagogies contribute to academic outcomes. Consultants and Collaborators build upon this through having an elevated understanding of the curriculum (sometimes via the learner's interpretation). However, they identify that their pedagogies are frequently invisible within 'self-directed study'. Transformers think of the curriculum as something they can influence and co-create.

Relationships with academic pedagogies

The relationships, synergies, and distinctions with academic pedagogies (differentiated from the sociocultural, interpersonal, and systemic relationships discussed in the introduction to this chapter) vary from being perceived as distinct and disconnected (Demonstrator) to integrated and indistinct (Transformer). All participants valued academic input and integration at all stages. Instructors described partial integration through aligning their activities to the outcomes of units or modules. In contrast, for Consultants, technical pedagogies were deemed complementary to academic teaching by supporting learners in achieving their aims via their response to the creative brief. Collaborators also experienced their pedagogies as complementary, with the difference that as relationships with learners developed, they were more likely to support learners within the broader context of their education. For Transformers, engagement and relationships with academic pedagogies were more likely to be experienced as synergistic and symbiotic.

Core meaning

The spectrum of meaning (why participants choose to teach in the ways that they do) across categories ranged from providing awareness of equipment or processes to instil confidence and competence to facilitate independent future use (Demonstrator), to enabling more sophisticated understanding and questioning of practice, integration of theory, and promoting making as a legitimate and valued form of thinking and research (Transformer). Put another way, for participants with the least complex conceptions of their pedagogies, meaning focuses on enabling learners to perform independently by copying an example. Participants with more developed conceptions of their pedagogies perceive technical and practical abilities to be taught as means of thinking, communicating, making sense of, and locating within an unpredictable and changing world.

8.23 Reflections on the frequency and distribution of conceptions

As noted throughout this study, phenomenography is unconcerned with the individual or their context, and the outcome space has been developed upon the collective conceptions of participants' pedagogies to accord with the research question. This is a defining characteristic of the methodology. Therefore, the frequency and distribution of the resulting categories of conceptions (via institution, discipline, or other sampling characteristic) are not deemed relevant. However, critics of the methodology have argued that without a sense of the distribution of conceptions, categories may be viewed as having equal weight because, theoretically, a single interview could contribute to the constitution of a category of description (Reed 2006:6). In the context of the methodology, this is legitimate (insofar as it is a distinct mode of conceiving regardless of prevalence), yet this was not found to be the case in this study. A glimpse of distribution is shown through the disciplinary labels assigned to each quotation. To obtain a quantitative measure, MAXQDA was used to export a frequency report of coded instances (Figure 23).

Category	Quantity/Percentage of interviewees	Coded instances
Demonstrator	Found in 23 interviews (100%)	144
Instructor	Found in 23 interviews (100%)	134
Consultant	Found in 20 interviews (87%)	38
Collaborator	Found in 16 interviews (69%)	24
Transformer	Found in 13 interviews (56%)	44

Figure 23: Frequency and distribution of coded instances by category.

Readers are advised to interpret these figures with some caution; coded instances varied, some were sentences, and others represented paragraphs. However, it is noteworthy that all participants expressed Demonstrator and Instructor conceptions. Furthermore, the Transformer Category was constructed from 44 coded segments across 13 interviews. These segments represent fragments rather than robust conceptions held by individual participants. However, 20 of these fragments were derived from two transcripts. For these two participants, comprising 8.7% of the participant sample, their dominant conception identified was Transformer.

The frequency and distribution of conceptions expressed by participants broadly correlate with the level of detail that can be extrapolated from accounts, and accordingly, the length and sophistication of categories vary, with Demonstrator and Instructor being the most comprehensive.

8.24 Category labelling

Category labels were a product of the interaction between my own conceptions and those emerging from the dataset. The labels ‘demonstrator’, ‘instructor’, ‘consultant’ and ‘collaborator’ were drawn from the transcripts, often repeatedly, examples are shown below:

> *I always <u>demonstrate</u> everything I want them to do… it’s really hard to learn unless you’ve been shown [Fashion and Textiles].*

> *What we do is we <u>instruct</u> people…how to use something [Illustration and Graphics].*

It's not really teaching. It's more a consultant [Metawork].

…your involvement is more collaborative …exchanging some ideas… [Fashion and Textiles].

The final label, 'Transformer,' was an exception, as no participants used this term during interviews. I selected the label while concluding the analysis process to reflect the expansive and transformative mindsets and approaches of conceptions within this category.

8.25 Summary

This chapter has set out the five qualitatively distinct ways of conceiving technical pedagogies presented within the categories of description in the previous chapter and expanded upon them to construct an outcome space. Each category's structural and referential elements have been presented and illustrated using interview extracts. Each category has been summarised, and in the final section, the summaries are combined to create a taxonomy that identifies the commonalities, variations, and relationships within and between categories.

Chapter 9: Discussion

9.1 Chapter introduction

This final chapter reflects upon the research processes and outcomes, explaining and evaluating how they respond to the research questions and discussing how the resulting insights might be interpreted, explained, and applied and by whom regarding their theoretical, methodological, and professional implications. The chapter concludes by problematising the findings to critically examine the research and its limitations and suggesting areas for future research.

9.2 Answering the research question

This study set out to discover, describe, and systematise visual arts technicians' conceptions of their pedagogies in order for them to be better understood and engaged for the benefit of the creative arts education sector and its stakeholders. The research question used to direct the research was 'How do visual arts technicians in higher education conceive of their pedagogies?' Focussed through three heuristic 'What,' 'How,' and 'Why' sub-questions. The sub-questions were subsumed into the structures and meanings afforded by "The unit of a science of experience" (Marton and Booth, 1997:99), when phenomenography was selected as the methodology in Chapter 4 (Research design and methodology). The epistemological nature of the enquiry and units of analysis (conceptions) dictated that the methodology and methods be sufficiently expansive to enable the full spectrum of experiences to be recorded, analysed, and reported upon. These points have been explained and evaluated within the relevant section of this thesis, with additional overall reflections and limitations set out later in this chapter.

When evaluating the quality of research, it is critical to clarify how the research design and implementation have responded to its aims and how the findings relate to the research questions. In the former, I found the epistemological and ontological positioning of the phenomenographic methodology (set out in 4.3) and its instruments (the categories of description and outcome space) to be an effective philosophical perspective and framework through which creative arts technicians' conceptions of their pedagogies could be described and systematised.

The specificity of the language used within the research question was also crucial, particularly the term ‘pedagogies’. Other comparable research (Drew, 2003; Trigwell and Prosser, 2004; Pratt, 2016) examines conceptions of ‘teaching’. Had the research question limited its scope to technical teaching, the research would have been severely impoverished as many participants did not feel comfortable describing their activities as teaching (see section 9.10 for further discussion on this point).

The study’s findings are empirically derived from participants’ spoken accounts described throughout Chapter 8 (The outcome space) and summarised in ‘*The Taxonomy of Technical Pedagogies in Creative Arts HE’* (Figure 22). These findings relate directly and explicitly to the stated aim of the research and research questions within the scope and delimitations set out in section 1.6.

9.3 Theoretical, methodological, and professional contributions

Trowler (2016) describes how evaluative research, which attributes value and worth to individual, group, institutional or sectoral activities undertaken within universities, can make three significant contributions: theoretical, methodological, and professional. Trowler’s framework is engaged in structuring discussions within this chapter concerning how the insights can be interpreted and applied and offer a contribution to knowledge. The theoretical element commences by reflecting upon the applicability of the educational theories introduced in the pre-empirical chapters. The methodological contribution sets out how this study can claim to have advanced, clarified, and expanded the frontiers and methods of phenomenography. The professional contribution responds to the knowledge gap set out in Chapter 4 (Research design and methodology), offering recommendations for how stakeholders could practically apply the insights via actionable strategies and meaningful interventions.

9.4 The theoretical contribution

Phenomenography is a second-order methodology (descriptive of descriptions), and Ekeblad and Bond (1994:159) argue a well-designed phenomenographic study describes the qualitatively different ways that something is experienced “nothing more and nothing less.” However, Larsson and Holstrom (2017:62) propose that phenemenographers should move from merely describing conceptions to using the generated results for educational interventions. As Trowler (2016) asserts, theory can be creative and emancipatory; it doesn't just seek to describe the world but should seek to change it. Prior to this study, there was a demonstrable absence of theory concerning technical pedagogies. This thesis has sought to establish a unique, authentic, and empirically derived lens to examine, challenge, and extend existing theory and pedagogical practices from a new (technician) perspective.

The outcome space represents the findings of the study, but the theoretical contribution began in the earlier chapters, specifically through an examination of the ontologies and epistemologies of contemporary arts HE (Chapter 2 – A contemporary context), and the construction of the tripartite pedagogy of activities (Chapter 3 – Theoretical perspectives) as a framework to arrange and examine potentially relevant educational theory. In the following sections, these points are re-examined from the perspective of the study's insights.

Orr and Shreeve (2018:15) describe an 'academic turn' transforming creative arts HE since the academisation of art schools in the 1980s. Insights from this study suggest a previously untheorised covert and concurrent 'technical turn'. I use the term 'turn' in this context to denote a shift in emphasis. This shift can be traced within policy literature (page 70) and is also reported through the lived experiences of technicians. Several participants described how the pedagogic elements of their roles had increased in the last two decades in response to changes to academic roles; the following participant describes the aftermath of an institutional merger:

> *Within a year or so, the academics had all been pushed into research contracts, and the technicians who were all level five, just normal technicians, high level technicians, were all given grade six academic-related technical tutor roles, and that left a void in the technician, although you were still having to sweep the floor, clean the bins, and then teach [Metalwork].*

The 'void' relates to what was described as a reduction of the traditional technician role. Several participants described how the emphasis of their roles had transformed from supporting and maintaining equipment into supporting learners and delivering teaching:

> *It used to be the maintaining of machinery, the sweeping up, but that role has diminished massively, and we are taking on the role now of more of a tutor, lecturer, dare I say [Metalwork].*

Others described how the previously core skills and functions of servicing and maintaining equipment had disappeared, and technician roles were now less likely to incorporate these competencies:

> *It [maintenance of equipment] is a proper skill… the role is shifted… we outsource that to contractors with skills and then we do more teaching. I don't know if that traditional technician really exists anymore… we don't really have those people. It's all art college graduates like me that are clueless about mechanics [Fashion and Textiles].*

This may be partially explained by the shifting portfolio towards digital technologies in which technical equipment frequently comprises sealed units containing no user-serviceable parts, meaning equipment is no longer maintained with tools and specialist knowledge as it once was. Instead, it is replaced at the end of life. New and emerging technologies are increasingly cloud-based, requiring specialist support that is usually covered by service contracts from the vendor. However, these same points were articulated by participants working in traditional craft disciplines.

Participant accounts suggest that during the same period academic roles are reported to have been deskilled (Ball, 2013; Newall, 2021), disaggregated (MacFarlane, 2010; 2011), and threatened by new and emerging technologies (Maeda, 2002) technician roles have also evolved in response to many of the same factors. On this basis, it seems reasonable to assert that the academic and technical 'turns' have advanced the status of technical teaching (Savage, 2018a; Wragg *et al.*, 2023) and blurred the lines between the previously distinct job families (Education in England,1997; TALENT, 2022), contributing to a 'Third Space' between academic and professional teams (Whitchurch, 2008b), in which academic and technical studio based pedagogies might be regarded as synchronous (Savage, 2018a – Figure 4). However, while this study reinforces and extends Whitchurch's work concerning the activities of non-academic roles, it also problematises it insofar that Third Space theories do not emphasise non-academic staff who shape and deliver the taught curriculum (as participants of this study describe). Additionally, I used the term 'synchronous' in 2018 to denote comparable teaching activities happening concurrently, in time and space, based on a small sample in a single institution. Insights from this study six years later with a larger and broader sample demonstrate that technical pedagogies are variable and complex; they include distinct and valuable traits that depart from what might be thought of as a deficit model, reaching instead into new areas of specialism, expertise, and personalisation that stand alone, rather than replicate, backfill, or replace academic instruction adding value to the teaching system. In the following sections, I reflect upon the theory used to illustrate the tripartite pedagogies of environment, teaching, and support in Chapter 3 (Theoretical perspectives).

Pedagogy of environment

The ‘pedagogy of environment’ was engaged to explore how several academic theorists conceive of the learning spaces in which technicians engage their pedagogies. All participants described working within and overseeing the operation of specialist studios and workshops (this dimension is introduced within the Demonstrator category). Management of the learning environment was a characteristic of most interviews, with a shared collective commitment to ensure that spaces were clean, tidy, safe, and welcoming, engendering environments where learners felt safe and supported. Participants also described the importance they placed upon environments being inclusive and accessible. These conceptions are consistent with the assertion of Shreeve *et al., (2010)* that the quality of space (size, layout, temperature, light, and cleanliness) influences learning and teaching but also illustrates that participants conceive of their contribution as going beyond the quality of space, to include how learners experience the space. Several participants described how they seek to foster a sense of belonging that carries through into the interpersonal pastoral engagements described by Collaborators. These findings accord with Vere (2022) who found “Students can often find technical staff more approachable than their academic colleagues because that more formal boundary between academic and student is not as present, for example technicians are rarely assessing the work of the student” (Vere, 2022:148). This may be more acute in the arts, due to the elevated level of neurological diversity, cogitative diversity, and differing knowledge domains providing multiple routes of enquiry. An examination of the pastoral element of creative arts technicians’ roles is beyond the scope of the present study but has been explored in relation to the wider HE sector (Science Council, 2019), and is noted later as a potential area of future study.

Thought of in this way, technician pedagogies of environment accord with Maslow’s (1954) ‘Hierarchy of Needs’ in which basic needs (psychological, safety, belonging and esteem) must be met before the highest level of self-actualisation (including creativity) can occur. The dressing and curation of learning environments were also key; participants whose conceptions were located within Demonstrator and Instructor pedagogies described displaying step-by-step guides, infographics, and exemplars within the environment (examples are visible in the participant portraits (Chapter 6) and others are shown in

Appendix 12). These pedagogical developments are intended to guide learners through predetermined sequencing while also providing visual cues for the significant proportion of the student population for whom English is a second language.

Accounts confirm that technician pedagogies contribute to the design, creation, and curation of learning environments in terms of their aesthetics, possibilities, and accessibility. In doing so, these insights provide additional nuance and credibility to Orr and Shreeve's (2018:243) claim that, in art and design, the studio is a pedagogy in its own right.

It is also notable that Demonstrators were more likely to refer to the environment, or facility, as the boundary, or "circle of influence and circle of concern" (Covey, 1989) to their pedagogies. This is likely due to their focus on inductions, where teaching and learning activities are related to equipment operation within designated studios, workshops, or facilities (Lliffe, 2008). While other categories teach in the same physical spaces, they tend to perceive learning as taking place beyond the physical space of teaching and within the learners' circles of concern. They are also more inclined to engage in dialogue-based teaching and learning activities in non-specialist environments than Demonstrators.

Pedagogy of teaching

The 'pedagogy of teaching' introduced educational theory relevant to pre-planned technical teaching activities. These activities were broadly characterised as induction, demonstration, and instruction. This study's insights support the idea that these are experienced as valid and legitimate forms of learning and teaching (and in two instances (Demonstrator and Instructor), these terms were also used to denote qualitatively distinct ways of thinking about technical pedagogies).

The 'Taxonomy of technical pedagogies in creative arts HE' (Figure 22) sets out the categories and conceptions and the subsequent section details the dimensions of variation between them. A commonality is that in all categories, participants adapt their teaching approaches to what they understand to be the requirement of their learners at that particular time. This is consistent with eminent educator Stephen Brookfield, who notes in the foreword to Pratt's '*Five Perspectives on Teaching*', "many of us draw on different perspectives at different times… how I teach at any moment on any day is strongly influenced by the purposes I'm trying to achieve and what I know about the people I'm working with" (Brookfield, 2016:x), and as Pratt notes later in the same book, "it's important to remember that holding a particular perspective does not predict the quality of someone's teaching" (2016:13). Insights from this study accord with Pratt, who argues that no perspective is necessarily better than any other, proposing "what is needed instead is a plurality of perspectives on teaching that recognize and respect a diversity of teachers, learners, content, context, ideals, and purposes" (2016:4). On this point, while constructivist 'learner-centred' theories are widely valorised in educational writing, the teacher-centred approaches characterised within the Demonstrator and Instructor categories are conceived of by participants as essential knowledge, that serves to safeguard learners (H&S), provide confidence, competence, develop affinity, build rapport with processes, and inspire some learners to advance beyond a simplistic awareness, to become those that develop into subject specialists who will engage in greater depth with Consultants, Collaborators and Transformers.

No single category is presented as better or more effective than another, though there are instances and types of teaching and support of learning that would suit a particular learning need. This contrasts with Freire's (1996) assertion that active teacher/passive learner approaches can lead to a lack of critical thinking in students and a lack of ownership of their learning. Insights do not indicate this, instead they align with Biesta's (2013) perspective that the role of the teacher is to introduce new knowledge to the learner, and aligning with Csikszentmihalyi's (2013) assertion that learners must thoroughly understand the domain and its rules before transformative work can occur. Csikszentmihalyi also points out that if the knowledge in the domain is incomprehensible, few young people will bother learning it, and thus the chances of creative innovations will be less (2013:340).

A further insight is that comparable to their academic colleagues (Orr and Shreeve, 2018:132), technicians describe having a high degree of autonomy in what is taught and how. Indeed, within the Instructor category, some described having greater autonomy (page 192) than lecturers. However, while some enjoy what they perceive to be elevated freedom and trust, a more significant number expressed frustration with the lack of direction and integration with the curriculum and alignment with the assessment criteria.

In structuring taught sessions, Demonstrator and Instructor categories described the clearest frameworks that combine transmissive approaches with the opportunities to replicate (Demonstrator) and apply (Instructor). Both categories were structured to translate the teachers' constellations of knowledge into cogent sequences of learning and teaching activities (Frayling, 2017; Witkin,1981; Shulman, 1986).

Pedagogy of support

The ‘pedagogy of support’ encapsulates the activities undertaken by technicians as they assist, guide, and advise students. Shreeve *et al.,* (2010) describe these collaborations and interactions between academic tutors and their learners as “a kind of exchange,” and this was evident in all categories, with the richest exchanges being described within the Collaborator category.

A theory introduced in this pedagogy was Swann’s (1986) “Nellie is Dead” in which the tutor spends time moving between learners offering comments on the work in progress. Insights suggest that participants perceive these personalised approaches as valuable and they continue to be employed by technicians, particularly by Demonstrators (corrective feedback in free practice) and by Instructors (supporting learners as they apply knowledge in new contexts). However, within Consultant, Collaborator, and Transformer categories, the nature of support is driven by the learner’s requirement rather than the tutor’s knowledge. Indeed, conceptions expressed within the Demonstrator, Instructor, and Consultant categories were likely to regard the point at which their pedagogies influence the learner’s ideas as the line that separates technical and academic pedagogies. ‘The line’ has been referenced several times by participants, and I explore this in greater depth later in this chapter. However, this is not consistently observed, and in all categories, participants described how, through introducing learners to new equipment, processes, techniques, materials, and possibilities, their ideas, aspirations, and outcomes can evolve, through deliberate and purposeful practice (Ericsson, 1993) contrasting and challenging Collingwood’s (2016) assertion that ‘creativity is not a technical matter’.

The pedagogy of support provided the richest insights of this study and formed the basis of a new understanding of technical pedagogies through the metaphor of a bridge as set out below.

9.5 A Bridge of realisation: A new understanding of technical pedagogies

The outcome space can be likened to a hologram (Lincoln and Guba, 1985) incorporating multiple perspectives of the same phenomenon to provide a holistic picture that ‘maps a plurality of good’ (Pratt *et al.,* 2016) technical pedagogies rather than discerning a hierarchy of quality or value. The following section theorises technical pedagogies as a metaphoric bridge. The concept of technicians ‘bridging’ domains is discussed within the historical context (Appendix 2) in relation to non-academic practitioner instructors being introduced to provide a bridge between ‘discipline’ and the ‘profession’ in the late nineteenth century. Brown *et al.,* (2008) described a different bridge, in which technical demonstrators provide a bridge between support (non-teaching technicians) and teachers (academic lecturers). Several participants conceive of their pedagogies as bridging the skills gap differently:

> *We bridge the gap, what academic tutors used to teach, we now teach [Painting, Printmaking, and Mixed Media].*

It is unclear whether this bridge exists from a simplistic deficit model arising from the ‘technical turn’, as this participant suggests, or reflects broader movements in which creative arts education requires different kinds of learning and teaching from different roles to become integrated.

Alternative bridges have also been theorised by others, Barley (1996) conceptualised technicians as bridging between representations and material worlds at an ‘empirical interface’. When viewed from a creative arts education perspective, Barley’s interface invites comparison with the realms of theory and practice (a bridge that Shulman (2005:56) asserts is far from simplistic) or, more specifically, in the context of technical pedagogies, how learners develop their ideas and give form to their thoughts through their making. Arseneau theorises a “Bridge to Understanding” (2016:163) within Pratt’s developmental perspective of teaching, in which teachers bridge (or translate) the curriculum into meaningful experiences for students, bridging from ‘the curriculum-as-planned to the curriculum-as-lived.’ Arseneau asserts that this moves students from ‘not knowing to knowing,’ bridging present and desired ways of thinking. In the following section, I propose that technicians build bridges between present and desired ways of thinking and doing, drawing upon and developing multiple intelligences in the production of knowledge.

At the entry point of this metaphor, the bridge (designed and built from the Demonstrators’ perspective) is short, tightly controlled, and leads to the technician’s pre-determined destination. Its purpose is to provide awareness of the subject and establish a clear pathway for learners to revisit the same destination in the future unaided. Instructors think of their bridges differently; they have a similar entry point but are likely to travel greater distances, and they are divergent; learners can deviate from the technicians’ route and travel towards destinations of their choosing, using and applying the skills and techniques they have been taught in a personalised practice. The Consultant’s bridge is narrow and can be short (a question and a response), but it can also be elongated and evolve as answers prompt more questions. The learner dictates the direction and destination, which extends beyond the bridges of Demonstrators and Instructors. The Consultant dictates the type of bridge to be built and travelled based upon the learner's description of the desired destination (because, as Rubin notes, a bridge is easier to build when it's clear what's on either side of it (2023:174)) and their assessment of learner's aptitudes and resources to make the journey. The Collaborator is a passenger, and as Rubin notes "sometimes the most valuable touch a collaborator can have is no touch at all" (2023:370); the learner steers, usually with a sense of direction and perhaps a partial map but without a clear destination. Transformers' bridges are concerned with the journey as much as the destination; they seek to engage their learners in deep thoughts about their practice, to consider other routes, and think not just about how the bridge may transform them but also to question how they might change or adapt the bridge. Put more succinctly, a Demonstrator's bridge takes the learner where the tutor wants them to go; an Instructor's bridge starts at the tutor's location but leads to where the learner wishes to travel, the Consultant joins the learner's bridge; using their starting point and takes the learner to where they think the learner wants to go. The Collaborator also joins the learner's bridge (the most effective bridges between knowing and not knowing are built from the learner's knowledge rather than the teacher's (Pratt *et al*., 2016)), beginning at their starting point and sharing the journey to a destination unknown at the outset. In contrast, the Transformer seeks to create the conditions in which the learner explores and discovers a destination they had not previously known they were interested in or wanted to visit.

These metaphors are somewhat linear and conceptual, but the most profound bridging activity, not previously theorised in this study's context of technical pedagogies, is bridging from the inception and development of an idea into a tangible artefact (also bridging states of 'thinking' and 'doing', and 'wanting to' and 'being able to').

Bridges can be thought of as pathways that lead from and to some new place or state through their crossing, and the spaces between entry and exit can be characterised as liminal. Liminality is a "transformational state" (Meyer and Land, 2005:380), and Felten (2016:5) describes liminality as a "liquid space" where the potential for learning, experimentation, and growth are maximised. Land *et al.,* theorise that "The liminal state entails an envisaging (and ultimate accepting) of an alternative version of self (the other side of the bridge), contemplated through the threshold space" (2016:18). Arseneau identifies that theoretical approaches to bridging knowledge have been neglected, in favour of subject knowledge (2016:162), and while Shulman's (2005) Pedagogical Content Knowledge (PCK) articulates approaches to teaching (which for Arseneau (2016:50) separates an expert teacher from a content expert) it emphasises the structuring of the tutor's knowledge rather than the learners.

Bridging realms

The means and approaches through which learners are made aware of specialist facilities and the foundational elements of how they are taught to explore their practice have already been discussed. The Bridge of Realisation is a term that is proposed for the technician pedagogies engaged as learners explore outwards from tutor-led activities in their responses to the creative brief. Their provisional ideas are likely to have been developed in response to, and in discussion with, academic tutors and interpretation of the module brief. For the purpose of this characterisation, these conversations with academic staff are conceived as being conceptual, divergent, and experimental, prompting questions rather than answers. The emerging ideas and associated curiosities begin to coalesce into what can be thought of as the learner's intent for an artefact or outcome. The idea represents the entry point of the learner's bridge, and their intent represents their destination (as envisaged at that time). Some learners may have pre-existing knowledge, skills, and resources to traverse the bridge unaided, supported by peers or other resources. However, others may choose to engage the support and advice of technicians, particularly when the realisation and resolution of their intent requires specialist facilities and the skills to use them. These interactions commence with the communication of the intent. In these conversations, technicians seek to understand and clarify the intent through questioning, and probing. At this point, the intent continues to be developed and refined by the learner in their mind as they communicate it in language. Through responding to questions from technicians that address points not yet contemplated, asking their own questions, evaluating comparable exemplars, and considering technical input, challenge, and alternatives the intent for the physical manifestation of the work may change as the idea evolves and develop with greater, or fewer, possibilities.

Pratt describes how these questioning conversations can be used to transport learners from their previous ways of thinking and reasoning to new, more complex, and sophisticated forms of reasoning and problem-solving (2002:5). These constitute Becker's "editorial moments" (2008:198) that can begin to shape the intent, into to something more concrete and communicable. Hirst describes how the learners' intention in planning creative work may be to visit an unexpected place, but "the ability to apply calculated predictions to the route will lessen the chance of an undesirable destination" (2013:41).

Further editorial moments can occur in the physical outworking of the intent. These processes are akin to Witkin's (1981) holding form. Witkin describes the holding form as a low-resolution mental incept, that guides the full expression. In this instance, the mental incept must be shared as faithfully as possible with the mind of another (the technician), frequently verbally but sometimes externalised, using sketches, prototypes, diagrams, rendering it tangible in the physical world. In these ideations and iterations, the learner advances and evolves their intent. A conception referenced in the Collaborator category (page 191) described how the participant perceived their role as transitioning a learner's idea to paper, to realise their intent based upon their resources, time, and skills. Through these exchanges, the technician can assess their responses to the learner regarding the scale and ambition of the advice and guidance given.

Through these processes, ideas become intent, and intent can be shared, mediated, planned, costed, into the realm of the achievable, to be realised. The bridge begins from the point of the learner's ideas and progresses as the intent becomes clearer, furthermore, as it heads in the direction specified by the learner, with the path and terrain to be traversed often suggested by the technician (based upon pragmatic factors of time, space, budget, and ability). The advice, support and guidance offered aligns with Vygotsky's (1978) 'Zone of Proximal Development' (ZPD) and his notion of the 'More Knowledgeable Other' (MKO). The term 'proximal' in this context relates to skills the learner is 'close' to mastering, and the 'MKO' represents a person with a better understanding or higher ability than the learner in relation to a specific task, concept or process. In his Apprenticeship Perspective of teaching, Pratt describes this as the "Zone of Instruction" (2002:6) where the level and sophistication of teaching are adapted to bridge what the learner could achieve unaided and what they might achieve through collaboration with a more experienced and capable technician (MKO). The technician's interpretation of how difficult a skill is to learn, is what Pinch *et al.,* (1997:101) describe as a 'second order quality' of the skill itself, that can be shared with, and understood by the unskilled and is also used by the MKO to delimit the individual ZPD of the learner.

Ideas evolve and iterate as the learner discusses their work with others (peers and academics) and through experimentation and the act of making. This phase represents the liminality, or 'middle section' of the bridge. This section often ceases to be linear and can include junctions, unexpected diversions, or serendipitous discoveries, where choosing one direction precludes others. As Wollheim (2015) notes, mental images cannot envisage all the problems, challenges, or opportunities that will arise from working in the medium or working alongside other creatives in making spaces. Sennett (2009), Ingold (2012), and others describe (repeated by a participant in the context of 'making literacies' in the Transformer category), the process of making is a process of thinking, and thinking gives way to new ideas or alternative ways of expressing the same ideas. In this context, thinking is accompanied by talking (see, for example, the extract relating to the scoping of a potential idea (page 193), developing an idea for plaster casting a pillow (page 203), evolving a work in progress (the architectural stairs on page 202), or assisting to process challenging feedback to find a new way forward (page 206)). It can be through these conversations and the use of language that learners develop their abilities to think about and articulate their intentions and practice. In these instances, technical pedagogies become a social process aligning in a broad sense with Vygotsky's (1978) sociocultural approaches to learning where learning is based on interacting and mediating with others and a wider community.

Participants described how their involvement with learners during these points can change the trajectory of the work; examples described included transitioning analogue intent into digital outcomes, 2D work becoming 3D, and static work becoming time-based; in each instance, the outcome of the work took a new direction through an enlarged understanding of possibilities.

Furthermore, as the intent develops, the learner begins to envisage the destination more clearly while the technicians (Consultant, Collaborator, and Transformer) provide support, guidance, and alternative ways of reaching it. In these moments, individual status as 'staff' and 'student' holds less relevance. An external observer of their activities, perhaps looking from outside the studio inwards, might perceive two practitioners collaborating, one with considerable expertise and another with less, generating, testing, and facilitating responses to the creative problem. Hsu and Roth (2008) found that technicians (within sciences rather than arts) and students draw on different forms of discursive strategies to articulate knowledgeability while transacting with each other. They challenge the conventional one-way notion of 'scaffolding' instead putting forward the notion of "emergent expertise" to describe new forms of expertise that are not the property of individuals but rather the product of collective transactions.

Of course, intent does not always proceed as planned or desired, as the bridge may collapse, or not reach the anticipated destination. In these instances, participants also articulated what Egan describes as "advanced accurate empathy" (1976:202) in which technicians can notice behaviour and feelings, with the authentic credibility of a practitioner who 'has been there'. These relationships build trust and contribute to the importance participants place upon belonging, encouragement, and the pastoral role prominent among Collaborators.

9.6 Congruence of insights with pre-existing educational theory

Additional theories discussed as potentially applicable to creative arts technical pedagogies in Chapter 3 (Theoretical perspectives) included Experiential Learning (Kolb,1984), Threshold Concepts and Troublesome Knowledge (Mayer and Land, 2003), Signature Pedagogies (Shulman, 2005) and the Hidden Curriculum (Jackson, 1968).

Insights suggest that Kolb’s ELT Cycle of the Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualism (AC) and Active Experimentation (AE) could be extended and re-interpreted to provide a helpful model to conceive of the experiential and collaborative nature of being shown, making sense, attempting to do, and experimenting independently. Threshold Concepts and Troublesome Knowledge are also evident in participants’ conceptions and show relevance to technical pedagogies, in the environment, teaching, and support.

Jackson’s concept of the Hidden Curriculum (1968) was referenced directly by a participant (page 216) and their interpretation was that the concept is problematic insofar as it asserts an invisible (rather than hidden) curriculum devised and delivered by technicians independent of the academic curriculum-as-written. There is little evidence that technical pedagogies are ‘hidden’ in the word’s literal meaning (to hide is a verb, and for something to be hidden, someone or something has to hide or obscure something). No participants conceived of their pedagogies as being hidden by any wilful act; instead, many described them as unseen (or invisible) at a university level, omitted from the curriculum and timetables, not being accounted for in structured delivery hours, but highly visible and valued from the perspectives of learners who engage with them.

The question of whether technical pedagogies might be considered a ‘Signature Pedagogy’ (Shulman, 2005) of creative arts HE is determined by whether the outcome space (cumulatively, or the individual categories contained within) meet Shulman’s characteristics of being distinctive in that profession, pervasive within the curriculum, encouraging learners to think like practitioners, and for them to be ubiquitous within and across courses and institutions. In the context of the technical teaching profession (rather than the creative arts profession), the outcome space shows that pedagogies are distinctive to the technician professions, are pervasive in the curriculum (not by name, but within self-directed learning), and they encourage learners to think (and act) like practitioners. Orr and Shreeve speculated “There may be many more examples of specifically designed signature pedagogies in the various sub-disciplines of art and design, and this requires further investigation” (2018:150). Viewed in these terms, the outcome space does fulfil Shulman’s criteria, and this study asserts that the technical pedagogies do represent an integral signature pedagogy within creative arts HE. The exploration of the significance of this finding extends beyond the current study. However, signature pedagogies can serve as a helpful framework for examining tensions around priorities and emerging trends (Ciccone, 2016:12) facilitating deeper examination and standardisation of technical teaching methods and approaches, leading to better informed integration with academic teaching, resource allocation, and curricula to ensure consistency and best practices.

9.7 Comparing technical and academic conceptions of pedagogies

An additional area of theory explored in Chapter 3 (Theoretical perspectives) concerned conception-based studies of academic teaching. These included the “Teaching Perspectives Inventory” (TPI) (Pratt *et al*., 2000), the “Approaches to Teaching Inventory” (ATI) (Trigwell and Prosser, 2004), Approaches to Teaching Design Subjects (Trigwell, 2002), and Drew’s (2003) adaptation and application of the ATI to creative arts subjects. Space restricts a detailed comparison of findings. However, it is helpful to briefly acknowledge commonalities and variations between the outcome space of this technician-based study and those of the academic studies (a table comparing the outcome spaces is reproduced in Appendix 13).

Two commonalities appear consistently within all four studies: firstly, each outcome space describes the same number (five) qualitatively distinct ways of experiencing teaching, and secondly, the categories span a continuum of Information Transmission/Teacher-focused (ITTF) and Conceptual Change/Student-focused Approaches (CCSF). At the ITTF end of the spectrum, The Demonstrator category of this study is broadly consistent with Pratt’s ‘Transmissive’ perspective (delivering structured content), Trigwell *et al*.’s ‘Teacher-focussed strategy (transmitting information to students)’, and Drew’s ‘Teaching is offering students a range of practical and technical skills.’ At the CCSF end, the Transformer category of this study shares traits with Pratt’s ‘Social Reform perspective’, Trigwell *et al*.’s ‘Student-focus aimed at students changing their conceptions’, and Drew’s approach of ‘Teaching is helping students to change as a person'. In each of these, the teacher's intent is for their pedagogies to initiate some change: change of society through the learner (Pratt), change of the learner's conceptions (Drew; Prosser and Trigwell), and, in this study, transforming learners' conceptions of their practice, curricula, and pedagogic norms.

9.8 The methodological contribution and clarifications

Phenomenography has a history of being advanced and developed by doctoral candidates' creative interpretation, application and methodological discussion (Åkerlind, 2018:956). While the primary objective of this study has been to increase knowledge and understanding of the commonality and variation of visual arts technical pedagogies through the design and implementation of the research design, it also offers novel and unique approaches that others can use to extend the methodology.

Engagement with literature

Phenomenographers adopt different approaches to reviewing the literature. While some conduct traditional literature reviews, others do not or only review it once fieldwork is complete (Ashworth and Lucus, 1998:421). The latter approaches are intended to avoid being influenced by prior thinking in the field (Cohen *et al.,* 2018). 'Pure' phenomenography excludes historical, social, cultural, and elements of the phenomenon being experienced and described. However, within this study of an under-examined field there was a lack of definition or theoretical interpretation of technical pedagogies. To provide what I believe was essential context and establish the gap in knowledge I engaged a historical perspective (Appendix 2) to foreground an interpretation of the contemporary context in which the topic and the participants are immersed. Through an exploration of the antecedents, chronology, and influencing factors associated with the evolution of visual arts technicians and their pedagogies, the research and its findings are presented as dynamic and evolving, continually shaped by political, economic, socio-cultural and technological factors that impact the HE sector.

I used academic literature, policy, and employment information to construct a framework (the tripartite pedagogies of environment, support, and teaching) to describe and delimit the topic and create a space to examine, reinforce, or challenge relevant literature. The development of the framework was pre-empirical and drew on a combination of my professional experience in the field and the jobs.ac.uk survey. Controls to ensure the selection, and interpretation of material remained open and neutral included regular drafting, discussion, challenge, and redrafting, with supervisors from senior and disparate fields within HE. Combined, this engagement with literature increased the study's credibility and trustworthiness by informing the research design and deepening understanding of the research topic through time, in the present, and suggesting trajectories for the future. Using the literature in this way enabled a more sophisticated and holistic theory of creative arts education to emerge. These approaches will likely be useful for phenomenographers exploring third-space roles and their contribution to learning, teaching, and academic outcomes.

Sampling

A defining characteristic of phenomenography is that it seeks to identify variation between qualitatively distinct ways of experiencing a phenomenon. Accordingly, researchers advocate for ensuring a diverse selection of participants, but few have articulated a clear method for doing so (Trem, 2017). This study combined an innovative pre-sampling strategy of harvesting and reviewing job vacancy information of the research population and explains how both research sites and individual participants were approached and selected to maximise the diversity of the perspectives within a manageable sample size.

Photography of participants

I chose to include photographs of participants to provide visibility to a notoriously invisible group and illustrate their context. Staging the photographs within participants' teaching spaces provides additional visual information that illustrates the study, augmenting the quotations used within the outcome space. This study supports Collier-Read's (2006) claim that the use of photography can extend the methodology but does so in a new and unique way. An unanticipated benefit of spending time with participants in their teaching environments was to observe authentic and unplanned encounters with learners. Other researchers considering using portraits of participants should take care to protect the confidentiality of research sites and ensure that readers cannot attribute quotes to visually identifiable individuals.

Data analysis

There are no clear or agreed-upon methods of conducting phenomenographic data analysis (Varnava-Marouchou, 2007; Tight, 2019), and the process is frequently misunderstood (Åkerlind, 2012). This lack of specificity invites critique from the research community (Richardson, 1999:53). I developed five methods in this study to simplify and clarify how phenomenographic analysis can be undertaken and reported. The first was to deconstruct Marton and Booth's analogy of coming across a deer (1997) and reconstruct it in the context of conceiving of technical pedagogies and delineated the internal and external horizons of experience and referential meaning. While not unique to this study, the detail in which these carry through to the key structural and referential characteristics included with each category has not been found in other studies. A second innovation was developing and applying the double diamond approach (Design Council, 2004) for working with large data sets aligned to Han and Ellis's (2019) four-stage sequence. The double-diamond approach provides a framework for researchers to diverge and converge to develop categories of description. The third contribution was to describe how phenomenographers can use computer-assisted analysis software (MAXQDA). The fourth deviation from traditional phenomenography was to include an aspect of context (discipline) in the quotations used to illustrate the outcome space. While this consists of fragments, I felt that including this detail provided helpful information that added to (rather than detracting from) the outcome space. The fifth contribution is the use of Rädiker and Kuckartz's (2020:51) 'flowers by the wayside' in which utterances of interest (but not direct relevance to conceptions of the research topic) are put to the side and revisited after the primary analysis. Phenomenographic convention is to disregard these points, but through retaining them, they provide additional information that may provide important contextual information to inform how readers might implement the insights in meaningful ways (described in the next section). Combined, it is hoped that these interpretations and the step-by-step detail through which they have been articulated provide future researchers with additional toolsets.

9.9 The flowers by the wayside

As Chapter 4 (Research design and methodology) highlights, a characteristic of phenomenographic analysis is that it does not attend to the frequency with which a particular conception is expressed or the strength of feeling, or emotion used to express it. This poses little issue for the theoretical and methodological contributions; but, before considering how the insights might be applied in real-world situations (the professional contribution), relevant dominant themes must be acknowledged. The most significant of these relates to participants feeling unable to describe their pedagogic activities as teaching and perceiving their pedagogies as being held in lower esteem than academic equivalents. It is noteworthy that while phenomenographic analysis (Chapter 8) does incorporate the relationships with academic pedagogies located within the external horizon of experiences, these conceptions concerned how technical and academic pedagogies interrelated rather than examine the culture, institutional systems, or relationships between job families or individual technicians and the course teams they support. The following section expands upon these points, reintroducing elements that were put to the side (flowers by the wayside) to provide additional context. The context is crucial in understanding the environments where the professional contribution of this study might be applied. It also helps to identify potential challenges and barriers that may arise in this application.

9.10 Why is it problematic for technicians to claim they are teaching?

To assert that technicians in creative arts HE are teaching has historically been contentious (Vere, 2022:41). To 'teach' as defined by the Oxford English Dictionary is "to give information about a particular subject… show someone how to do something" (OED, 2012). Ramsden (2003:86) points out, teaching is a complex matter that evades clear definition, but he lists attitudes and behaviours synonymous with good teaching that include: a desire to share love of the subject with students, ability to make the material taught stimulating and interesting, and the facility to engage with students at their level of understanding. These traits and abilities relate to the teaching rather than the contract status or job family of the teacher. The weight of evidence on this point is compelling, yet in many interviews, participants felt unable to describe their activities as teaching. The following extracts span categories, institution types, and disciplines and are presented in volume to signify breadth and prevalence:

> *I'm always embarrassed to say that I'm teaching. I don't know why because I keep on calling it demonstrating. So, you feel like you're getting a bit above yourself and using the word teaching… But I am teaching all the time… it is just a constant emphasis upon avoidance by everybody of the word teaching from your contract to your manager, to your colleagues, even though it's quite obvious that you are*

teaching, it's like everybody's in this kind of conspiracy this thing [Fashion and Textiles].

I can't say that I teach… because I'm a technician. But I can say that I instruct students on how to use the software and encourage them to try different things with it [Illustration and Graphics].

We certainly do teach. I've often wanted to call myself an educator really, I know it's very contentious issue [Painting, Printmaking, and Mixed Media].

I don't see how my technical delivery is different from the academic technical delivery… it's really difficult to know what to call myself. I feel like saying Illustration Tutor, even though that's not my role [Illustration and Graphics].

I'm definitely teaching… you're just institutionalised. But then I usually follow-up with, well, I actually do a lot of teaching to be honest with you, but we don't get recognised for that [Fashion and Textiles].

I was being sort of told... "You're only a technician" [Fashion and Textiles].

It's not that anybody said, "You are not a teacher." But if everybody keeps on calling it by a different name all the time for years on end, and then you realise that they don't really think of it like that [Fashion and Textiles].

What I do isn't regarded as teaching. Now that comes from higher up the chain of academia. Within my own course, they very much regard me as part of teaching staff, but that cannot go against recorded taught time for the students. So even though I am teaching, it can't be called that [Illustration and Graphics].

We're classed as second-class kind of teaching. It's not proper kind of academic teaching, and I think the university, rightful or wrongfully, unknowingly or knowingly backs that up [Metalwork].

These extracts reveal a striking paradox in which universities utilise the teaching of technicians while simultaneously sustaining a culture and discourse that denies that technicians teach. A participant previously referenced, (page 165) described experiencing the denial of their teaching as ‘gaslighting’. Gaslighting is a form of manipulation where an authority or dominant figure or group creates a false narrative and uses it to create an alternative reality that causes the victim(s) to question their own experiences and perceptions.

Identifying as a ‘teacher’ in creative arts HE can also be problematic for some academic staff, but for different reasons. Fortnum and Pybus (2014:4) reported (in a study of fine art academics), many “had come to feel a certain suspicion or inadequacy when using the term ‘teaching’ in relation to their roles. A preferred term by many of the speakers was ‘facilitating’ or ‘guiding’”. Participants feel these tensions in discourse and identity around the language and definition of their teaching deeply. The contractual separation between job families is clearly defined, but as the outcome spaces of studies concerning academic teaching conceptions show, the boundary between pedagogies is less clear. In Vere’s (2022) study of technicians in HE, she identified a running theme of a conceptual boundary between technicians and academia, whether that be academic staff or senior leaders/the institution itself:

> This boundary takes many forms, for example, a boundary defined by the type of knowledge technicians are thought to possess or a boundary built on a lack of status attributed to technical roles. These boundaries have meant that technicians experience different positioning in comparison to their academic colleagues, often resulting in them experiencing lower levels of visibility and recognition (Vere, 2022:5).

During interviews, participants were asked to reflect upon how they perceived their pedagogies to differ from those of their academic colleagues. Several described ‘teaching to the line.’ This phrase is used within technical communities to denote the point at which technical teaching crosses into domains perceived as academic (a simplified summary is that the line differentiates the point where pedagogies are believed to be influencing the learners’ thinking and the aesthetics of the work rather than the operation of tools, processes, materials and functions). With echoes of Plato’s ‘dividing line’ that separates cerebral and physical realms, used in this context the line is what separates academic and technical teaching. While it has never been defined and is highly subjective to individual and context, the notion of the ‘line’ has proved durable within literature and institutions, with Education in England (1997), TALENT, (2022), and Wragg *et al.,* (2023) each describing how the line was becoming increasingly blurred.

A possible explanation for the sensitivity of the word 'teaching' is that it symbolises and sits atop 'the line'. Non-academics, such as technicians, have not been considered teachers in the past (Caldwell, 2024) and similar conception-based studies have found comparable tensions concerning the pedagogies of academic librarians in Australia (Romany, 2023) and the UK (Wheeler and McKinney, 2015). Indeed, for some, such as Feather (2015:38), teaching is one of the defining factors of an academic role that differentiates the staff groupings. If, as this study proposes, technical and academic roles in creative arts HE are converging in the area of practical teaching, it will have many implications. Academic staff are likely to fear that a core element of their role can be replaced by another job family, while senior leaders will fear that re-codifying technicians as teachers will lead to pay inflation. A more sophisticated understanding of the different kinds of teaching performed by different job families can only help to remove fear and increase teaching potential that sits between and across these teams.

The external horizon examined the periphery of participants' experiences. Insights indicate that Demonstrators are more explicit on how their pedagogies can be distinguished from academics, while Transformers describe using academic approaches. Therefore, there is no clear binary line; instead, there is a spectrum with commonality, variation, and varying emphasis. The lack of definition is further complicated by what would appear to be a moving line:

> *I've worked here for 21 years, and the job has changed quite significantly… their (academic) job has changed so much that they've been taken away [from workshop teaching]. So, we bridge the gap, what academic tutors used to teach, we now teach [Painting, Printmaking, and Mixed Media].*

Participants described various ways in which they differentiated academic pedagogies from their own:

> *The academics, while they are mostly very capable practitioners, they would teach more of the theory, show them some examples and some skills. However, then they would hand the rest of the class over to me to teach them the technical skills that are required, so that would be the line that would separate us [Illustration and Graphics].*

> *Their (academic) teaching will be a lot more responding to what's been made and will be a lot more contextual. So, they'll be talking about artists or designers that students should engage with perhaps to gain more understanding of what they're doing within*

a wider context. And also, they'll be critiquing their work [Painting, Printmaking, and Mixed Media].

There was a general consensus that academic pedagogies were more likely to be concerned with the conceptual and contextual elements of learners' ideas, whereas technical roles were more orientated towards the realisation of the works (accepting this as an interplay rather than a firm line). Participants described being careful in how they approached 'the line':

> *Whereas a tutor can say, you need to change your lighting, I would say, have you thought about your lighting? So, the line is there again, I never tell them whether or not what they're doing is good or bad unless it's unsafe… a tutor might offer suggestions of what they would do, whereas I can only support the student's own idea [Filmmaking].*
>
> *I always make them aware that that's not my role to teach, to sort of give them feedback, conceptual feedback on their work… You kind of crossing the line if you do… But I will in certain occasions, because sometimes you get to know a student and you know their work just through working with them a lot [Photography].*

In these accounts, participants reveal the areas they consider to be on the other 'academic' side of the line. Conceptually, this relates to the development and contextualisation of 'learners' ideas rather than their skills, know-how, or the artefacts in which they may manifest. Participants acknowledge that academic pedagogies are more likely to be informed through engaging with and conducting academic research in the disciplinary field, which is an area that no participants described direct involvement in. These fragments also demonstrate how formative feedback is focussed upon the technical aspects of the work.

'Staying in lane' is an area of concern for all categories. Instructors and Consultants described particular sensitivity to encroaching into academic domains. Two participants (pages 184 and 198) described taking care not to "step on the academics' toes." Others expressed similar points and found the distinction between academic (conceptual) and technical (practical) teaching important and legitimate to avoid learners receiving mixed messages and delimiting roles and responsibilities. For others, ego was also described as a factor:

It could be my relationship that I have with my academic as well. I'm kind of aware not to ever make myself bigger than her. I'm very much in a supportive role [Fashion and Textiles].

Participants generally perceive academic teaching to focus upon conceptual elements. In contrast, technical pedagogies are more likely concerned with the skills, techniques, and material encounters. However, the physical (rather than theoretical) emphasis of instruction was not the sole reason given by participants for feeling unrecognised or undervalued. Critical factors related to a lack of perceived visibility, recognition, and integration with the curriculum and communication with academic teams. The lack of integration was particularly problematic for Demonstrators and Instructors, who described being asked to deliver teaching with minimal context or direction:

We have very, very little to do with the academics. I don't know how they teach because we are not involved in the sessions at all. The only exception might be during induction time when they're teaching their half and we're teaching our half, obviously across a room, we would see how they teach. In terms of how it's coordinated, it's not [Fashion and Textiles].

One of the biggest disjoints we have in technical provision. It doesn't line up with academic delivery [Photography].

This was not universal, and some participants described positive relationships and effective communication with academic teams. However, the majority reported having a high degree of autonomy in their teaching but with little or no guidance on what they should teach. In many cases, participants described developing sequences of instruction based on their assumptions of learners' needs:

I would have a chat on different things with my academic, but she doesn't really have any knowledge of that. So, basically, I just decide on how much and what way [Fashion and Textiles].

A distinction contributing to whether technical teaching is held in lower regard compared with academic teaching may not directly relate to the content or approach but rather whether it regarded as formal contact time or recognised within the formal assessment processes. This varied by participant, with some describing how their teaching activities were not integrated within the curriculum at all, while others were teaching exclusively upon assessed modules. Several participants described a blend, where some activities (such as inductions, electives, skills refreshers, and sign-ups) were not timetabled, but other aspects (aligned to module outcomes) were. For some, this lack of recognition contributes to the sense that technical teaching is not 'proper' teaching:

> *If you're an academic, you have a number of hours that you have to teach. You're on the workload model. You're timetabled. It's modulated. If you're a technician, they can just turn up [Metalwork].*

Some participants expressed frustration on the lack of feedback they received on their teaching quality and minimal involvement with the formal assessment process. In the former:

> *There's no feedback that I get from anywhere on how the session went, which is a bug bear of mine. Because it's not classed as academic teaching, the students don't have to feedback on it… I could be doing dreadfully, quite honestly [Metalwork].*

Concerning the latter, participants described limited involvement in the formal processes of summative assessment of student work, which they believed was detrimental:

> *There's a disconnect in a way where between what's happening in the workshop and the academic context. Although the academics will see a finished piece, they don't really know how much work's gone into making it [Painting, Printmaking, and Mixed Media].*

This point was put forward by numerous participants spanning all categories, however, while some saw their peripheral contribution as problematic, others described how it enabled them to have a less conflicted and more straightforward facilitative relationship with learners:

> *You're not the person who's grading them. They're not afraid of you [Fashion and Textiles].*

“They're not graded within my workshop. I play on that” [Painting, Printmaking, and Mixed Media].

These perspectives are consistent with a previous study:

Technical teaching is great because you get to help students without feeding back in a formal fashion, as a technician you can provide formative feedback and help them as they progress and assist when things are going wrong in their work, but you never have to be the one who says that their work is worth a D (Savage, 2018a:246).

9.11 The professional contribution

The theoretical framework of ‘bridging’ set out earlier contributes to a greater understanding of visual arts technicians’ conceptions of their pedagogies, and the nature of the pedagogies themselves. However, as Bell (2010:249) notes, for research findings to be put into practice, they must be presented in a way that practitioners and policymakers can understand them. In this section, insights are discussed in terms of potential real-world application from the perspective of the stakeholder groupings set out in Chapter 4 (Research design and methodology): Researchers, Government and Policymakers, Networks and Sector bodies, The HE Sector, Creative Arts Universities, Academics, Technicians, and Students. These groups are not exhaustive, and it is hoped that insights will contribute in additional and unforeseen ways.

Before detailing potential benefits within a professional context, it is important to acknowledge that research is frequently evaluated in terms of the ‘scientific holy trinity’ (Kvale, 1994) of validity, reliability, and generalisability. However, outcomes from qualitative research methodologies such as phenomenography that explore complex social phenomena are inherently problematic, given that the approach is non-positivist, subjective, uses a relativist ontology (embracing multiple realities) and engages data deriving from verbal utterances, photographs, documents, and artefacts that are not easily measured, or represented numerically. As Cossham (2017:24) notes in her evaluation of phenomenography, the positivist standards of scientific rigour should not apply to a methodology that was established to discover variation in experience. This is consistent with Lincoln and Guba (1985), who suggest ‘trustworthiness’ should be employed within interpretative research instead, which they argue is demonstrated through a combination of ‘credibility’, ‘transferability’, and ‘dependability’. Credibility relates to the ‘truth value’, relating to the fit between the participant’s views and the researcher’s interpretation of them (Nowell *et al.*, 2017). Transferability relates to the extent to which findings can be applied in other contexts (Sin, 2010). The researcher must provide the reader with sufficient detail about the phenomenon (outcome space) and its context (flowers by the wayside) to evaluate the potential transfer value of the knowledge critically. In their writing on trustworthiness in phenomenographic studies, (Collier-Reed *et al.,* 2009:9-10) argue that to be ‘dependable’, phenomenographers must ensure consistency of interpretation throughout interview conversations, during data transcription, and the constitution of the categories of description. This is distinct from the positivist measure of ‘reliability’, in which another researcher should broadly replicate the outcome. Marton (1986) argues that the categories of description are a form of discovery and that discoveries do not have to be repeatable. A further measure of phenomenographic trustworthiness is the degree to which the results can meaningfully impact societal change (Collier-Reed *et al.,* 2009:13).

In this study, I have taken care to explicate a meticulous approach, reporting the step-by-step selection, application, and limitations of methods and decision-making at all stages to provide a clear chain of evidence and reasoning that responds to the research question.

Researchers

Calls for research in this field are cited in the early chapters and are not repeated here, however, as Tight (2019:175) notes “More attention should also be given to the growing variety of non-academic staff (management and administration, support staff etc.) who contribute to the higher education experience.” This study has contributed by offering researchers authentic empirical insights into the pedagogic practices of technicians in creative arts HE. The study has built upon and extended previous research (Sams, 2016; Wragg *et al.*, 2023) providing a credible basis upon which existing educational theories can be tested in a new domain, challenged, or developed. Insights also provide a platform for new theories to evolve within the Scholarship of Teaching and Learning (SoTL). This will be of particular interest to researchers working the fields of creative arts pedagogies, technical education, and SoTL concerned with the contribution of non-academic staff to the student experience, engagement, and education.

A further area in which this study will bring value is for technicians engaging in PgCert courses. In 2024, two new specialist technical PgCert courses launch: ‘Creative Education

Technical Pathway' (UCA, 2023) and 'Higher Education Global for Technical Professionals' (University of Nottingham, 2023). This study will provide a point of knowledge to this new group of pedagogic learners and researchers through collating and consolidating relevant studies and examining existing theories of learning from a technical perspective. Additionally, the extensive references detailed at the end of this study provide an exhaustive list of texts that concern or relate to technician pedagogies. It is also hoped that other researchers from technician backgrounds will be inspired and enabled to engage in doctoral study in related areas to extend the frontiers of knowledge in this area.

Government and policy makers

The historical perspectives (Appendix 2) and contemporary context (Chapter 2) have described instances in which governments have sought to better understand creative arts education to inform interventions and policy. In '*How to engage with policy makers: A guide for academics in the arts and humanities'* the think tank Information for Government (IfG) direct policy-makers to understand and improve the prosperity and well-being of the people they serve "They are interested in the way that current circumstances affect the population as a whole, and the different demographics within it, and they seek to project to alternative futures" (IfG: 2020:6). To date, the technician population as a whole has not been well understood. Early insights from this study have already contributed to policy recommendations via TALENT (2022).

Although creative arts-based technical teaching has been acknowledged as a discrete phenomenon (Education in England, 1997; Wragg *et al*., 2023), it remains opaque and is described as blurred (with academia). Insights from this study bring the blurred areas into sharper focus at a time when the political context and prevailing narratives are focused on skills, productivity, and technical education against a backdrop of arts courses being portrayed in financial terms as 'low-value degrees' with comparatively low graduate outcomes (DfE, 2019). The emphasis described by participants on teaching real-world, current, and relevant practical skills of the creative professions (and the approaches to teaching they adopt while doing so) will be of interest to funders, policymakers as well as governments in the UK and internationally. This is timely in the UK, as DCMS announced "ambitious plans to grow the economy and boost the creative industries by 50bn" (DCMS, 2023), which builds a pipeline of future technical talent. Beyond augmenting the narrative concerning skills development and economic gain, the broader HE policy context can benefit from a deeper understanding of creative arts education's complexity, sophistication, and value, incorporating technical learning and teaching within a broader critical and transformative educational framework.

Networks and sector bodies

Professional networks and sector bodies (including The Technician Commitment, the UK Institute for Technical Skills & Strategy (ITSS), Council for Higher Education in Art and Design (CHEAD), Higher Education and Technical Education Development (HEaTED), The European Technical Heads Organisation (ETHO), and The European League of Institutes of Art (ELIA)) have expressed increasing interest, involvement, and influence concerning the activities of creative arts technicians, and their contribution to learning and teaching. In the life of this research, these interests have manifested through communications strategies, conferences, and development events concerned with the leadership and management of technicians.

These initiatives can be hampered by the ongoing sector-wide misapprehension that technicians do not teach, but even when this point is accepted, there has been no empirical framework, theories, or language to articulate technical pedagogies. The insights in this study, build upon previous research (Savage, 2018a; TALENT, 2022; Wragg *et al.,* 2023) to provide the most complete picture to date that can be used inform discourse, debate, and developmental initiatives.

The HE sector

Universities UK (UUK) describe the UK HE sector as “demonstrably world-leading in the production and application of knowledge and skills through research, teaching and innovation” (2018:4). Technicians are a significant element of the workforce and yet their contribution to learning and teaching remains obscured (TALENT, 2022). Senior leaders have relied upon anecdotal frames of reference to strategise technical teams, their development, and deliverables. Across the sector, Heads and Directors of Services find themselves in unfamiliar territories recruiting, managing, appraising, and developing teams of technical educators rather than the maintenance operatives and equipment supervisors that characterised technical roles of the past. These ambiguities constitute a risk to institutional sustainability, business continuity, student experience, and quality of education. The outcomes of this study can challenge leaders established world views, identities, and practices, while also providing a greater understanding of how technicians can be more effectively deployed, engaged and integrated. However, this integrated, synergistic, and harmonious vision of the HE workforce is not representative of the lived reality of the sector. Tensions between academic and support staff in HE are well-documented (Dobson, 2000; Dobson and Conway, 2003; Whitchurch and Gordon, 2010). Within the creative arts, Orr and Shreeve (2018:133) draw specific attention to the difficulties, challenges, and boundaries between academic and technical staff. Participant accounts offer detailed perspectives into these difficulties in relation to technician pedagogies.

The insights of this study propose and advocate for cultural and structural changes in how universities treat and manage technicians who carry out tasks sometimes deemed academic. However, implementing such strategies would significantly disrupt the status quo and creative HE landscape, surfacing complexities, inconsistencies, and contradictions, challenging existing ideologies, power structures and social contexts, resulting in large-scale cultural and organisational change. Sectoral change at this scale is unrealistic and would be met with considerable resistance from established hierarchies (Rosenburg, 2023). However, as small and specialist institutions creative arts universities are arguably better placed to implement critical changes based on the more sophisticated and holistic theories of teaching creative practices that emerges from these potentially disruptive forces.

Creative arts universities

Creative arts universities and multi-disciplinary institutions that include arts faculties stand to derive the most significant benefits from this study and its insights. This study has reified and codified information that was previously suspected by many in technical roles but lacked visibility or empirical grounding. The outcome space offers a new foundation for institutions to build a more complete understanding of the student and staff experience and develop more inclusive and effective learning and teaching strategies with the potential to enhance performance, productivity, and institutional resilience and sustainability. However, to realise these potential benefits, creative arts universities must commit to identifying, addressing, and removing the cultural, institutional, systemic, and local barriers to acknowledging, valuing, and ensuring the visibility and integration of technical pedagogies as related to the whole system of creative practice (systems and culture). While institutional change takes time and encounters resistance, more immediate gains can be implemented through smaller incremental and less controversial steps within the domains of learning and teaching and the strategic development and management of the workforce. These two interrelated areas are particularly critical, given that both creative arts higher education and technician roles are undergoing rapid change within a backdrop of technological innovation and discourse concerning the purpose and value of creative arts degrees. At the time of writing (07/05/2024), these longitudinal trends in the UK HE sector are further exacerbated by financial pressures, with fifty-three universities reporting planned reductions in academic roles (QMUCU, 2024) and the arts and humanities being identified as the areas at the most significant risk (Mitchell, 2024)

Learning and teaching

Among the most salient insights emerging from the study is that, in many instances, participants described how they were unable to align or integrate their pedagogies with the curriculum. This was particularly acute for Demonstrators and Instructors, who described devising their own curricula with limited input. This was found in all disciplines but was particularly acute in technology-led domains. A participant described being asked to teach the Adobe Suite (a vast toolset) with limited direction:

> *I've managed to get some information out of the tutors that at some point After Effects would be coming... or they want some form of moving image. I'd discuss with them, "Shall I bring it in now?" … there's a lot of, "I don't know the software, so you know when to bring it in"…it's guided by a mustard burp of information from the tutors [Illustration and Graphics].*

A further inconsistency (noted previously) is whether pre-planned technical contact time is included within structured delivery learning hours. Universities should consider engaging technicians in the formal planning of module delivery to inform the spectrum of possibilities, and jointly plan what equipment, processes, skills, and techniques should be taught, when, in what group sizes, and where, to provide learners with the knowledge and support they require to achieve the academic outcomes they will be assessed upon. Participant accounts suggest this would support a constructively aligned and integrated curricula, greater operational efficiencies, and improved staff and student experiences. However, institutions should note with caution, that change of this nature introduces a significant disruption to the status quo, hegemonies, and carries significant staffing, workload, and planning implications.

Institutions should also ensure technicians who teach are represented in the broader frameworks, discourses, and quality assurance and enhancement activities of learning and teaching. These were infrequently found within most categories, though Transformer conceptions describe how engagement with these initiatives brought value to the individuals and the wider university ecosystem.

Strategising the workforce

Souleles (2003:253) predicted "significant changes in art and design instruction will occur when the debates of the present and the influences of the past are replaced by curricula and instructional practices that reflect the new discourse on art and design education." And, as Jonathan Grant notes in his post-pandemic writing on the social purpose of HE in the 21st century (arguing third space workers will be a main driver of future staffing models), "The combination of a disaffected academic workforce with the emergence of new skills for both academic and professional staff means that radical change is inevitable" (Grant, 2021:114). Grant's perspective is consistent with the Institute for Public Policy Research in '*Higher Education and the Revolution Ahead - An Avalanche is Coming'* that describes the threat posed to traditional 20th-century universities if key institutions don't change radically, as well as the huge opportunities open to them if they do (Barber *et al*., 2013:3). Campbell-Perry argues that to grasp and actualise this potential:

> There needs to be a commitment at senior management levels to review the skills that the institutions have, and to identify development gaps and opportunities to allow more collaboration to occur within their organisations in order to deliver more collaborative cultures and more joined up student experiences. The roles may be there, the skills may be there, but the environment and culture required to effectively discharge them have yet to be fully created within HE (2022:127).

Campbell-Perry's words resonate with the insights of this study, which speak to the challenges of the invisibility of technical pedagogies, and lack of integration with academia, curricula, or university systems to develop, improve, monitor, and deploy them. For leaders to commit, as Campbell-Perry suggests they must, they need to know what they are committing to. A reformed state is for universities to reject and replace outdated staffing binaries and frameworks that reinforce 'the line' that asserts academics teach, while technicians support learning in favour of a new model in which creative arts pedagogies are devised and enacted by a unified community of educators, working collaboratively in support of the student experience, engagement, and education. It is important to acknowledge, however, that the envisioned community comprises different roles and job families that have different emphases and levels of responsibility. The purpose of the following commentary on this point, is to offer thoughts on how universities might consider acting upon the insights in their specific context.

A deceptively simple starting point is for universities to reflect upon the business functions their technicians perform, in which specialisms, and the quantity and type required. There are no sector benchmarks or agreed multipliers in common use, and no agreed workload allocation models, and HESA does not collect sufficiently granular data to report on the technical community or their activities. Numerous participants described rising student numbers that had not been accompanied by additional technical staff, reducing the time they were able to spend with students, restricting the content taught, and impoverishing experience through enlarged group sizes or shorter lessons. Some universities use a Student to Technician Ratio (STR), with multipliers based upon the intensity of the discipline, which can provide models and guidance, but in the context of this study, which concerns technical pedagogies rather than the full remit of technician roles, the defining factor is contact hours based upon what is taught, how, where, for what purpose, and optimal class sizes in which to do so. Using a model of this nature, the curriculum can be co-created between academic and technical staff and distinct job families can be developed to ensure that duties, quantities, and deployment are consistent, equitable, and proportionate. Trends observed within the five-year jobs.ac.ak vacancy survey (Chapter 5 – Data collection) indicate that institutions are beginning to recognise the contribution and trajectories of technical teaching roles. This study has presented a clear and compelling argument for the establishment for the pedagogical specialisation of the technical role within an inclusive and holistic approach to HE, that aligns with contemporary needs and values the contribution of all staff.

With a greater understanding of technical pedagogies and their integration (rather than assimilation) with academic teaching, institutions can develop nomenclature and grading in accordance with the balance of academic and technical duties that suit their mission, portfolio, and pedagogies. This knowledge has potential to aid institutions in understanding, differentiating, and communicating their unique educational approaches, to inform role profiles, job evaluation criteria, recruitment, onboarding, and targeted professional development that acknowledges and enhances these pedagogical roles. Insights can also improve talent management and career pathways while also considering more senior pedagogic roles for technicians, such as the emerging technical professorships, for example

(UoL, 2023).

The transformation and restructuring of the HE workforce is unavoidable (Grant, 2021; Campbell-Perry, 2022). For some commentators (Ball, 2013; MacFarlane, 2011), the proliferation of 'third-space' themed roles and non-academic teachers heralds further disaggregation and deskilling of academic roles, contributing to an erosion of standards. However, this study suggests more convincing arguments can be made in support of the requirement for a new ontology (TALENT, 2022:5) in which academic and technical staff collaborate within a framework of updated, shared and mutually respected epistemologies to design, define, and animate learning and teaching methodologies to enable students to flourish at university, within creative careers, and ultimately lead better lives.

For institutions that rely upon high volumes of technical or practical teaching, an enhanced integration of academic and technical pedagogies offers potential to release significant volumes of academic time, affording lecturers greater capacity to engage with scholarly activities, such as research, citizenship and subject stewardship. Institutions may also find that financial savings can be made when rebalancing staffing models. Additionally, while it has become relatively common for technicians to transition their careers into academia it is less common for academic staff to transition to technical careers. However, as the status, opportunity, and recognition of technical teaching roles increase, it is possible that practitioner teachers on academic contracts may be drawn into technical teaching roles. A participant in a former study who had moved from a technical role to an academic role reported excessive workload and their practical knowledge and skills atrophying:

> *As an academic you end up taking your work home with you which can be quite stressful. A bit of me kind of thinks back to the times that I was a technician and remembers it fondly, I could certainly go back* (Savage, 2018a:246).

Academics

Many of the contributions already described in the context of creative arts universities will be of interest, benefit, and use to academic staff. Other potential contributions to the academic community include a new perspective from which academic staff can glimpse and understand the activities that take place between technicians and learners during self-directed study. Academic staff may also benefit from gaining insight into the frustrations and challenges described by participants who perceive a lack of academic integration and direction. This may provide an opportunity for academic staff to learn about best practices and values that are exemplified within the Transformer category. Furthermore, this enhanced awareness of how technicians think about and enact their pedagogies may assist some academic staff in gaining a deeper understanding of their own.

Technicians

Researchers should be clear on how their study will advantage the participants and the wider community (Cohen *et al.,* 2018). Through this study, its individual and collective narratives and insights, technicians can come to know, better understand, talk about, envisage, share and contextualise their own pedagogies and practices within a broader framework. Insights also provide an empirical base from which technicians can cast aside self-limiting and deprecating beliefs. Most significantly, this study advances debate beyond outdated questions of whether visual arts technicians teach at all, to identifying five distinct ways in which their pedagogies are thought about and enacted.

Students

This study did not aim to examine student conceptions of technical pedagogies (this is an area for potential future studies). However, the conceptions described by participants show that technicians consider themselves to be performing a crucial role ensuring the safety, well-being, learning, and teaching of students. In relation to learning and teaching, insights from this study potentially benefit students through creative arts universities gaining a deeper understanding of technicians' contribution to their education, engagement, and overall HE experience. Specific areas with the most significant potential to improve student outcomes include structuring and timetabling curricula to introduce and apply knowledge (Demonstrator and Instructor) while also recognising and ensuring non-timetabled individualised pedagogies (Consultant, Collaborator, Transformer) are explicit and sufficiently resourced.

9.12 Problematising the findings

In this chapter, I have proposed ways in which this study can contribute to theoretical, methodological, and professional domains, while also reflecting upon real-world challenges, barriers, and resistance to change. Trowler (2015:5) points out doctoral research design and enactment takes place in the world as it is rather than the pristine and hermetically sealed world of the research methods textbook. In the following section, I seek to problematise the findings further by identifying assumptions, limitations, methodological shortcomings, omissions, and researcher positionality and bias.

Assumptions

The study is founded upon my experiences and perspectives that suggest technical pedagogies positively contribute to creative arts HE. It has also posited that technicians enjoy the pedagogic aspects of their roles and take pride in teaching. This was reflected in the sample, but it is important to note that the participants were identified by research facilitators who nominated those interested in and engaging in teaching. As previously noted, (page 233), some described being coerced into a teaching role, while others lament role creep and resent being asked to undertake what they perceive as academic work (Macfarlane, 2010) without recognition or reward (TALENT, 2022:129), leading to anxiety, insecurities, and discomfort (Romany, 2023:77). Therefore, it is possible that other categories exist that have not been identified or reported in this study.

Furthermore, this study assumed that participants provided authentic, accurate, and honest responses. As Richardson (1999) notes, this is not always the case. In one instance (page 116), detailed and comparatively uninhibited conceptions were expressed verbally during the interview but then moderated by the participant when confronted with an ‘on the record’ transcript of their words verbatim. This dissonance raises questions about whether the conceptions of practice expressed are consistent with those enacted (Kane *et al*., 2002), and whether those verified for analysis represent the participants’ true feelings, or whether they were tempered with hindsight or fear of reprisal for ‘crossing the line’.

Limitations

In section 1.6, I set out the scope and delimitations of the research enquiry, distinct from limitations (matters and occurrences that arose during the study beyond the researcher's control). Two significant limitations were the COVID-19 pandemic and the rapid advancement of artificial intelligence (AI).

This study was conducted between 2019-2024. Consequently, it was designed and implemented during the global pandemic and UK lockdowns. Fieldwork began in February 2022 (eleven months after the third (and final) national lockdown that ended on 29th March 2021) during which "The technical workforce were last out and first back in while everyone else is still safe working from home" (The Science Council, 2020:7). Participants had been teaching and supporting learning in person, blended, and online. They were asked during interviews to reflect upon their 'in-person' or 'face-to-face' teaching. A significant majority chose to reflect on recent instances of their teaching (post-pandemic rather than pre). COVID/online pedagogies were not the focus of the study. Some described developing greater levels of digital literacy and more sophisticated electronic learning resources, but these appeared to make no meaningful difference to how they conceived of their pedagogies at the time of the interviews.

The sophistication and proliferation of AI were also unforeseen when planning the research; the sample did not include technicians working in these fields. In November 2022, ChatGPT was released to the public, and subsequently, machine learning and large language models and generative AI have significantly influenced society, the creative arts, and the world of work. Since interviews were conducted, many of the participants will likely have engaged AI in their pedagogic practices.

Methodological weaknesses

In Chapter 4 (Research design and methodology), I discussed criticisms, limitations, and weaknesses of the methodology and methods employed. This discussion is not repeated here, but in reflecting and reviewing the research, it is helpful to recall that with its interindividual epistemology and focus on the collective experience, the method is not an effective model to examine how conceptions vary by discipline, personal or professional characteristics, or institution type. Factors such as power differentials (line management, relationships with academics, and peers) and between the researcher and the researched were beyond the scope. As were conceptions of role or identity.

As Cohen *et al*. (2018:132) point out, as the 'subjective' individual becomes 'objective', collective, descriptions that were once 'thick' become 'thin'. For example, a participant described designing their lesson using an escape room format, locating their learners in a context requiring them to solve problems to access new knowledge to proceed and advance their learning. Rather than position themselves as an instructor or teacher, they described taking on the role of 'gameshow' host and facilitating the lesson. The detail of individual innovation such as this are largely lost in the formation of categories of description.

Omissions

The study did not set out to explore how participants conceive of their role in interdisciplinarity. Several participants voiced that their scope included working across disciplines or, in some instances, being discipline-agnostic (Demonstrators). However, during the writing up stage, I realised that participants had predominantly focused their responses upon learners from their associated degree programmes. Minimal data was recorded about how participants engage in cross-disciplinary practices. This is potentially significant, because while academic staff are more frequently aligned to a course, year, or module, technicians are more frequently assigned to wider disciplinary fields and facilities. If a question concerning interdisciplinarity had been included it may have generated insights to expand knowledge and understanding of this area.

Researcher positionality and bias

In the introduction of this thesis I described my positionality (my interest and how my conceptions of the research topic were formed and developed) in the context of 'prior-ethnography' (Corsaro, 1982) describing potential bias to the methodology and approaches that would be employed to manage the risk. Mitchel *et al.,* (2005) assert that self-study of this nature can be a powerful tool for uncovering and discovering one's underlying values and the manner in which actions and beliefs intertwine. However, for others, these approaches have been criticised for lacking fieldwork, being "more about the 'auto' than the 'ethnography'...the apotheosis of navel-gazing, narcissism and self-absorption" (Cohen *et al*., 2018).

While recognising my bias was reasonably straightforward, managing it at the various levels of cognition, awareness, and processing was more challenging. The root of this thesis stems from my career, history, observations, beliefs, values, and worldview, and the researcher's assumptions, biases, and world views shape interpretations of experience, both our own and that of others (Mitchel *et al*., 2005). Indeed, "The inconsistency is that phenomenographic research is done within the framework of a second-order perspective, but the findings are presented according to a first-order perspective" (Cossham, 2017:25).

An aggravating factor was that while I began the research from a relatively detached position, during the second half of the study, I was appointed to lead a large team of creative arts technicians, and my professional and research worlds intersected. While I checked myself regularly and continually tested my assumptions in empirical data, it would be remiss not to acknowledge that my perspectives have significantly influenced the design and implementation of the study and the subsequent discovery and constructions of the categories of descriptions; however, as Hajar writes in his critical review of the foundations of phenomenography "No researcher is, or ever could be, a blank canvas on which interviewees draw their pictures" (Hajar, 2021:1427).

9.13 Potential areas of future research

This study is the first to explore conceptions of technical pedagogies in creative arts HE. It has generated insights that offer valuable glimpses into what, how, and why technicians teach, contributing to the theoretical, methodological, and professional domains. These learnings are likely to apply to the creative arts and the broader HE sector, not just within the UK but internationally, where comparable educational environments operate. The thesis introduces a new domain within the scholarship of learning and teaching, paving the way for new technical researchers. However, this is just a starting point that illustrates there is still much to learn about the under-examined field of technical pedagogies.

Notably, this study did not examine technicians' contribution to research, though this has been explored by others at a sector level (McLaren and Dent, 2021; MI TALENT, 2022). Like pedagogies, this is likely to be exacerbated within creative arts domains where "new knowledge in creative arts research can be seen to emerge in the involvement with materials, methods, tools and ideas of practice" (Bolt, 2010:31), and as Smith and Dean (2014:24) note "The transmission of technical possibilities through increased understanding of the method and practice is potentially one of the most valuable outcomes of the rise of practice-led research."

The rising status of technicians and their contribution to learning, teaching, and research is increasingly evident, as reflected in the present UKRI consultation on whether to include technicians and their research activities and outputs in the Research Excellence Framework 2029 (REF 2029). UKRI acknowledged during their 'Initial decisions and issues for further consultation' webinars (UKRI, 2023) that previous REF exercises did not recognise the contribution of all those who conduct, enable and support research (such as technicians). They propose that these contributions will be recorded in the future through a proposed increased weighing on People, Culture and Environment (PCE). In a separate exercise, UKRI AHRC conducted and published a study of research technical professionals working in arts and humanities research in the UK (Abdullah *et al.,* 2023), identifying a Research Technical Professional as:

> Anyone who brings indispensable specialist technical skills, at an advanced level, to a research project, i.e., professional skills that are necessary for the development, delivery and completion of the project. Depending on the project, Research/Academic Library professionals, Information systems specialists, Sound engineers, Digital technicians, Conservators, Information systems and software engineers, Archivists, Animators, Illustrators, Graphic designers, Conservators, Curators, and others may qualify for inclusion.

This study has illustrated how technicians have increasingly contributed to teaching, and the proposed expansion of the REF signifies another change that is set to recognise technicians' contribution to research. At the time of writing (06/05/2024), consultation had not yet concluded, and the REF Steering Group have indicated it will continue throughout 2025 (REF, 2024). In advance of the outcome being known, it seems reasonable to assert that research supported, undertaken, by and about technicians can expect significantly greater attention in the future than seen in the past.

Future research offers the potential to build and develop the outcome space of this study. This could include repeating the same study using an alternative methodology (to focus more deeply on the individual roles and experiences that phenomenography deprioritises). Additional studies could explore student, graduate, or academic conceptions of technical teaching to expand the hologram to a fully formed multi-dimensional portrait of creative arts technical pedagogies. Additional detail could potentially be found through an exploration of the variation and commonality between the sub-fields of the creative arts, and whether the outcomes are applicable beyond the UK, or within practically orientated STEM disciplines.

9.14 Summary

This chapter has concluded the thesis by reflecting upon its critical insights and their theoretical, professional, and methodological contributions and potential applications. I have outlined a new theoretical model of technical pedagogies in creative arts as a ‘Bridge of Realisation’ and contextualised the cultures and environments in which insights may be applied before proposing areas of future research.

In summary, of this chapter and the broader thesis, I set out to bring a new and previously ‘unheard’ perspective, or “outsider mindset” (Syed, 2011), to refresh and inform debates in arts education. As Vere notes, insider research within the technical community is unusual (2022:27) and through this study, authentic technician accounts provide a new lens that challenges the current orthodoxy via informing, interrogating, and disrupting the status quo, testing existing theory, developing new conceptions of creative arts education, and providing valuable working knowledge for the wider HE sector.

Hart describes how all research is, in its own way, unique. But it is not original. “To be original may be taken to mean to do something no one has done before or even thought about doing before” (2018:69). This study meets Hart’s criteria, it is unprecedented and brings unfamiliar voices (of technicians) on a familiar subject (learning and teaching in creative arts HE). Accordingly, it offers a modest but valuable contribution to knowledge in the field and, through doing so, seeks to change it for the better.

List of Illustrations

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Appendix 1: Publications, exhibitions, and conferences

Aspects of this Doctoral study has been shared and published in the following forms:

Keynote:	Savage, T. (2024) 'Technicians through the ages' In: *Manchester Metropolitan University 200-Year Anniversary Technicians Conference*. 22/06/2024.
Presenter:	Savage, T. (2024) 'Recognition for quality technical teaching' In: *The National Technical Teaching Symposium'*. University of Leicester. 12/06/2024.
Presenter:	Savage, T. 'How do creative arts technicians conceive of their pedagogies?' Knowledge Exchange placement. Massachusetts Institute of Technology and Rhode Island School of Art and Design. 05-07/05/2024.
Author:	Savage, T. (2024) 'Technicians as educators' In: Vere, K (ed.) *Technicians in Higher Education and Research.* London: Routledge.
Presenter:	Savage, T. (2024) 'Teaching and supporting learning' In: *Let's Talk about Technicians.* Winterfest. Online: MI TALENT. 09/01/2024.
Presenter:	Savage, T. (2024) 'Careers in creative technical toles' In: *Let's Talk about Technicians.* Winterfest. Online: MI TALENT. 17/01/2024.
Exhibitor:	Savage, T. (2023) 'Photographic portraits of creative arts technicians' In Tech X' James Hockey Gallery. UCA, Farnham. 01-31/10/2023.
Presenter:	Savage, T. (2023) 'How do creative arts technicians conceive of their pedagogies?' In: Farnham Craft Town Month - Artist Talk Series. UCA, Farnham. 18/10/2023.
Presenter:	Savage, T. (2023) 'Stakeholder Engagement' In: *CHEAD Technical Leaders Programme*. Staffordshire University, London. 25/10/2023.
Keynote:	Savage, T. (2022) 'How do creative arts technicians conceive of their pedagogies?' In: *Pick and Mix – ETHO Technical Community Conference* (ELIA). Royal College of Art, London. 22-24/02/2023.
Presenter:	Savage, T. (2022) 'Careers in creative technical roles' In: *Worlds within Worlds Then, Here and Now' UCA Student Research Festival.* UCA Doctoral College: Canterbury. 12/07/2023.
Commissioner:	TALENT (2022) *The TALENT Commission: Technical Skills, Roles and Careers in UK Higher Education and Research.*

Appendix 2: Historical perspectives

This appendix offers a historical perspective to provide a textured understanding of the research problem at different times and better understand how political, economic, social, and technological (PEST) factors have contributed to the proliferation and sophistication of technical pedagogies. It is not intended to contribute to the history of arts teaching; instead, it is used to better understand the causes of current debates and discourses and contextualise the roles of technicians, and what is currently thought of as 'technical teaching'. It begins by outlining how historical trends and trajectories can be used to illuminate the research topic by reflecting upon how technical and practical instruction has evolved in creative arts education over time, with a focus on relevant periods, including, briefly, the Medieval Guilds (applied arts as trade and manufacture), the Renaissance (elevating the status of fine arts), the period of Industrialisation (impact of technology), Modernism (the Bauhaus), the Coldstream Reports of the 1960s and 70s (academisation of art education) and post 2000 (the advancement of digital technologies).

Historical context

Ekins (2001) reminds us that what we tend to think of as the ordinary arrangement of departments, courses, and subjects has not always existed. He cautions that the danger of not knowing the history of art instruction is that the activities in our arts universities begin to appear timeless and natural. He asserts that knowledge of history allows us to begin to see the kinds of choices we have made and the particular biases and possibilities of our kinds of instruction. Elkin's point is salient for the subject of this study, which, as will be set out, has transformed, expanded, and elevated as the sector has been buffeted by political, economic, social, and technological changes.

'Technicians that teach' are a relatively recent and understudied phenomenon, but the activity under investigation (teaching of skills, technique, equipment, use of materials and processes to neophyte artists) is not. Moreover, there are rich (Western) histories of art and design education, that have informed this section, including Walker 1989; Efland, 1990; Pevsner 1991; Thistlewood 1992; Singerman 1999; Macdonald 2004; Romans, 2005; Souleles, 2013; Houghton, 2008, 2016; Lee, 2016; Williams, 2017; Dohmen, 2020. Each offer glimpses into the roots of educational practices and instruction that have become synonymous with creative arts technicians.

The following historical accounts are examined from a new epistemological perspective, specifically though a technician's lens. The lens (in the context of this thesis) focuses on teaching technique, skills, materials, tools, equipment, processes, and practice. This approach has limitations, and a point that must be acknowledged is that none of the authors cited sought to communicate the pedagogies of technicians as their aim. This is mainly because the academic/technical job families are a relatively recent creation; accordingly, they must be extrapolated from the wider history of arts education and interpolated in the present. As Shapin reports in '*The Invisible Technician,*' historians of science have shown little inclination to study the roles of technicians or other support personnel involved in making and recording scientific knowledge (1989:554). Research undertaken for this thesis has demonstrated that this also holds for the creative arts.

The Middle Ages and the Renaissance

There is no agreed origin of the creative arts distinct from the origin of humankind, or indeed, the activities of teaching art and for the most part, this falls outside the scope of the present study. However, notable historical periods provide a sense of how artists have learned and taught their practices. One of the earliest antecedents of arts instruction relevant to technicians is the master and apprentice model of the Guilds that can be traced to the latter stages of the Middle Ages (1000AD to 1300AD, also known as the High Middle Ages). "The 'artist' of the Middle Ages was a 'craftsman,' proud of executing a commission to the best of his ability" (Pevsner, 1991:21). Painting and sculpture were classified with craft trades such as tailoring and leatherwork and held in lower esteem than agriculture, hunting, and medicine. Macdonald (2004:19) attributes the lower status to the belief that painting and carving were merely craft skills, acquired by apprenticeship to the master of a shop, who, like a baker or candle-stick maker, bought raw materials and then sold for profit articles produced by the 'mysteries' of his craft.

Guild masters would accept commissions and work alongside their apprentices to realise them. Sennett describes the learning processes of the apprentice as "the absorption into tacit knowledge, unspoken and uncodified in words, that occurred there and became a matter of habit, the thousand little everyday moves that add up in sum to a practice" (Sennett, 2009:81). Once the apprentice had reached a satisfactory standard a guild certificate would be awarded, entitling the apprentice to work as a journeyman. Following an additional three or four years of training, the journeyman would be eligible to submit an exemplar of their work, a "Masterpiece." In his history of the art school curriculum, Houghton

(2016) identifies parallels between the masterpiece and the ‘Final Major Project’ of an undergraduate arts degree, suggesting that guild pedagogies continue to influence contemporary HE, describing echoes of the master’s instruction as an ‘apprentice curriculum’ which “can still be found in the contemporary art school. It continues whenever practical skills are being learned (often from a technician in a workshop)” (Houghton, 2016:3).

The Renaissance (1300-1600) is another period of critical relevance when charting artists' and craftspersons’ changing profiles and practices. The Renaissance represents the “origin of art” (Becker, 2008:353) and the “birth of the artist” (Daichendt, 2010:32). During this period, divisions between art and crafts deepened; painting, sculpture, and architecture enjoyed elevated status. Although the term ‘fine art’ would not be coined until late in the 18th and 19th centuries, Giorgio Vasari’s writings in the 16th century identify and conceptualise associated notions of artistic creativity, invention, imitation and beauty in relation to architecture, sculpture and painting (Cheney, 2017) alongside his practical directions of material and processes (Brown, 1907). Pevsner (1991:21) describes how artists became elevated from mere craft practitioners to “superior beings, bearers of a great message” during the Renaissance. Art and artists gained status, while artisans and their craft were associated with “despicable toil” (Pevsner, 1973:31 cited in Houghton, 2008).

During this period, the practical and vocational teachings of guild masters were embellished through the establishment of academies. Academies are reported to have largely maintained the atelier model emphasising arts practice. In contrast, the masters of guilds taught a trade. The earliest informal academies were established by artists who took on pupils for a fee in advance of the first independent art school (Accademia delle Arti del Disegno), which opened in Florence in 1563, followed by others across Europe, including the Academy of St Luke in Rome in 1577, various academies in Paris from 1648, and London from 1768. The average age of pupils was ten to fifteen, though some enrolled as early as six (Lee, 2016). Each academy evolved its own bespoke curriculum, but mainstays included supervised drawing from nature, plaster casts or life, and copying the work of Masters. Students of the early academies were taught through the process of observing and remaking works of masters, with each iteration requiring emerging artists to re-perform gestures, techniques and processes to ensure the technical foundation of the artist in the classical tradition was established by reoccupying the place of artists past (Ganz Blythe, 2013:116). Rembrandt is reported to have encouraged his pupils to copy his drawings meticulously. Lee (2016) describes this as a form of cloning whereby drawings by the best pupils were indistinguishable from those of Rembrandt himself. Rembrandt’s pedagogies were predominantly demonstration and imitation (comparable with the stereotype of contemporary technicians). During this period “The students were not asked to be original. Creativity in the modern sense, in which each student is helped to make something that is his or her own was not important in these stages of academy instruction” (Elkins, 2001:21).

Industrialisation

By the end of the eighteenth century, Britain had become “the workshop of the world” (Hobsbawm, 1999:25) and the leading superpower in global economics. Technological advances propelled industry and disrupted the art world, deskilling traditional craftspeople in favour of the development of the machine age, manufacturing, and mass production. Macdonald (2004) describes how curricula of the nineteenth century took two distinct forms. Like the Renaissance, the first was based upon replication (of nature - as the foundation of divine beauty and copying of classic artworks). The second was through the knowledge of conventions such as the golden section while training in geometry and technical drawing. Creativity was “condemned as ‘delusive innovation and false assumption’ or suchlike” (Macdonald, 2004:196). Teaching methods of the time facilitated imitation, conventions, and conformity, comprising of practical demonstrations and the correction of learners’ work-in-progress.

Industrialisation heralded the growth of a new English middle class with growing appetites for products and commodities of higher taste. Daichendt (2010) describes how the educational systems of art of the time were regarded as disproportionately producing fine artists, whereas the economic requirement was for applied arts and industrial design. These tensions were vociferously debated by well-known figures of UK arts education such as John Ruskin, William Morris, and Henry Cole around this time. Dohmen (2020) articulates a detailed history of this period (1700s-1880s). Sproll describes how the dissonance between the function of arts education and the needs of manufacturers prompted the first major government intervention in arts education:

> The creation of the 1835 Select Committee on Arts & Manufactures and its subsequent report are significant milestones in the development and history of art education in Britain… this committee raised key questions regarding the condition of the nation’s art, its value to the individual, its usefulness to the manufacturing industry, and art education’s contribution to the country’s economic success (1994:105).

The 1850s was a period of particular significance in the history of English arts education. The Great Exhibition of the Works of Industry and all Nations opened in 1851, intended to showcase the latest developments in science, engineering and the arts, industrial progress, as well as objects of cultural significance from Britain and abroad. A year later, The Museum of Manufactures was established in Pall Mall. The tripartite aims of the museum were to provide exhibitions and facilities for the benefit of design students, for interested members of the manufacturing populations and to educate the tastes of the public as consumers (Frayling, 2008:2010). In 1853, the museum changed its name to become the Museum of Ornamental Art before moving to its current location as the South Kensington Museum in 1857. It was renamed in 1899 as the Victoria and Albert Museum (V&A, 2024). The Royal College of Art describes how their founding institution (the Government School of Design, located in Somerset House) was radically transformed following the exhibition, as its remit expanded to accommodate the teaching of art as well as design, leading the institution to be rechristened the National Art Training School at its new home in South Kensington. The establishment of a government-directed art and design education in the service of industry provided a focus for national arts instruction that encompassed the practical and applied arts, their associated technologies, and the training of teachers. In 1896, the National Art Training School was renamed The Royal College of Art (RCA, 2023). It would eventually evolve to become the world's top-ranked art and design university (QS Top University Rankings, 2024).

A later policy intervention was The Technical Instruction Act (1889). The Act enabled local authorities to access additional funding to aid technical education through day and evening classes. The Act differentiated 'technical instruction' from 'manual instruction', the latter being defined as "instruction in the use of tools, processes of agriculture, and modelling in clay, wood, or other material" (1889:338); it also explicitly prohibited schools from teaching trade, meaning that while funds could be used to teach technical principles and skills that may be useful in industry, schools could not provide direct training for specific vocations (for example, electrical, plumbing or carpentry).

Macdonald (1992b:87) describes how, during this period in Scotland, technical art studios became established as the government diverted surplus excise duties into education. Sharp (1971) describes how this 'whisky money' as it was known, was used to develop technical and secondary education. In 1892, the Glasgow School of Art used this revenue to install and equip craft spaces. Once established, three technical art instructors were appointed for glass staining, wood and stone carving, and needlework (Macdonald, 1992b:87). This is the earliest reference to technical instructors found within the literature, but these roles were still characterised as teachers of art rather than technicians. Activities such as studio configuration, maintenance, sourcing materials, demonstration of techniques, troubleshooting, and supporting students with their work-in-progress were not deemed technical roles at the time; these tasks were regarded as day-to-day duties of art teachers. The inception of contemporary titles such as ‘lecturer’ and ‘technician’ was still many decades away, and the current categorisation of staff working in Higher Education (as determined by the Higher Education Statistics Agency (HESA) of academic/non-academic staff) would not be established for over a century.

At the same time that art and design education was responding to industrial growth, technological change continued to accelerate. These new technologies were eagerly adopted by increasing numbers of consumers in the still-growing middle class and sections of the working classes who were beginning to enjoy rising living standards. The invention of the gramophone popularised music, while Kodak’s Brownie camera (launched 1900) made William Henry Fox Talbot’s invention of photography (1834) accessible to the public. The birth of photography would fundamentally change the nature of art - particularly painting (Sontag, 1977), seeding the emergence of media as it is understood in contemporary terms. Photography was significant for the arts, technicians, and technical instruction. It required a machine (camera) and the ability to use it to realise a successful outcome.

The Bauhaus

The Guilds, Academies, and pre-1900 schools of art contribute important threads to the histories of creative arts technical instruction. However, it is the Bauhaus (established in Weimar, Germany, in 1919 by Walter Gropius) that is credited as the first art school to combine arts education with machine production (Macdonald, 2004:314) “seeking to unify what was perceived as a division of art and craft, while also bridging the schism between art and industry” (Daichendt, 2010:49). Critically (from the perspective of this study) the Bauhaus employed technicians in the wood, metal, textiles, glass, clay, and stone workshops, or “laboratories of art” (MacCarthy, 2019:143) as Gropius termed them. Bauhaus workshops were experimental spaces connecting arts, crafts, and sciences with the world of work (White-Hancock, 2022:269). Gropius rejected “traditional academic hierarchies” (MacCarthy, 2019:86) and each workshop was staffed by a master of form, responsible for aesthetic and creative matters, while a workshop master would oversee craftsmanship and technical aspects. It was common for former star students to be appointed as workshop masters. Notable instances included Marcel Breuer (Furniture), Josef Albers (Glass), Gunta

Stölzl (Weaving), and Herbert Bayer (Typography and Graphic Design). Workshop masters taught tools, materials and processes and supervised the execution of ideas while being supported by technicians. When the Bauhaus moved from Weimar to Dessau in 1925, having produced its own instructors, each workshop was overseen by an 'artist-craftsman' (Macdonald, 2004:315). This amalgamation of staffing reflected the first principle of the Bauhaus Manifesto "the intellectual, manual and technical training of men and women of creative talent for all kinds of creative work, especially building" (White-Hancock, 2022:268)." For many commentators, "the Bauhaus is by far the most important influence on current art instruction" (Elkins, 2001:32).

The work of art in its age of technological reproducibility

As the Bauhaus embraced applied and industrial arts, a conceptual movement within the fine arts was challenging the very notion of the 'work of art'. "Aestheticians developed a theory that placed the artistic character and quality of the work outside the physical object itself" (Becker, 2008:146). "It has also led to the idea that there exists some form of mental attribute known as 'creativity' that precedes or can be divorced from a knowledge of how to make things" (Dormer, 2019:18). Marcel Duchamp exemplified this movement between 1912 and 1916 via his concept of the 'ready-made' artwork. Duchamp rejected existing conventions; instead, he selected an object, signed it, and exhibited it. The most well-known of Duchamp's ready-mades was a commercially manufactured urinal that he titled 'Fountain', which he signed 'R Mutt' and displayed in a gallery. Duchamp asserted that the artefact was a work of art because the artist had declared it so (this phenomenon became known as 'nominalism' within contemporary art (Petry, 2012:8)) and negated the need for craft, design, technique, skills, or production. Duchamp's work reflected a wider art movement in which physical making, skill, materiality, and technique were subservient to the artist's cerebral intent. Some commentators, such as Lee (2016), lament this period as deskilling both art teachers and learners. Macdonald cites the architect Charles Robert Ashbee as being particularly critical of how art was being taught, referencing a 1911 Royal College of Art Committee that reported:

> The English art schools, of which the Royal College is the chief, have resulted, so far, in the creation of a certain type of official… perpetuation of a type of teacher, the Art School Master, who is divorced from the actual conditions of life and often teaches what he does not practice (Macdonald, 2004:311).

Ashbee's observations reflect the longstanding and ongoing debate concerning the purpose of a creative arts education. The comments made in 1911 resonate with the 1835 Select Committee, which stipulated that for learning to have value, it should have application beyond the institution in which it occurred. The themes remain explicit in current government policy; see, for example (DfE, 2019). In 1931, the Board of Trade appointed Lord Gorell to lead a Committee to enquire into the 'Production and Exhibition of Articles of Good Design and Everyday Use', stating "It is common knowledge, we believe, that cooperation between Industry and Art Schools is not always so close as it should be" but the only suggestion of the Committee for art schools was that the existing system be strengthened by the services of first-rate practising artists and craftsmen, in a part-time capacity (Macdonald, 2004:302). Gorell's new non-academic instructors were envisaged to bridge 'disciplines' and the 'professions.'

Theoretical knowledge within established academic disciplines was relatively static, whereas professions were evolving at a pace as technology and techniques expanded the possibilities and audiences for artists. Mass communication media developed through the increased prevalence of photography, music, newspapers, and radio. The first television pictures were broadcast in 1920. The BBC was established two years later, and in 1935, Walter Benjamin wrote his seminal text '*The Work of Art in the Age of Its Technological Reproducibility*'. Benjamin identified a synchronicity between the technological innovations of the time and the art forms they produced. Benjamin's most crucial theorising relevant to technical pedagogies was to explore "the epistemological potentialities of forms of art made possible by means of new technologies of production and reproduction" (2008:6). Benjamin describes being influenced by Bauhaus Master Lázló Moholy-Nagy's 1922 essay 'Production-Reproduction' that interrogated how equipment and technologies broadened the potentialities of artists. Moholy-Nagy drew on photography, identifying that "the automatism of the camera lens is a crucial prosthesis, an extension to the range and power of the human visual apparatus that alone can reveal to human cognition new relationships between elements of the perceptual world" (cited in Benjamin, 2008:11). Benjamin also used photography, observing that use of the machine (camera) "freed the hand from the most important of artistic tasks in the process of pictorial reproduction – tasks that now devolved upon the eye alone" (Benjamin, 2008:20). He identified that "the vital, fundamental advances in art are a matter neither of new content nor new forms – the technical revolution takes precedence over both" (Benjamin, 2008:329). The significance of photography for Moholy-Nagy and Benjamin is partly due to how the discipline's invention and expansion impacted the creative arts. Photography expanded the boundaries of how art could be created, consumed, and understood, and offered new aesthetic possibilities via new technologies.

While photography is the medium being discussed here, the same philosophical principles of extended possibilities through technologies apply across many creative disciplines.

It is notable that Benjamin's theorising of technological advances offered no insights into how artists might learn how to operate and exploit the new tools. He conceptualised new ways in which teachers and students could think about photography but did not comment on how they might teach, learn, or advance the discipline. Harold Edgerton's photographic work of the era exemplifies this omission. In 1938, Edgerton (an electrical engineer and former technician) invented a multiple-flash stroboscopic technique to capture the movement within the swing of golfer Bobby Jones in his well-known high-speed image. Two decades later, Edgerton invented the electronic shutter, enabling him to create his iconic 'milk drop' image (1957) and 'bullet through apple' (1964), creating new tools for humanity to see and understand the world. Notably, Edgerton's technical innovations are now considered valuable commodities of high art and exhibited globally (MoMA, 2023).

Around the same time, Edwin Land invented the Polaroid process (1937). Polaroid captured the essence of the technical dichotomy. Photography of the era was complex and required knowledge of physics, light, chemistry, process, and technique; it afforded infinite options for experimentation and unlimited potential for unique and crafted images. Polaroid, by comparison, was straightforward, providing "Pictures in a minute!" (Bonanos, 2012) but severely limited the artistic possibilities and aesthetic outcomes. Anyone could take a Polaroid, or as George Eastman, founder of Kodak had put it, "you press the button, we do the rest" (Kodak, 1888), but only those with technical knowledge of the camera and darkroom skills could envisage and exploit the full possibilities of the medium.

The impact and disruption of emerging technologies on the creative arts sector and the subsequent impact on arts education was a global phenomenon. In the US, Kenneth Hudson (Dean of the School of Art at Washington University) lamented in 1955 that commercial arts and industrial design "carry the taint of professionalism and are therefore inconsistent with liberal arts ideals" (Singerman, 1999:152), suggesting that these were poorly supported in education, because "in these fields the absence of highly developed technical skills and understanding cannot be disguised – and these demands the college department cannot meet" (Singerman, 1999:152). Hudson's experiences seeded the requirement for staff with technical skills and understanding, distinct from the teachers. Few art schools taught film and photography before the Second World War (Elkins, 2001), but since the 1950s, these technologies and the technicians who supported them proliferated.

The Coldstream fracture

In 1957, the UK Minister for Education, David Eccles (who would later serve as Minister for the Arts between 1970-73) established a National Advisory Committee on Art Examinations to advise on all aspects of art education. In 1959, the National Advisory Council on Art Education (NACAE), led by Sir William Coldstream, was established to consider the Committee's recommendations and a ministerial recommendation that a new diploma of a higher standard should replace the National Diploma in Design (NDD). Coldstream's Report (MoE, 1960) recommended that arts education be formalised with a one-year Pre-Diploma course (retitled 'Foundation' course by the 1965 addendum) and a three-year Diploma in Art and Design (Dip AD). Coldstream specified that these courses should be "approximate in quality and standard and achievement to a university course leading to a first degree" (MoE, 1960:1).

Coldstream's recommendations stated that students should spend approximately fifteen percent of their learning on the history of art and complementary studies. However, the teaching approach to the remaining eighty-five percent focused on the practical aspect of the discipline. The report emphasised technical training, stating that "the general aim of all these courses should be to train students in observation, analysis, creative work and technical control through the study of line, form, colour and space relationships in two and three dimensions" (MoE, 1960:1). Although the theoretical component was a relatively small element of the curriculum, it was transformational, but not universally popular. The inclusion of the historical and theoretical elements within the curriculum established what might now be thought of as a tripartite of instructor specialisms comprising contextual studies lecturers, practitioner lecturers, and technicians. For Macdonald, this revised emphasis represented "a swing away from vocational, useful, and specialised design education…away from the needs of society and towards a 'liberal' type of art education dominated by high art and tall talk" (1995a:20).

Yeomans, in his PhD thesis that examines this period of arts education, attributes the inclusion of the more technically orientated aspects of the Coldstream Report to Victor Pasmore, a prominent British artist and influential committee member. Pasmore, who was a powerful figure in education at the time, was a strong advocate of basic skills of form, colour, structure, and perceptual processes. He was also persuasive in putting pressure on other committee members. Yeomans (1987:178) points out that Pasmore resigned from the Coldstream Committee when it recommended basic form teaching in the first year, but not subsequently.

Coldstream acknowledged the rising importance of media, stating “We draw special attention to the value of photography. We regard as important the provision of adequate facilities for the creative as well as the technical use of this medium in this and other fields” (MoE, 1960:7). Coldstream embraced skills teaching, and for some commentators, such as Brown (2018:482) Coldstream sought a balance between creativity and technical skill, “warning that an over-emphasis upon pure training will result in obsolete skills.” For others, rather than providing a balance, Coldstream’s Report caused a “historical fracture in the art and design curriculum” (Kill, 2006:313). “It was a change that had massive implications for art education, in particular for the relationship of studio practice to art history and theory” (Candlin, 2001:3). Aspinall describes Coldstream’s first report “as a graspable moment of displacement in the British art world” (2014:1). In which disciplined studies of techniques and crafts were superseded by conceptual thinking and design. These shifting relationships would dramatically change the role of the art teacher while also creating the conditions in which technicians would quietly evolve their teaching practices.

In his final report (MoE, 1970), Coldstream drew reference to the impact of newly formed polytechnics upon art education, acknowledging the distinction between arts education and preparation for employment. The formation of the polytechnics was unpopular with many, in his infamous article ‘Murder of the Art Schools’ for The *Guardian*, the painter and critic Patrick Heron (1971) described the process as “A disaster of massive proportions... (that would deprioritise)… economically justifiable skills and disciplines and indeed trades.”

Concerning technicians, Coldstream noted “In the field of art and design education it is more difficult to define the role of the technician than in some other areas of further education” (MoE, 1970:26), crediting the status, importance, and value of technical roles and drawing specific reference to “new materials, techniques, and application, engaging skill, judgment, initiative, responsibility and creativeness” (MoE, 1970:28).

Coldstream’s 1970 report concludes with a note of dissent from Sir Nikolaus Pevsner, who rejected that the fifteen percent of “strictly intellectual or, we might say academic pursuits” (MoE, 1970, 48) was sufficient. For Pevsner, knowledge and facts provided the clarity of thought and expression sought within arts education. For Brown (2018:480), Pevsner’s dissent illustrates the “historical context for the nuanced relationship between technical and vocational skills and the academic and intellectual purpose of creative education that still has implications for curriculum today.”

Post Coldstream

The 1970s brought a “golden era” (Tight 2010) for the HE sector. Academic knowledge was elevated in status, as were the staff who generated and taught it. Pevsner’s concern that theoretical study would be deprioritised post-Coldstream appeared largely unfounded. Writing in 1973, Macdonald observed:

> It is possible under the present system for a student to pass right through the course from a fine art orientated Pre-Dip. course to a final year painting without ever designing and completing any artefact in general use, from a representational book illustration to a common pot (1992a:20-21).

For Goodheart (2020:182), the 1970s marked the start of a general societal shift towards physical passivity and declining skill levels due in part to emerging technologies, resulting in artists unable to draw, and musicians unable to play instruments. Christopher Frayling (Rector of the Royal College of Art between 1996 and 2009) also criticised deskilling within art and design colleges, founded initially to train designers for the manufacturing industries, but which “rapidly turned into finishing schools for fine artists and fine art workmen” (Frayling, 2017:53).

The late 1980s and early 90s brought rapid expansion in university participation, and in the 1990s the Further and Higher Education Act (1992) permitted thirty-five polytechnics to become universities. Until this time, the academic culture that had developed within universities had little impact on the art school sector, and little attention had been given to research (Rust *et al.,* 2007). This was borne out by the 1992 Research Assessment Exercise (RAE), in which the outputs of newly established arts universities consisted predominately of applied knowledge undertaken within industrial or professional practice contexts (Brown *et al.,* 2004). However, as art schools expanded their focus to pay greater heed to academic scholarship and the theoretical merits of a liberal education, the requirement for students to be taught the practical elements of making declined.

Michael Newall, author, lecturer and philosopher of arts education described his schooling in the mid-1990s “I went to art school because I wanted to be an artist… Little did I know that my teachers mostly didn’t have these skills to pass on, as their art schooling had also failed to give them any grounding in traditional techniques” (2021:1). Continuing, “The deskilling of art schools reflects and reinforces what is known as deskilling in contemporary art, which on the whole makes much less use of these crafts and techniques than it has done in the past" (Newall, 2021:13). He questions, "what learning can take place in such an environment, where training in skills has been so reduced, and where such freedom is allowed?" (2021:2). Newall's comments contribute to debates of conceptual art rather than technical teaching, but he surmises that if art can be taught (contrary to Elkin's (2001) view that it cannot) two things, at the very least, are necessary: 1. a concept of art needs to be instilled, and 2. the means to make objects that accord with that concept need to be taught. In the contemporary arts university, the former is exclusively attributed to the academic teaching team, while the latter is more likely (but not exclusively) taught by technicians (or professional artists on part-time contacts).

Digital technologies

The 1990s heralded the beginning of a digital revolution that would change how artworks were created, shared, and experienced. Technology, technique, and technicians would become fundamental enablers in creating and publishing content and artworks within industry and education. Apple released the Macintosh in 1984, transforming the design industry, trivialising hard-earned drawing skills (Maeda, 2002:12). Adobe released Photoshop 1.0 in 1990, providing professional imaging software to industry, home, and educational markets. Computer game design, production, and consumption expanded exponentially during this period; Sony's Playstation (launched in 1994) was the first platform to ship 100 million units globally (Statista, 2024), delivering immersive gaming experiences comparable in sophistication and graphics to film. In 1995, the first entirely computer-animated film (Disney Pixar Animation's Toy Story) established digital animation as a credible cinematic medium. In 1998, Apple released the first iMac, allowing (sufficiently affluent) art students to have a professional toolset of a Mac, production software, internet access, and printer. At the turn of the millennium, Nikon released the first professional-level Digital SLR (the D1), and in 2004, sales of digital cameras exceeded film for the first time.

Just as the 1990s had digitised much of the production of artworks, the 2000s would do the same for disseminating them. Facebook launched in 2004, YouTube (2005), Twitter (2006), Netflix (2007), Instagram (2010), and TikTok (2016). These technologies were disruptive, demanding new, dynamic, and unfolding knowledge while providing expanding outlets for creativity and commerce. Participation relied on continually updating conventions, platforms, technologies, and know-how. In 2007, the first iPhone launched, heralding an era in which smartphones propelled photography, filmmaking, and an ever-expanding diverse range of creative tools enabling users and communities to innovate, connect, and share media, through global networks at speed and scale.

As an early career technician working in a creative arts university, I observed this change and its impact on technicians first-hand. While still a relatively junior staff member in the 2000s, I was co-opted to university committees and decision-making forums that would prioritise, procure, and install major capital investments in creative technologies. Lewis describes how in these instances technicians contribute to the “absorptive capacity” (Lewis, 2023:4) of the university, meaning their ability to make effective use of new technology. My role was often able to understand, explain, translate, and mediate between academic teams, professional services departments (Estates, Finance and IT), and suppliers.

This period is described by Orr and Shreeve as “the digital turn” (2018:30). Technological innovations proliferated within creative arts institutions to attract and educate students for emerging industries. Souleles (2013) describes how, during this period, within art and design, learners were becoming comparatively more computer literate than their lecturers. Maeda (2002:42) describes an emerging “segregation of creativity and technology” in HE, creating “an entire generation of disillusioned pre-computer design educators who feel increasingly irrelevant and are retiring en masse” (2002:12), unable to provide skills they do not have without support from technicians (Shreeve, 2008:122). This technological knowledge vacuum was problematic for students who demanded value from their fees raised following the Browne Review (BIS, 2010).

Nevertheless, technologies advanced exponentially, bringing new subject areas and unanticipated possibilities to existing disciplines. Lewis notes that the effective deployment of technology to bring about improved operational performance depends upon the ability of technicians to install, adapt, operate, troubleshoot, and maintain it (Lewis, 2023:4). Recruiting specialist teachers in technological disciplines proved problematic, as the market value of the requisite skills were beyond university pay structures. Many universities and art schools, (including my employer) found that the most credible teachers of these technologies were a combination of sessional lecturers and those with the deepest and most profound knowledge and passion for them: the technicians.

The student body also expanded and diversified during this period, partly due to increased international students in the UK and the widening participation (WP) agendas. The latter was formalised by the establishment of the Office for Fair Access (OFFA) to support students from disadvantaged backgrounds under the Higher Education Act (2004) and The Equality

Act (2010). Subsequent policy interventions induced the implementation of Access Agreements (2015), superseded by Access and Participation Plans (2019), which are mandatory for every provider who wishes to access public funding to "improve equality of opportunity for underrepresented groups to access, succeed in, and progress from higher education" (OfS, 2023a). These changes in technologies and learners impacted upon what is taught in creative arts universities, and how, and the roles created to do so.

Summary

The golden thread running through these selected histories demonstrates that values ascribed to forms of knowledge and teaching in the creative arts have fluctuated in purpose and esteem at different times. Before the establishment of academies, art was simply another form of trade. Masters and guild teachers taught skills, techniques, and artistry for industrial and commercial applications. It is relatively recently that the creative arts have been interpreted as academic disciplines, heightening tensions relating to their meaning, value, and purpose. Successive governments since the Select Committee of 1835/36, Coldstream in the 1960s, Dearing in the 1990s and more recently Dr Philip Augar's Post-18 Education and Funding Review (DfE, 2019) have sought to intervene to align arts education (and education in general) with manufacturing and the productivity of citizens. Technological advances have proven to be critical enablers to the practices of creating artworks, and new disciplines have developed the pedagogies of technological specialists.

Appendix 3: Introductory email to research facilitators

Dear (insert name),

I am the Director of Technical Learning at the University of the Creative Arts (UCA). I am also a doctoral candidate with a research interest in the teaching activities of technicians. My research question is ‘How do creative arts technicians in higher education conceive of their pedagogies?’ My thesis aims to examine variation in what technicians teach, the teaching methods they employ, and the philosophical underpinnings and values that inform their approaches to teaching.

The value of my research is that it explores a highly significant but under-researched activity with direct influence upon the experiences and outcomes of creative arts students. Research of this nature exists for academic teachers, but this is the first UK-wide study of technical teaching. Insights are anticipated to disrupt, challenge, and offer a new (non-academic) epistemological lens through which to view existing knowledge and frameworks of creative arts pedagogies.

The sample includes eight UK-based institutions, including the University of (insert here). I am contacting you to ask if you would be willing to suggest potential participants. The sampling approach seeks a diverse population encompassing arts, craft, design, media, and digital and analogue specialisms (exclusions include performing and literary arts). Participants should also have a minimum of two years’ experience, and if selected, be comfortable in reflecting in detail upon their conceptions of and approaches to teaching. I am seeking up to six recommendations from each institution, and the eventual selection will be informed by the principle of maximising the diversity of perspectives.

If you are willing to suggest potential participants, please reply to this email with names, job titles, and email addresses. Upon receiving your recommendations, I will contact each person directly, supplying participant information document and Informed Consent form explaining my research (attached to this email for your information). The study is being conducted following UCA’s ethical approaches and standards.

Those wishing to participate will be asked to complete a short survey and asked if they would be prepared to meet with me. If they accept, I will ask them to attend an interview (lasting an hour) between February and July this year. I would be grateful if you could grant time for the interviews to take place during working hours.

Lastly, when the research is concluded, I will seek to share the outcomes with the sector. I welcome your suggestions of achieving this aim within (insert institution), and within any other HE networks that you may feel this research resonates with?

Thank you and best wishes, …

Appendix 4: Introductory email to potential participants

Dear (insert name),

I am a doctoral candidate at the University for the Creative Arts (UCA) with a research interest in the teaching activities of technicians. My research question is ‘How do creative arts technicians in higher education conceive of their pedagogies?’ My thesis aims to examine variation in what technicians teach, the teaching methods they employ, and the philosophical underpinnings and values that inform their approaches to teaching.

The value of my research is that it explores a highly significant but under-researched activity with direct influence upon the experiences and outcomes of creative arts students. Research of this nature exists for academic teachers, but this is the first UK-wide study of technical teaching. Insights are anticipated to disrupt, challenge, and offer a new (non-academic) epistemological lens through which to view existing knowledge and frameworks of creative arts pedagogies.

The sample includes eight UK-based institutions, including the University of (insert here). I contacted [insert name of research facilitator] and they recommended that I speak with you. Therefore, I am writing to ask whether you would be willing to participate in the study. If so, please register your interest via this Google Form: (link redacted).

The form requests some addition information relating to both professional and personal characteristics. The purpose of requesting this information is to maximise the diversity of perspectives and experiences of participants. Upon receipt of the form, I will shortlist and make contact again to request a convenient date between February and July this year for me to visit and interview you (no longer than an hour) at the (Institution). (The research facilitator) has kindly agreed to allow time off for selected participants to attend the interview.

The research is being conducted in accordance with UCA’s ethical approaches and standards and I attach a copy of the Participant Information and Informed Consent form that explains more about my research. If you take part, you will be required to sign the Informed Consent form at the start of the interview. Please also note, that consent must be given freely and voluntarily. No harm will occur if you do not wish to participate, and your institution will not be informed of your decision.

I do hope that this opportunity to engage with research into technical teaching is of interest to you. If selected, your experiences and voice will contribute to a greater understanding of what, how, and why technicians teach in the creative arts.

If you have any questions or concerns, please do get in contact. I look forward to hearing from you.

Thank you and best wishes, …

Appendix 5: Google Form inviting disclosure of characteristics

This form is used to record characteristics of potential participants in Tim Savage's doctoral study 'How do creative arts technicians in higher education conceive of their pedagogies?'

1. What is your name?

2. Please confirm your email address

3. Are you interested in participating in this research?

   Mark only one oval.

   - Yes
   - No

4. Please confirm your job title

5. Which institution do you work for?

Mark only one oval.

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- Other: __________

6. How many years have you worked in a technical role inducting, demonstrating, or teaching students?

Mark only one oval.

- 0-2
- 2-5
- 5-10
- 10+

7. Please confirm the main disciplinary areas in which you teach upon (select all that apply).

Tick all that apply.

- [ ] Art (Fine Art, Illustration, Painting, Sculpture, Printmaking)
- [ ] Design (Graphic Design, Advertising, Interiors, Architecture, Product Design, Furniture Design, Fashion, Make-up, Curatorial practice)
- [ ] Media (Photography, Film-making, TV/Broadcast, Journalism, Marketing, Animation, Computer Games, Media Studies, Sound Design)
- [ ] Crafts (Jewellery, Ceramics, Textiles, Glass, Metalwork)
- [ ] None of the above
- [ ] Other: ____________________

8. Do you have a teaching qualification

Tick all that apply.

- [ ] No
- [ ] Yes - PGCE
- [ ] Yes - Associate Fellowship of the Higher Education Academy
- [ ] Yes - Fellowship of the Higher Education Academy
- [ ] Yes - Senior Fellowship of the Higher Education Academy
- [ ] Other: ____________________

9. How many days per week do you work?

Mark only one oval.

- 5 - Full time (1FTE)
- 4 (0.8 FTE)
- 3 (0.6 FTE)
- 2 (0.4 FTE)
- 1 (0.2 FTE)

10. Please confirm your age

Mark only one oval.

- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+
- Other: ____________________

11. Which of the following best describes your gender identity? Please select all that apply

Tick all that apply.

- [ ] Man (including trans man)
- [ ] Woman (including trans woman)
- [ ] Non-binary
- [ ] I prefer to self-describe
- [ ] Other: ____________________

12. Does the gender you live in match the gender you were assigned at birth? Please select one

Mark only one oval.

- Yes
- No
- Prefer not to say
- Other: ____________________

13. Which of the following best describes your sexual orientation/preference? Please select one

Mark only one oval.

- Bi/Bisexual
- Gay/Lesbian
- Heterosexual/Straight
- Queer
- Prefer to self-describe
- Prefer not to say
- Other: ____________________

14. Which of the following best describes your ethnic group? Please select the option that best describes your ethnic group or background

Mark only one oval.

- White - English
- White - Scottish
- White - Welsh
- White - Northern Irish
- White - British
- White - Irish
- White - Gypsy or Irish Traveller
- White - Roma
- Any other White background
- Mixed – White and black Caribbean
- Mixed – White and black African
- Mixed – White and Asian
- Mixed – Other
- Asian or Asian British – Indian
- Black - African
- Black - Caribbean
- Black - Other - please describe
- Arab
- Any other ethnic group, please describe
- Other: ______________________

15. What is your religion, faith or belief? Please select one

Mark only one oval.

- None
- Atheist
- Buddhist
- Christian (including Church of England, Catholic, Protestant and all other Christian denominations)
- Hindu
- Jewish
- Muslim
- Sikh
- Prefer not to say
- Other: ____________________

16. Do you consider yourself to have a specific learning disability, other disability, impairment or long-term health condition? Please select one

Mark only one oval.

- Yes
- No
- Don't know
- Prefer not to say
- Other: ____________________

17. Please describe your disability, impairment or long-term health condition. Please select all that apply

Tick all that apply.

- [ ] Physical impairment, such as using a wheelchair to get around and/or mobility difficulties
- [ ] Blind or partially sighted
- [ ] Deaf or hard of hearing
- [ ] Mental health difficulties, such as depression or schizophrenia
- [ ] Learning difficulty (such as dyslexia, dyspraxia)
- [ ] Profound and/or multiple learning difficulties
- [ ] Autistic Spectrum Disorder
- [ ] An unseen disability or health condition e.g. diabetes, epilepsy, asthma, HIV
- [ ] A disability not listed above
- [ ] Prefer not to say
- [ ] No known disability, impairment or long-term health condition
- [ ] Other: ____________________

18. The EU General Data Protection Regulation (GDPR) and the UK Data Protection Act 2018 govern the processing (acquiring, holding, using, etc.) of personal data in the UK. I consent for my data responses (which include 'Special Category Data') to be stored securely and processed (used) by the researcher for the purpose of inform sampling (who will be selected to participate in the research). A DPIA is available here: [redacted]

Mark only one oval.

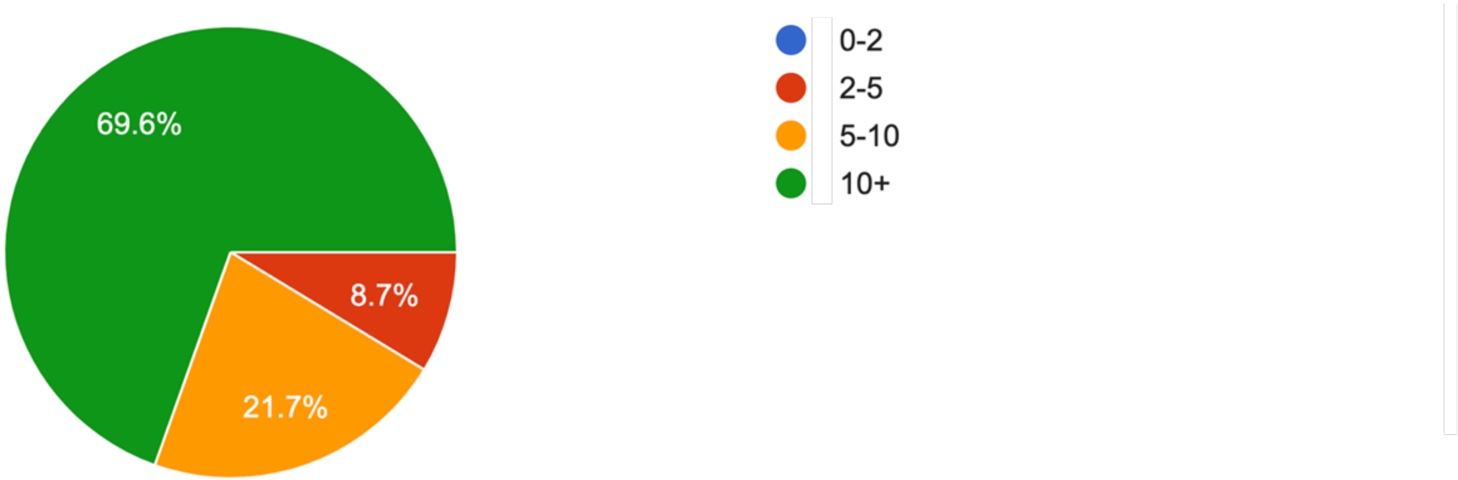
- ( ) I provide consent
- ( ) I DO NOT provide my consent

Appendix 6: Participant characteristics

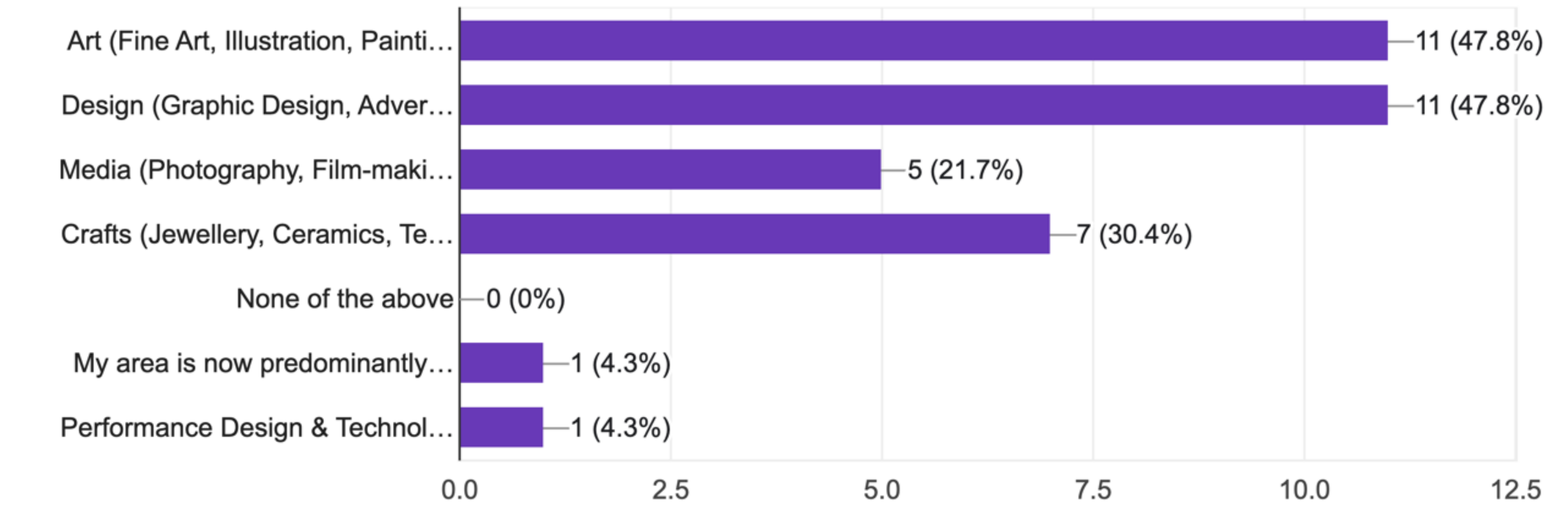
This appendix details the professional and personal characteristics disclosed by participants:

Which institution do you work for

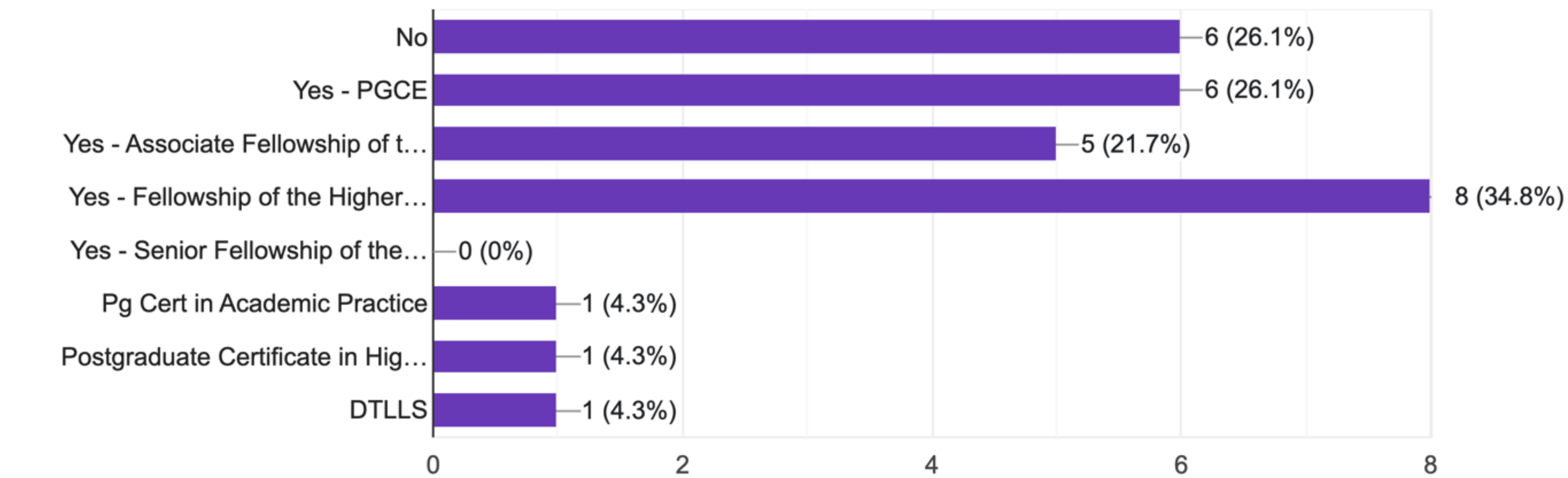
How many years have you worked in a technical role inducting, demonstrating, or teaching students?



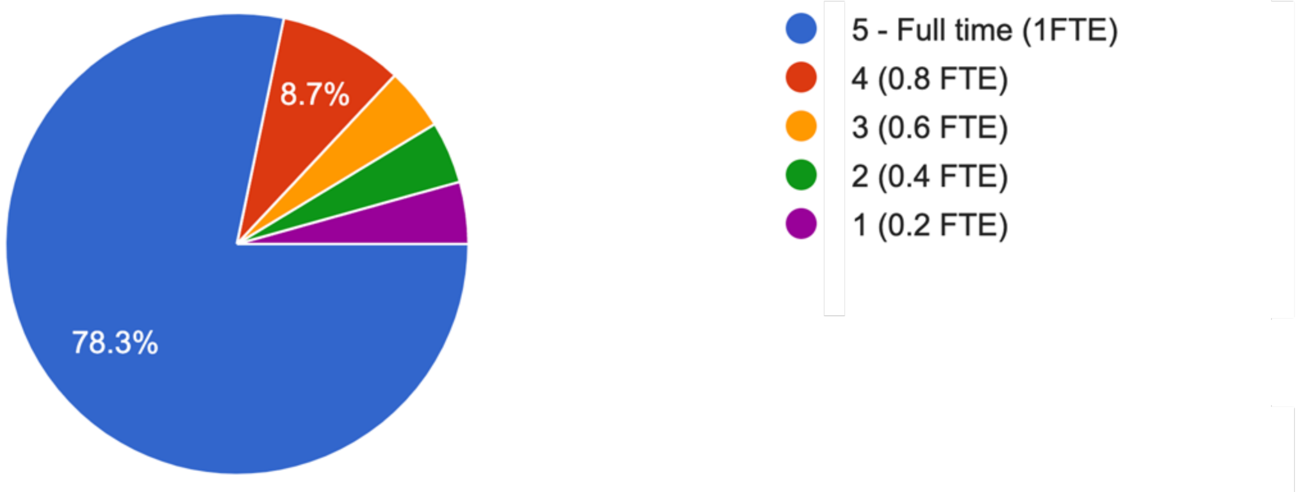
Please confirm the main disciplinary areas in which you teach upon



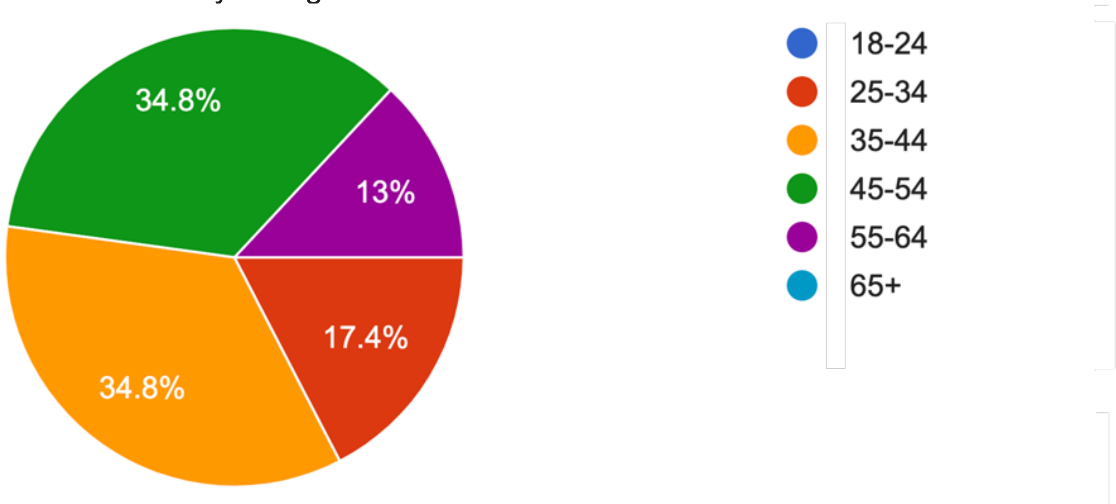
Do you have a teaching qualification?



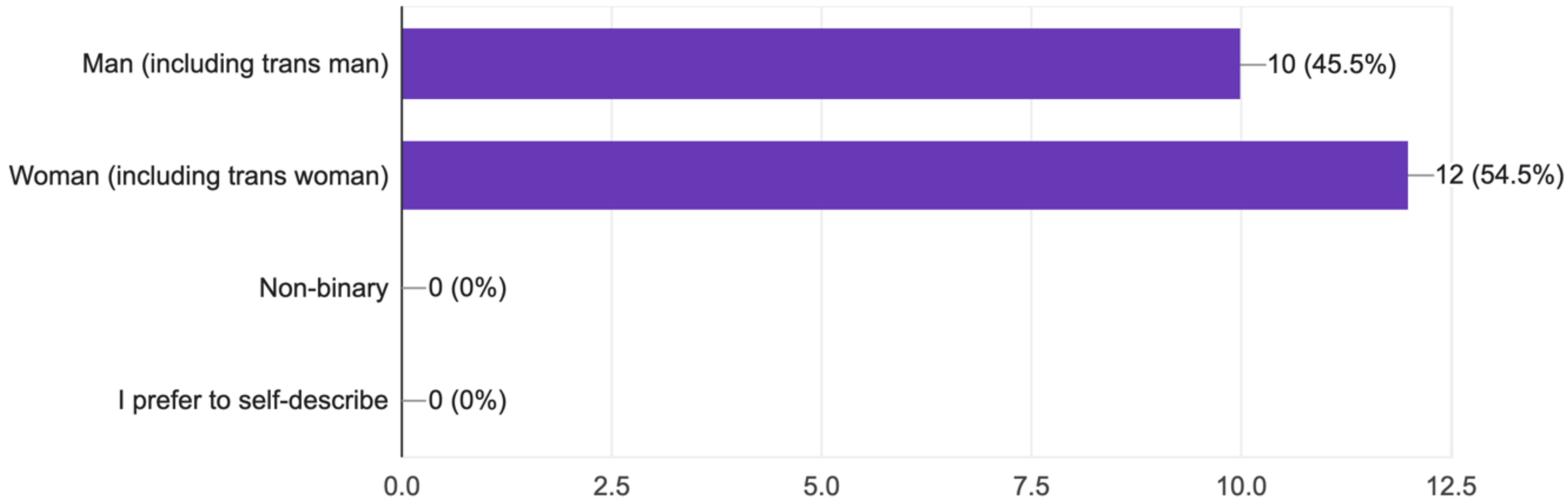
How many days per week do you work?



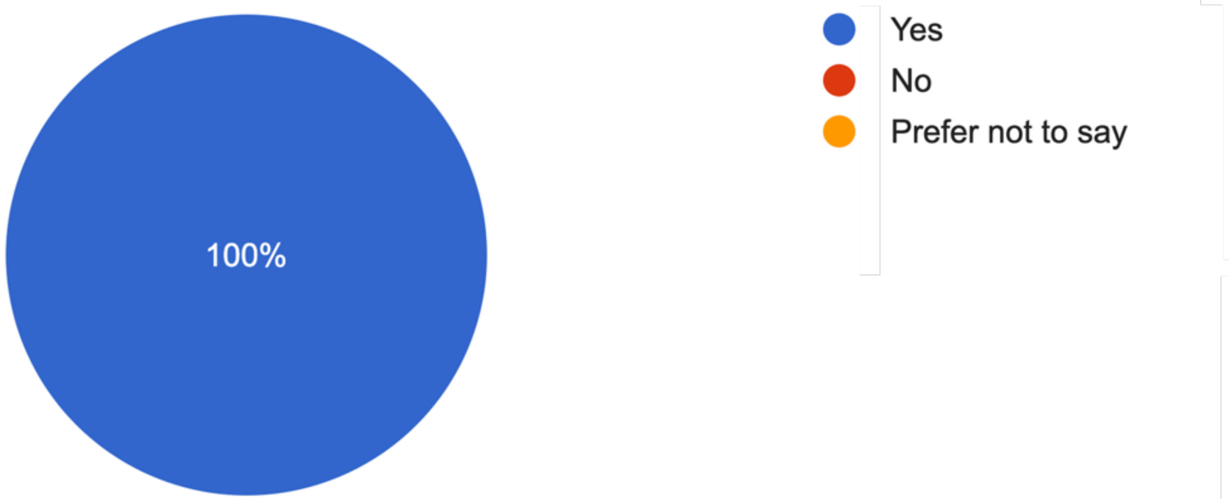
Please confirm your age



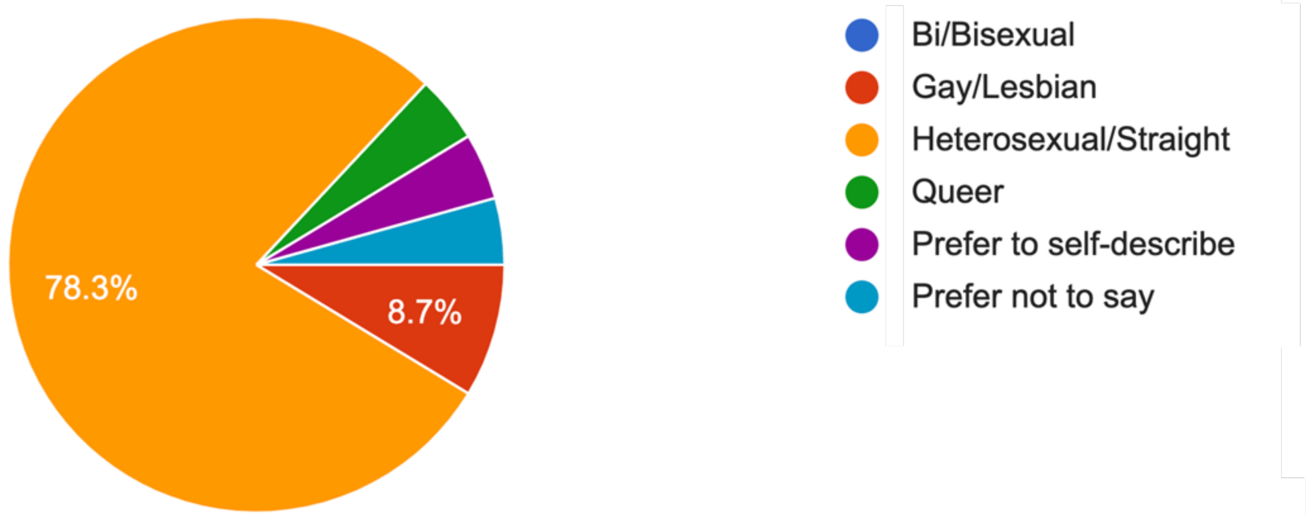
Which of the following best describes your gender identity?



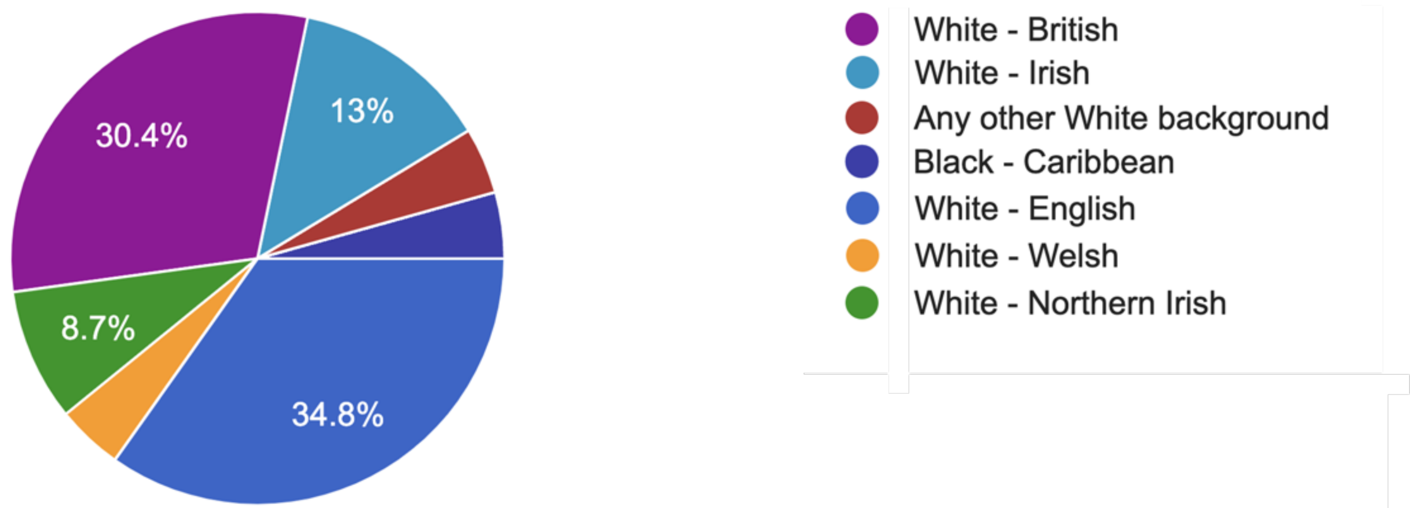
Does the gender you live in match the gender you were assigned at birth?



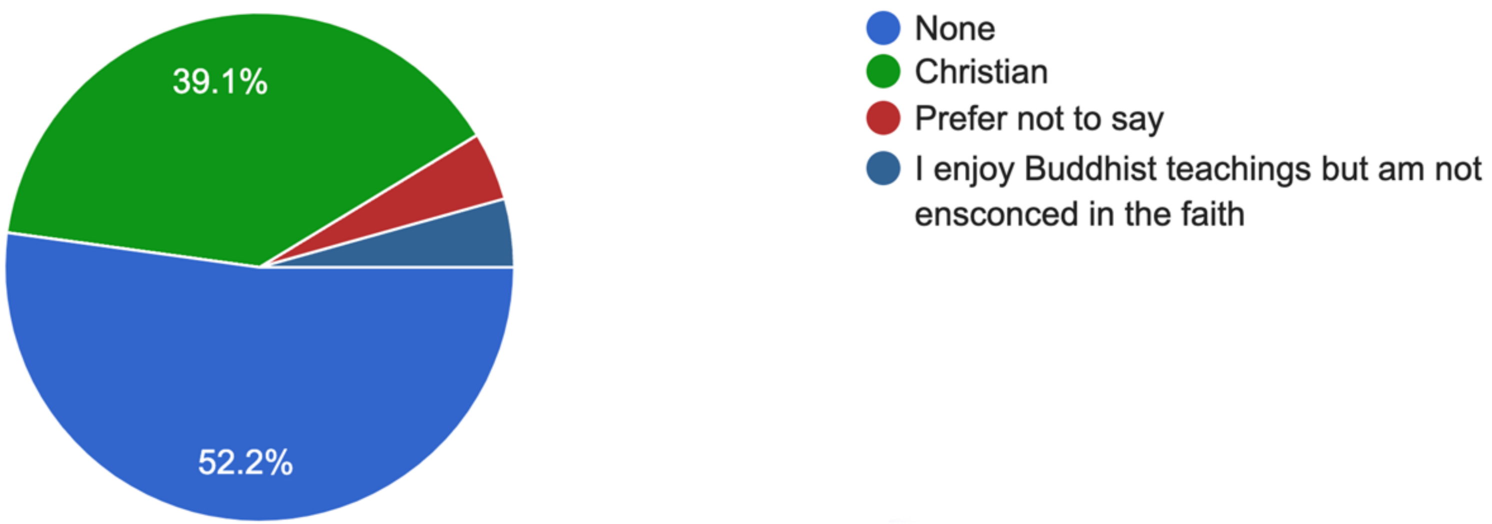
Which of the following best describes your sexual orientation/preference?



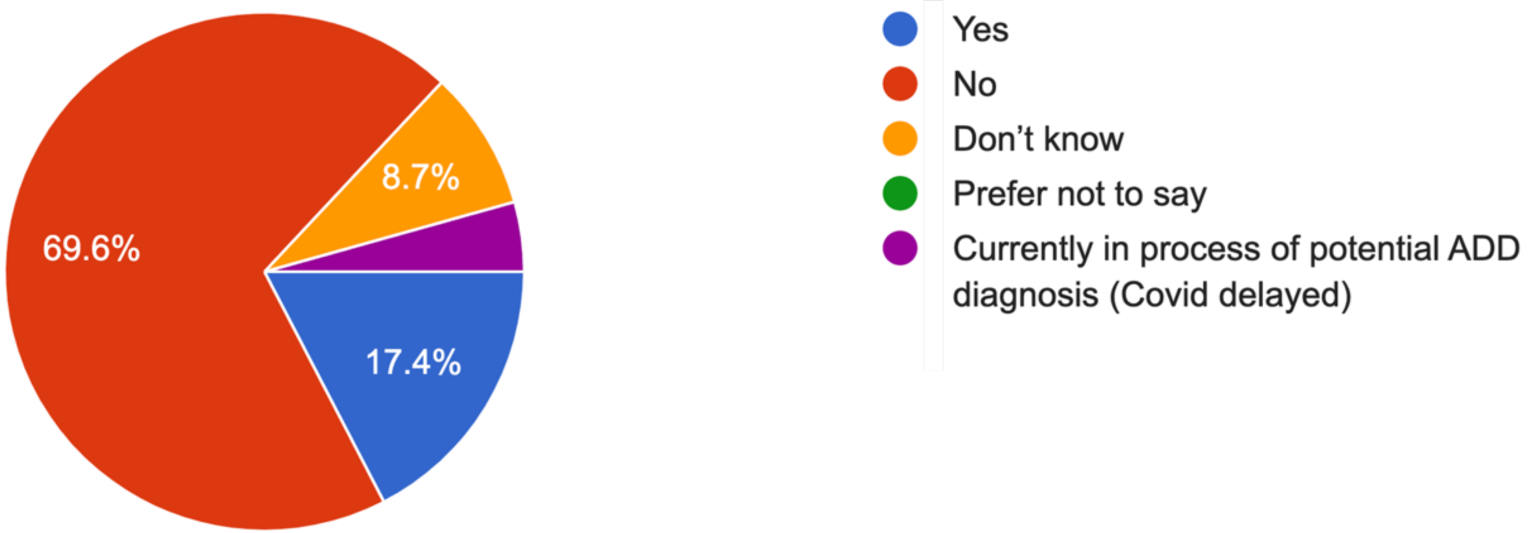
Which of the following best describes your ethnic group?



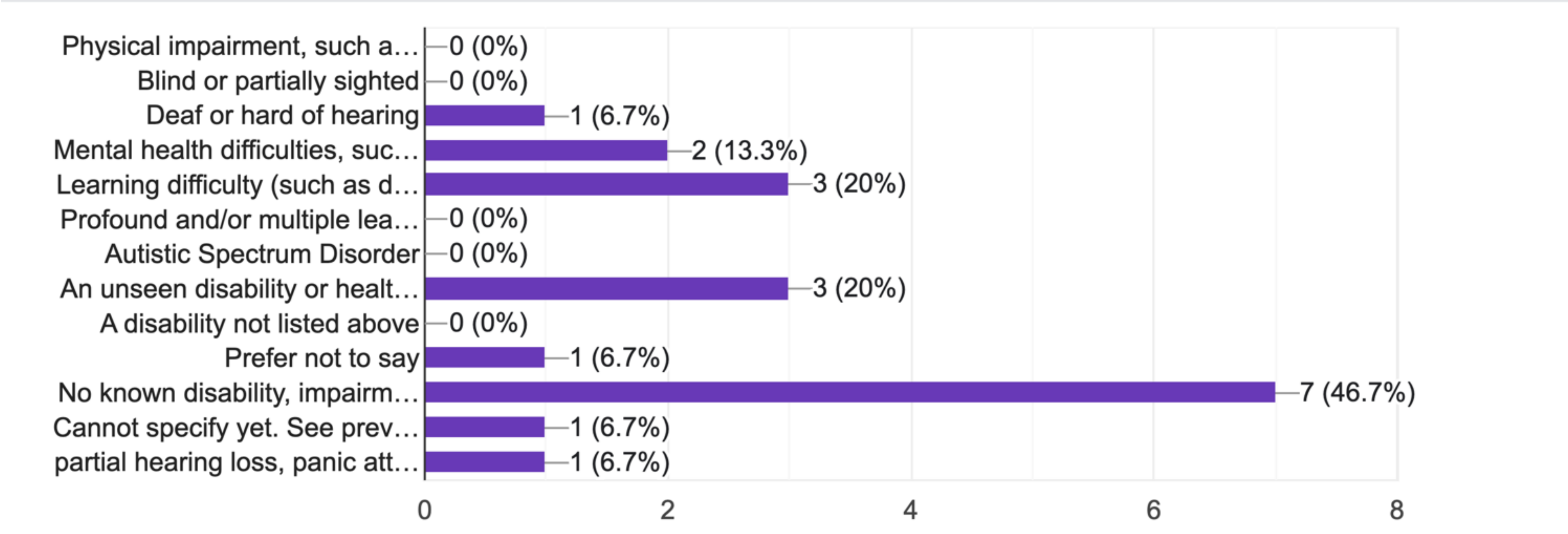
What is your religion, faith or belief?



Do you consider yourself to have a specific learning disability, other disability, impairment or long-term health condition?



Please describe your disability, impairment or long-term health condition.



Appendix 7: Research risk assessment

Researcher: Tim Savage										
Host institution: University for the Creative Arts						Date written: 1st October 2021				
						H&S Qualifications: IOSH (Managing Safety) & NEBOSH (Gen Cert)				
Activity/Element	Description of Hazards	Who is at risk	Initial Risk Rating			Control Measures to be implemented to reduce risk	Residual Risk Rating			
			L	S	R		L	S	R	
Assessor: Tim Savage		Signed:				Dates valid: 2022-2023				
Pre-empirical										
Ethics	Unethical research practices	Tim Savage Participants UCA Host institutions	M	M	M	• Research will be conducted in accordance with the UCA Code of Ethics. • No approaches or interviews will be undertaken until ethical approval has been granted by UCA.	L	L	L	
Ethics	Protection from harm	Participants	M	M	M	• Informed consent (including right to withdraw) obtained and recorded from participants. Anonymity and confidentiality assured to participants (unless specifically waived due to participation in photography). • All documents and data (for example, consent forms, audio recordings, photographs, field notes) will be stored in accordance with GDPR principles. Interview transcripts will be validated by respondents prior to use. • No data in the public domain will be attributed to any specific individual. • Only participants who provide their explicit consent and sign model release forms will be photographed.	L	L	L	

						• Secure transcription services to be used to reduce risk of transcriber being familiar with location or individuals.			
Fieldwork						Interviewing participants at their place of work			
Travel	Excessive travel, stress, fatigue and vehicle breakdown	Tim Savage	M	M	M	• Attended defensive driving course at UCA (high mileage staff) completed. Take regular breaks on long journeys. • Book accommodation for journeys of over 200 miles. • Compliance with UCA Driver Declaration Policy and Procedure. • Breakdown recovery membership. • Breakdown triangle and charged mobile telephone to be taken on all trips.	L	L	L
Interviews	Emotional harm/distress during interviews	Participants	L	L	L	• Gatekeeper introduction. • Use of participants choice of location. • Ice breaker and calm demeanor adopted by interviewer. • Breaks offered if required.	L	L	L
Covid-19 (dynamic risk based in national factors and changing guidance).	Risk of transmission through close contact	Tim Savage and participants	M	M	M	• Conduct dynamic risk assessment based upon risk factors of time, location, and participant circumstances (e.g., vulnerable). • Adhere to government advise in respect of COVID Alert level and outbreaks. • Adhere to institutional Policies and Procedures. • Subject to above, controls may include maintaining social distancing, use of face coverings, practice hand hygiene, meeting in well-ventilated spaces and requirement to show vaccination evidence and/or a recent negative lateral flow test.	L	L	L

Photography						Photographing participants in studios and workshops			
Manual Handling	Back strain, Hernias, sprains, and strains	Tim Savage	M	M	M	• Unlikely to feature based upon 'light kit'. • Lifting equipment to be used where required. • Correct lifting and carrying methods to be used. • Manual handling course attended.	L	L	L
Work at heights	Falls persons/materials	Tim Savage.	H	M	H	• Working at height not anticipated, though WAH training has been completed. • In the (unanticipated) event of working at height only certified 'non-domestic' ladders or steps to be used.	L	L	L
Vulnerable and young people	Non-participants	Young people who happen to be in locations	L	M	M	• DBS enhanced checks completed of photographer. • No identifiable individuals will be recorded within the photographs. • Where groups or particularly vulnerable people (including participants) are involved a specialist risk assessment will be completed.	L	L	L
Danger to public and participants and subsequent litigation	Hazards identified on this RA	Public and models	M	M	M	• Photographer has Public Liability Insurance policy to cover photographic services to the value of £5 million.	L	L	L
Electric shocks from defective lighting equipment	Death, burn or injury	Operatives	M	H	H	• Unlikely to feature based upon 'light kit' of DSLR and portable flash and reliance upon batteries. • All electrical items to be visually inspected prior to use. • Any defects to be repaired by a competent person. • Photographer is certified PATS tester. • Avoid overloading mains sockets with 4gangs.	L	L	L

Slips, trips, falls	Personal Injury	Tim Savage and participants	M	M	M	• Avoid trailing cables where possible. • Tape down or cover trailing cables if used. • Ensure no food or drink is in proximity to area used for photography.	L	L	L
Publication									
Publication	Reputational and/or career damage (if comments are identifiable)	Participants	M	L	M	• See controls outlined in ethics section of this risk assessment relating to confidentiality and anonymity.	L	L	L
Publication	Emotional harm/distress (if comments are identifiable)	Participants	L	L	L	• See controls outlined in ethics section of this risk assessment relating to confidentiality and anonymity.	L	L	L
Publication	Reputational damage	Host institutions	M	L	M	• Institutions will be identified as research locations, and insights may be shared in relation to categories of institution, however, data is pooled in phenomenography, and no specific quotations or extracts will be attributed to an individual named institution.	L	L	L
Publication	Image rights dispute	Participants	M	L	M	• Two copies of the model release form to be signed by participant and photographer at the time of shooting. • Photographer retains one copy, to be stored in accordance with GDPR requirements.	L	L	L
Publication	Reputational damage – arising from poor quality research tools and compliance	Researcher institution (UCA)	L	L	L	• Rigor of PhD assessment and viva prior to thesis publication. • Related journal articles subject to peer review prior to publication.	L	L	L

	with academic conventions								

L = Likelihood S = Severity R = Risk (Likelihood x Severity)	Likelihood and severity must be assessed as Low (L), Medium (M) or High (H). Risk is established by multiplying likelihood by severity – e.g. – L x M = M, L x H = H, L x L = L, M x M = M, M x H = H – i.e. – the highest level of risk prevails.

Appendix 8: Participant information and informed consent

Research Title
How do creative arts technicians in higher education conceive of their pedagogies?

Invitation
You are being invited to participate in a research project that I am undertaking towards partial fulfilment of a Ph.D. in Education at the University for the Creative Arts. Before deciding whether to participate please take the time to read the following information carefully. If any part is unclear, please ask for clarification.

What is the purpose of the study?
There is a rich body of literature that describes academic approaches to teaching, but very little is known about technical teaching in the arts. The purpose of the research is to learn insights from technicians with teaching responsibilities in creative arts HE exploring what technicians teach, the teaching methods they employ, and the philosophical underpinnings and values that inform their approaches to teaching.

Why have you been chosen?
The goal of phenomenography (the research methodology) is to capture the widest possible variation of conceptions from the research population (creative arts technicians), and accordingly a diverse range of educational institutions have been selected. Each of these institutions has a nominated 'Research Facilitator' who has been asked to identify technical staff with teaching responsibilities with at least two years of experience. At your institution, the Research Facilitator is (Insert name here), and they have identified that you fulfil the research criteria.

Do I have to take part?
No, participation is entirely optional.

Will I be paid?
No, participation is voluntary.

What will happen to me if I take part?
Initially, you will be asked to complete a short Google Form that records professional and personal characteristics to inform the final selection of participants. If you are shortlisted for interview we will meet at a time of mutual convenience and at the location of your choice (at your university campus). I will ask you a series of semi-structured interview questions relating to the purpose of the study (described above), during which I hope to learn from your perceptions and experiences. You may also wish to bring teaching materials such as lesson plans and learning materials, if you feel they are relevant to the research. The interview will last around an hour, it will be recorded and transcribed. A copy of the transcription will be provided to enable to check that your responses are correctly interpreted before they are taken forward into the research. Your views will form the pool of data that responds to the research question.

Another element of the research is visual. A thread running through existing literature is that technicians are 'invisible' in the HE workforce. As part of my research I plan to photograph some participants within the spaces in which they teach. The photographs are not anticipated to respond to the research questions directly, but may be used to accompany the research in presentations and/or publication of the resulting insights. Participants willing to be photographed will be required to sign a model release form.

What are the possible benefits to my participation?
Direct benefits to participants may be arise through engaging in reflective conversations; and through the satisfaction of offering their experiences to research that aims to occupy the gap in knowledge and appreciation of technician teaching. Participants are likely to see their experiences represented, contextualised and contrasted with others in my Ph.D. thesis, and potentially through the presentation of the research as a conference paper, press or journal publication.

What are the negative aspects or risks to taking part?
There are minimal risks associated with participation in this study. A foreseeable risk is reputational, for example if negative comments were traced back to participants, of which the main control measures are confidentiality and anonymity (see below).

Can my participation be anonymous and will my contribution be confidential?
Yes, subject to the following points:

- The Research Facilitator at your institution is aware that you have been approached as a potential participant;
- Your institution will be identifiable by name in the thesis, and job titles and disciplinary specialisms will be referenced in the list of participants (though no comments will be attributed to particular institutions, or individuals);
- All views expressed will be treated anonymously. The research reports on the experience of multiple participants rather than on specific individuals. Where views are specifically expressed, a pseudonym will be used, e.g., Technician A, Technician B etc.
- My supervisors work for UCA, UAL and Queen Mary University of London. They are informed as to which institutions and roles are participating, but will not have access to transcripts that reveal the details of what was discussed or the identities of participants.
- In all conceivable outcomes of the research, names of interviewees will be removed unless otherwise specified by participants (e.g., as captions for those consenting to be photographed).
- A detailed risk assessment accompanies this research and can be made available upon request.

But what if I consent to be photographed?
Participants consenting to be photographed will be visually identifiable and the accompanying caption may include their name, role title and institution, and therefore their participation cannot be anonymous. However, no quotes will be attributed to individuals (whether photographed or not) and therefore details of all participants' contribution will remain confidential.

What if I consent now but change my mind later?
Participants have the right to withdraw at any time during the research. If this right is exercised all recordings, transcripts, field notes, photographs and references to the participant will be removed.

What happens to the recordings and transcripts once the research is finished?
Transcripts and audio recordings will be stored securely and in accordance with GDPR requirements for the duration of my research project (anticipated end date is August 2024). Once my PhD research is completed the audio recordings will be deleted. Transcriptions, citations, and quotes that remain in the final body of work will remain though will not be traceable to their original source.

For any further information please contact

Tim Savage
Director of Technical Learning
University for the Creative Arts
Falkner Road
Farnham
GU9 7DS
tsavage@uca.ac.uk

Informed consent (to be completed and signed at the start of the interview)

Project Title
How do creative arts technicians in higher education conceive of their pedagogies?

Researcher
Tim Savage

Please circle Yes or No for the following statements.

1. I confirm that I have read and understood the information sheet relating to the above study and have had the opportunity to ask questions.

YES **NO**

2. I understand that my participation within this research project is voluntary and that I can withdraw at any point, without giving a reason.

YES **NO**

3. I agree to take part in the above study.

YES **NO**

4. I consent to being photographed as part of the research (if yes, please sign the model release form shown on the next page).

YES **NO**

Name of participant:

Signature: Date:

Role:

Institution:

Name of researcher: Tim Savage

Signature: Date:

Appendix 9: Data protection impact assessment (DPIA)

This DPIA is used to outlines the process and outcomes of data management in accordance with DPIA guidance issued by the Information Commissioner's Office, and should be read alongside that guidance and the Criteria for an acceptable DPIA set out in European guidelines on DPIAs.

Submitting controller details

Name of controller	Tim Savage
Subject/title of DPO	Not applicable
Name of controller contact	University for the Creative Arts

Step 1: Identify the need for a DPIA

Explain broadly what project aims to achieve and what type of processing it involves. You may find it helpful to refer or link to other documents, such as a project proposal. Summarise why you identified the need for a DPIA.
This research project seeks to record, describe and analyse conceptions of technical teachers working in creative arts higher education. The study uses a phenomenographic methodology to identify a full spectrum of experiences and explore variation and commonality. Accordingly, maximising the diversity of participants within the sample increases the range of perspectives and the richness of data. Potential participants are asked to complete a short survey that asks them to disclose personal data that constitutes 'Special Category Data' under GDPR legislation. Under the terms of GDPR as a sole researcher, the project does not require a DPIA by law. However, based on legal advice from the University solicitor, this DPIA is produced as 'best practice' rather than compliance.

Step 2: Describe the nature of the processing: how will you collect, use, store and delete data? What is the source of the data? Will you be sharing data with anyone? You might find it useful to refer to a flow diagram or other way of describing data flows. What types of processing identified as likely high risk are involved?
Data collected from potential participants is: Name Email address Job title Employer Length of work service Arts discipline Teaching qualification status Contract FTE Age Gender identity Birth gender Sexual orientation/preference Ethic group or background Faith, religion or belief Learning disability/disability, impairment or long-term health condition Data is collected via a Google Form, respondents will be self-selecting, and data will be processed to ensure the most diverse sample of participants from those who consent to participate in the study. No one else will have access to the data in this form. A processed and anonymised version that shows the frequency of responses across the participants will be included in the thesis.

Describe the scope of the processing: what is the nature of the data, and does it include special category or criminal offence data? How much data will you be collecting and using? How often? How long will you keep it? How many individuals are affected? What geographical area does it cover?
The data records personal characteristics (Special Category Data – described above) that will be collected once (via online form). The data will be recorded in Q1 and Q2 of 2022 and used to sample potential participants to inform the researcher's judgement in obtaining a diverse pool of interviewees. The data will only be used for this purpose and will be deleted at the end of my PhD studies (likely in Summer 2024). It is envisaged that no more than 50 individuals will complete the form and submit their data. All participants will be based in the UK.

Describe the context of the processing: what is the nature of your relationship with the individuals? How much control will they have? Would they expect you to use their data in this way? Do they include children or other vulnerable groups? Are there prior concerns over this type of processing or security flaws? Is it novel in any way? What is the current state of technology in this area? Are there any current issues of public concern that you should factor in? Are you signed up to any approved code of conduct or certification scheme (once any have been approved)?
The individuals submitting data are potential participants in a research study. They have full control of whether to supply data. They can choose not to participate or to select the 'prefer not to say' option with no detriment. All potential participants will receive an informed consent form detailing the ethical issues, benefits and risks of participating and GDPR status. The reason for recording the data and its use is clearly stated in these documents. No data will be recorded from children or vulnerable groups. There are no prior concerns or security flaws, and the technology (Google Forms and Google Drive) is mature and secure. The study is being conducted following UCA's ethical approaches and standards.

Describe the purposes of the processing: what do you want to achieve? What is the intended effect on individuals? What are the benefits of the processing – for you, and more broadly?
Data will be processed by transposing it to a 'sampling matrix'. The matrix enables demographic trends in the sample to be identified (for example, to ensure that the sample is not disproportionately weighted or omits groups or characteristics). The benefit is to ensure diverse representation, rich data, and quality research.

Step 3: Consultation process

Consider how to consult with relevant stakeholders: describe when and how you will seek individuals' views – or justify why it's not appropriate to do so. Who else do you need to involve within your organisation? Do you need to ask your processors to assist? Do you plan to consult information security experts, or any other experts?
Only the individuals submitting it and myself will see the data in its raw form. The data will not be shared, and no other processing will occur. I have consulted with an information security expert (UCA Solicitor), who has approved the research from a GDPR/legal perspective.

Step 4: Assess necessity and proportionality

Describe compliance and proportionality measures, in particular: what is your lawful basis for processing? Does the processing actually achieve your purpose? Is there another way to achieve the same outcome? How will you prevent function creep? How will you ensure data quality and data minimisation? What information will you give individuals? How will you help to support their rights? What measures do you take to ensure processors comply? How do you safeguard any international transfers?
The legal framework for processing data (as set out in Article 6 of the GDPR) is on the basis of consent (individuals have provided clear and explicit consent for their data to be processed for a specific purpose). Data will be processed through the population of a framework to promote and maximise participation from diverse and underrepresented groups in HE. There is no other method to ensure that these voices are represented in the study. A summary of anonymised data will feature in the appendix of the thesis but will be anonymised and cannot be traced to individuals.

Step 5: Identify and assess risks

Describe source of risk and nature of potential impact on individuals. Include associated compliance and corporate risks as necessary.	**Likelihood of harm**	**Severity of harm**	**Overall risk**
Identification of individuals and disclosure of their data from either data breach (Google). Identification through published outcomes (quotation, discipline and photography).	**Remote,** possible or probable	Minimal, **significant** or severe	**Low,** medium or high

Step 6: Identify measures to reduce risk

Identify additional measures you could take to reduce or eliminate risks identified as medium or high risk in step 5				
Risk	**Options to reduce or eliminate risk**	**Effect on risk**	**Residual risk**	**Measure approved**
Data breach Identification	Exclusively use Google Drive and delete data at earliest opportunity (non-participants in 2022, Participants in 2024). Do not use portable media drives. Ensure the participant characteristics section of thesis is anonymised (no routes to individual or research site).	Eliminated **reduced** accepted	**Low** medium high	**Yes**/no

Step 7: Sign off and record outcomes

Item	Name/position/date	Notes
Measures approved by:	This RA was agreed as suitable and sufficient with the UCA Solicitor on 15th December 2021.	
Residual risks approved by:	N/A	There are no residual risks
DPO advice provided:	N/A	N/A
Summary of DPO advice: N/A		
DPO advice accepted or overruled by:	N/A	
Comments: N/A		
Consultation responses reviewed by:	N/A	
Comments: N/A		
This DPIA will kept under review by:	Tim Savage	

Appendix 10: Model release form

I hereby give the Photographer (Tim Savage), his representatives, assigns and licensees, those acting upon his authority, those for whom he is acting, and those acting with his permission, and their respective agents and employees, and any publisher, who may hereafter publish and exhibit the Photographs (hereinafter collectively referred to as the "Users"), the absolute right and permission to copyright, use, reuse, manipulate, publish, exhibit, display, print and reprint in advertising, publicity or promotional material, magazines, books or any other media, or for any other purposes, the Photographs heretofore taken, or taken this day, or hereafter taken by the Photographer and for which I have acted as a model/subject, including without limitation, reproductions thereof of which I may be included in whole or in part. The failure of the Photographer to pay for such use shall not be deemed as a failure of consideration by any other Users.

I hereby waive any right to inspect or to approve the Photographs or the editorial or advertising copy or printed matter that may be used by the Users in conjunction therewith, and further waive any claim that I may have with respect to the eventual use to which it may be applied. Such Photographs may be used in the sole discretion of the Users, with or without my name, alone or in conjunction with any other material relevant to the research related to technician pedagogies. I hereby release, discharge and agree to save harmless the Users and their licensees and assigns from and against any and all liability in connection with the use of such Photographs. Without limiting the foregoing, the Photographs may be used in thesis, journal articles, presentations, teaching materials, exhibitions, competitions etc.

I hereby represent that I am eighteen years of age or older, and that I was eighteen years of age or older at the time the Photographs were taken. I further represent that I have read this Release Agreement prior to signing it. I have not been induced to sign the same by any representation or statement made by the Photographer or his agents, employees or anyone acting on his behalf.

Name:		Signed:
Address:		Date:
Photographer:	Tim Savage	Signed:

* Form adapted from a template within Association of Photographers (AoP, 1996).

Appendix 11: Interview questions mapped to the research questions

---

RQ: How do creative arts technicians in higher education conceive of their pedagogies?	**Key**	
Q1: What is it that creative arts technicians believe they teach?	1	
Q2: How do creative arts technicians approach their teaching?	2	
Q3: Why do creative arts technicians teach in the ways that they do?	3	
Structure of Awareness: Internal horizon	INT	
Structure of Awareness: External horizon	EXT	
Structure of Awareness: Referential	REF	
1. What is your professional identity? Put another way, how would you describe yourself?	Ice break	N/A
2. Technical roles comprise part tutor/part technician, how do you experience these two elements?	EXT	1&2
3. My research explores how creative arts technicians conceive of their pedagogies, by which I mean their contribution to learning and teaching. Before we get into specifics, what are your goals as a teacher?	REF	3
- And what are your goals for students' learning?	REF	3
4. I'd like to focus upon a specific 'typical' instance of scheduled teaching with you in detail, are you able to recall a particular example [assume answer is yes]. Who where you teaching, where, and when did it take place?	INT	1
- Why did you teach it, was the lesson part of a unit or module?	EXT	1&3
- If yes, can you tell me about the module and explain how your teaching contributes to the outcomes?	EXT	1
- If not a unit, can you tell me about why it was scheduled?	REF	2
5. How much autonomy do you have in deciding what and how to teach?	INT	2
- What decisions did you make while planning and what were the reasons for them?	INT	2

6. What were your intended outcomes for the lesson?	REF	3
7. Talk me through the session as it played out step by step, what did you do, and what did your students do?	INT	1,2&3
8. What did the students learn? - How do you know?	REF INT	2&3 2
9. Why do you think you teach in the way that you do (that is, rather than some other way)? - Why is it that you want students to learn that way?	REF REF	3 3
10. I'd also like to explore your experiences of reactive or unscheduled teaching. Are you able to recall an instance when you have taught or supported a student as they have worked autonomously? Can you tell me about it please?	INT	1,2&3
11. Students you teach will also be taught by academics; how do you differentiate your teaching from theirs?	EXT	1&2
12. Are there other significant contributions to learning and teaching that you feel should be acknowledged in this research?	ALL	ALL

Frequency analysis of showing how interview questions relate to research questions (RQ) and structures of awareness:

RQ: How do creative arts technicians in higher education conceive of their pedagogies?	Key	=
Q1: What is it that creative arts technicians believe they teach?	1	7
Q2: How do creative arts technicians approach their teaching?	2	9
Q3: Why do creative arts technicians teach in the ways that they do?	3	9
Structure of Awareness: Internal horizon	INT	6
Structure of Awareness: External horizon	EXT	4
Structure of Awareness: Referential	REF	7

Appendix 12: Sample of learning and teaching materials

This appendix contains a representative sample of learning and teaching materials provided by participants (redacted elements identify participants or research sites).

Example 1: Lesson plan

<table>
<tr><td colspan="6" align="center">Workshop Title:

Introduction to Canvas Making and Stretching</td></tr>
<tr><td colspan="6">Technician Demonstrator:</td></tr>
<tr><th>Module</th><th>Class size</th><th>INDUCT/SKILL/ TECH/EXP/CRIT/OPENH</th><th>Time</th><th>Venue</th><th>Duration</th></tr>
<tr><td></td><td>Max. 8</td><td>SKILL</td><td>10.00-16.00</td><td>Painting & Mixed Media Workshop</td><td>5Hrs</td></tr>
<tr><td colspan="6">Aims
To provide students with basic hands-on knowledge/skills in stretcher bar construction techniques and recommended ways of producing a professionally stretched canvas. Also to aid students generally in choosing an appropriate substrate upon which to start their paintings.</td></tr>
<tr><td colspan="6">Learning Outcomes
By the end of the workshop students will be able to:
1. Measure up and make informed decisions on format and size of painting substrate including the necessity of cross bars/extra reinforcement
2. Demonstrate basic skills in constructing a small stretcher, using the tools and equipment provided
3. Demonstrate basic awareness of tools needed for the construction of an effective stretcher and realistic time scales for making
4. Present a well-constructed and complete stretched canvas ready for priming
5. Apply their skills to their next project, knowing that they can ask for assistance and recaps from Tech Dem where necessary</td></tr>
<tr><td colspan="6">What students must bring:
Notebook (+camera - optional)
Suitable footwear & clothing for workshop use
Apron (aprons are available to borrow)
Pencil</td></tr>
<tr><td colspan="6">Link to relevant health & safety information:
Use of Studio Workshop Risk Assessment</td></tr>
<tr><td>Time</td><td>Lesson Phase</td><td colspan="2">Teaching Methodology</td><td colspan="2">Resources Provided</td></tr>
<tr><td>10 – 10.30</td><td>Introduction</td><td colspan="2">Verbal presentation</td><td colspan="2">Examples of finished stretchers and stages of construction
All tools needed for construction and stretching</td></tr>
</table>

10.30 - 13.00	Application/ Making	Practical demonstration – students work in pairs and are guided through each step by TD. Students take it in turns to use tools	Pre-cut stretcher bars Clamps, glue, drills, drill bits, screws, squares, rulers
14.00 - 14.45	Finishing Touches	Students guided, as above, in attaching quadrant and finishing their shared stretcher	Pre-cut quadrant, panel pins, pin hammers, glue, tape
14.45- 16.00	Stretching Canvas Material	Practical demonstration on stretching canvas material over stretcher. Drawing attention to making neat folds & finishing corners. Students guided throughout	Pre-cut 9ox cotton duck canvas material, canvas pliers, staple guns, scissors
Notes: Students must finish their shared canvas. If this is not the case at the end of the session, they will be permitted to use workshop at convenient time to complete. If both students in their pair wish to make another stretcher they may do so.			

Associated Module Descriptor:

INTRODUCTION TO CONCEPT, PROCESS & PRACTICE
Module Aims

This module introduces the student to the range of technical knowledge and practical skills associated with the materials, media, techniques and methods of a practicing artist, and introduces methods of judgment, both self-reflexive and peer-to-peer, and the relevance of this to a student's individual studio practice.

This module introduces the student to the fundamental relationship between concept, process and practice, and the importance of a context for the practice of Fine Art.

This module introduces the student to the demands of undergraduate study in the discipline of Fine Art, offers an understanding of academic conduct in the university

Module Learning Outcomes
On successful completion of this module, students should be able to:

Skills/Context/Ideas

- Demonstrate basic proficiency in the use of a range of facilities and equipment.
- Demonstrate practical skills associated with the materials, media, techniques and methods of a practicing artist.
- Articulate the relationship between concept, process, and practice.
- Demonstrate self and group reflection in relation to their studio practice.
- Identify practitioners and theorists that relate to the student's studio practice and offer potential professional pathways for future exploration.
- Demonstrate an understanding of the application of critical and aesthetic judgment in relation to studio practice.

Learning & Teaching Delivery Methods

Learning and Teaching Delivery Methods *(SCHEDULED: lecture, seminar, tutorial, project supervision, demonstration, practical classes, workshops, supervised time in studio/workshop, fieldwork, external visits. NON-CONTACT: guided independent study; PLACEMENT: workbased learning; placement; year abroad)*			
Method	Rationale	Type of Contact (scheduled/ guided independent study/ placement)	Total hours
Academic Delivery	Knowledge acquisition	Scheduled	144
Technical Workshops	Skills development	Scheduled	72
Self-Directed Studio Practice	Studio practice	Guided independent study	184

Module Indicative Content

In this first module on the Fine Art course students will be exposed to a wide range of material and theoretical practice approaches through academic-led projects. The intention is for them to become familiar with many options, methods, and techniques and so have a range of choices about how they wish to work. These projects will be supported by workshops and demonstrations that deal with the various material processes. Students will be asked to consider their studio practice in relation to these material processes and explore how new processes can be used to broaden the vocabulary of their own studio practice.

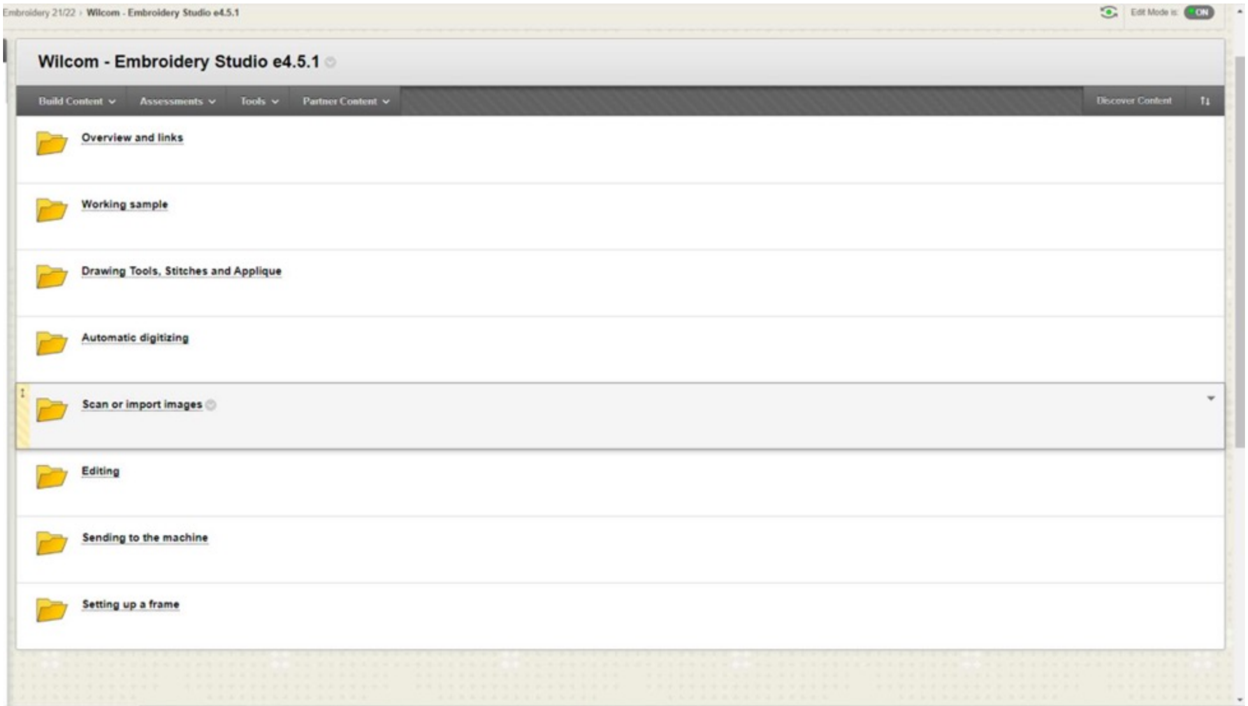
Critique will be instigated through project group tutorials, seminars and keynote lectures.

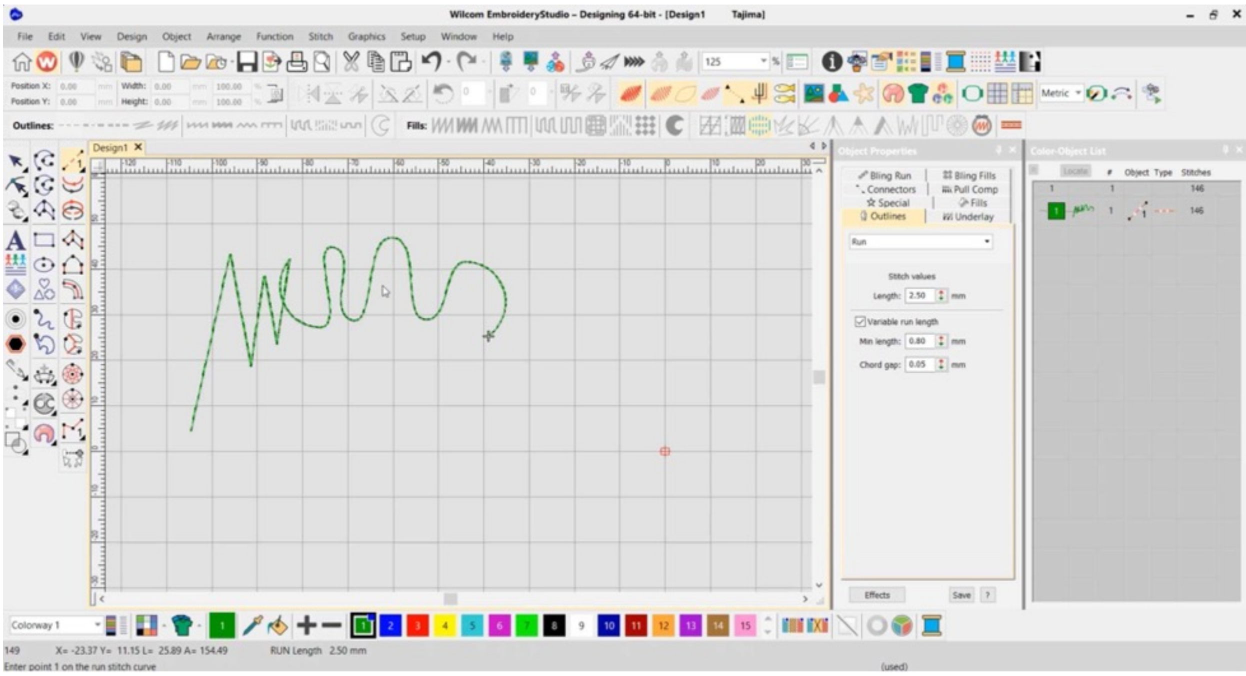
Contextualisation within both the contemporary and historical practice of Fine Art will be further supported through a series of keynote lectures, formal visits to the museums and galleries, and other national centres of excellence, along with one international trip a year to cities or events of importance.

Health and safety practices relevant to fine art studio and workshop practice will be covered.

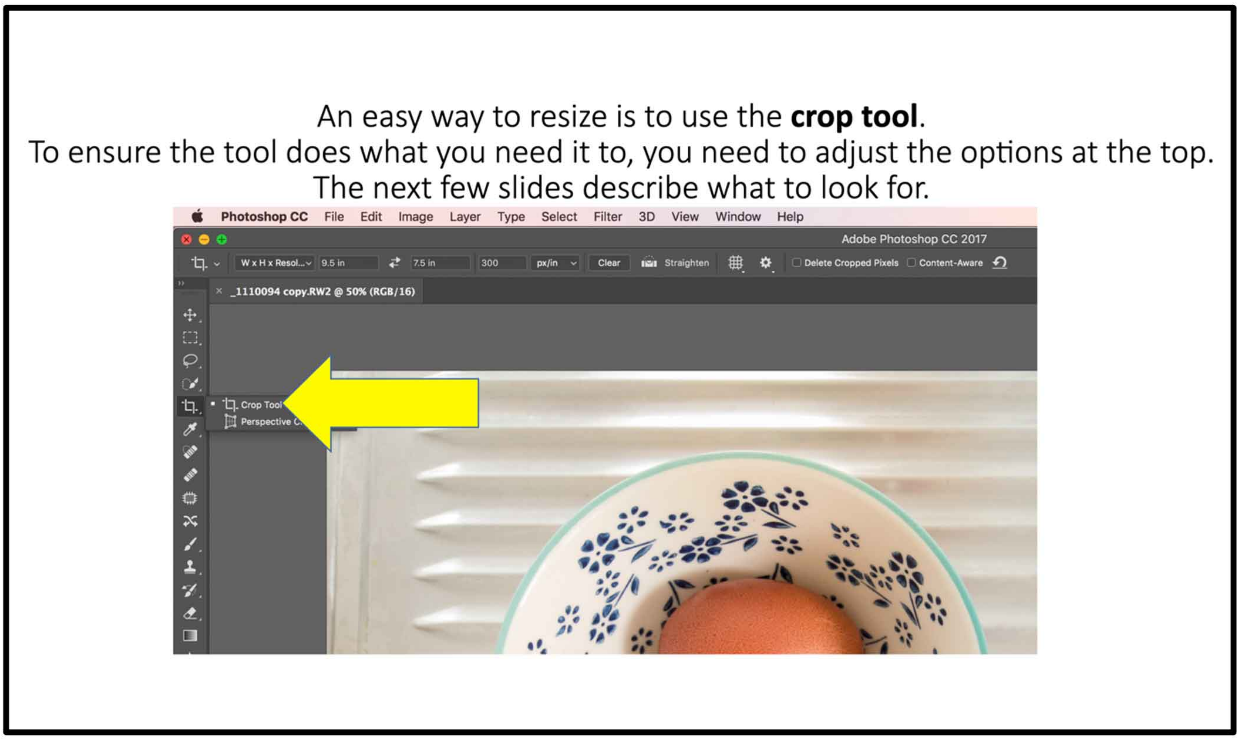
- Introduce a broad range of studio practice to the student.
- Establish a safe and professional studio culture
- Introduce peer and autonomous learning strategies.
- Establish a culture of research and information gathering in relation to students' studio practice .
- Introduce debates and issues relevant to the practice of contemporary fine art practitioners.
- Introduce methods of critical judgment, both self-reflexive and peer-to-peer, and the relevance of this to a student's individual studio practice.

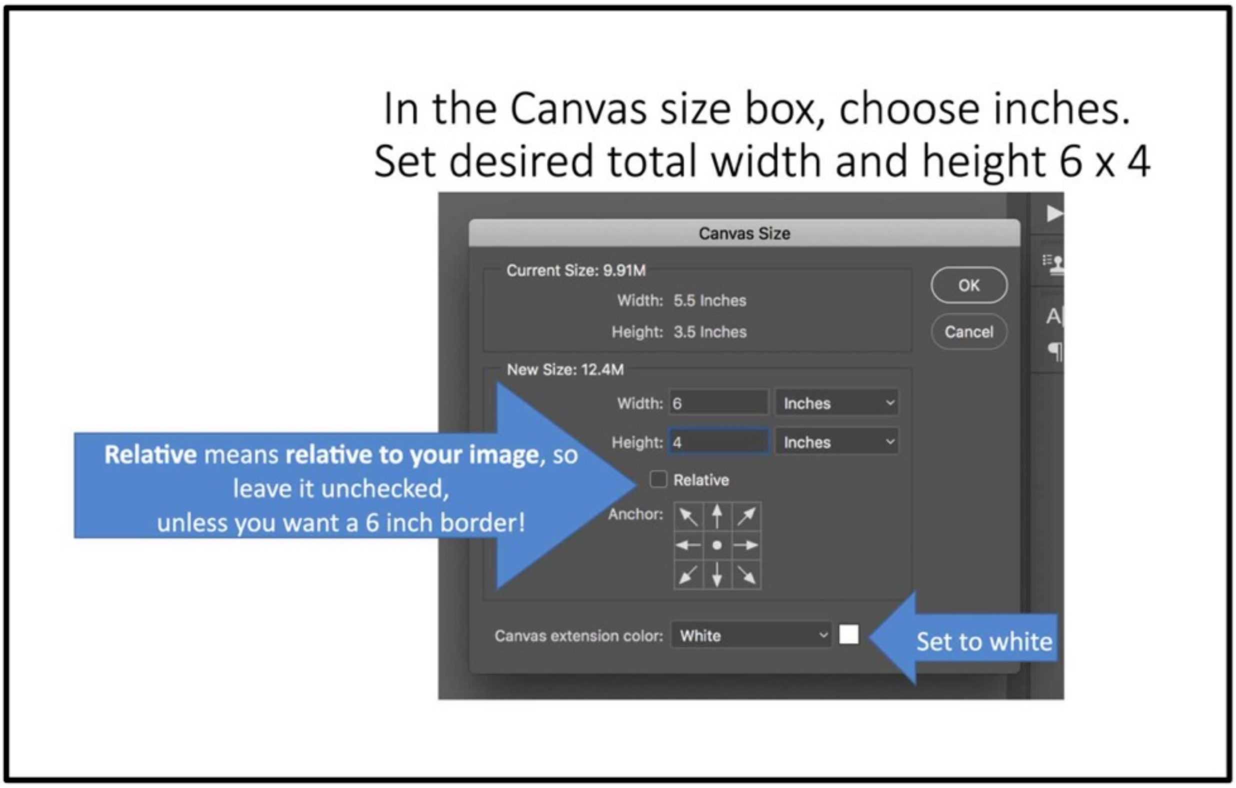
Example 2: VLE Library and Screenshot





Example 3: PowerPoint Slide (Crop Tool in Photoshop)





Example 4: Prototyping iterations

Example 5: Handout

PHOTOSHOP 1 | ITERATION

INTERFACE I WORKSPACE
LAYERS
TRANSFORM
HISTORY I SNAPSHOTS
ITERATE

BRING

- **BOOKCOVER OPTIONS**

INTERFACE I WORKSPACE

Talk through the interface, introduce document window, panels, Window menu to switch panels on and off, interface brightness, pasteboard colour and workspace switcher

LAYERS

Look at layer controls, the layers panel icons and options for new layers, delete layers, opacity and duplication

TRANSFORM

Talk through show transform controls, auto select, basic transform, edit>transform options, warp, alt drag copies and layer stacking order

HISTORY I SNAPSHOTS

Demo History states, snap-shotting, new document from snapshot, cmd Z and underline the beneifts of iterative composition. Demonstrate screen shots and contact sheet as a method of collation. Demonstrate the iterative process using crappy fox - ‘One day, little fox decided to go on an adventure’

ITERATE

Set book cover project 128mmm by 198mm and advise options for cover. minimum 5 iterations. Share at the end of session at 12.15.

Example 6: Digital skills handout (extracts)

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2022|2023 CURRICULUM
LEVEL 1: SB2

Thursday Rotations *9.30-12.30*
These will be ONLINE in your groups as per your timetable

1| **DIGITAL PAINTING** *Editing, Making, saving and using brushes in photoshop, looking at tips and tricks for digital painting*

2| **ILLUSTRATOR** *Learning the basics of vector drawing tools, colour pallete exercises and Image tracing*

Thursday Rotation - Extra class *4 - 4.30pm*
These will be ONLINE in your groups as per your timetable

1| **BLEND MODE PAINTING**

2| **PATTERN MAKING**

Additional Workshops
See timetable for session times

1| **ZINE MAKING IN INDESIGN - ONLINE**

2| **TYPE AND POSTER MAKING IN INDESIGN - ONLINE**

3| **DUMMY BOOKS IN INDESIGN - ONLINE**

4| **RISO PRINTING - SIGN UPS - ON CAMPUS**

5| **ROTOSCOPING FOR ANIMATION - SIGN UPS - ON CAMPUS**

EXAMPLES FROM SESSIONS 15

DIGITAL PAINTING *Use selection, texture and editing to make brushes that work for you*

ILLUSTRATOR *Learn vector drawing tools, image trace, colour and create work from scratch*

ZINE MAKING I RISO *Make zines in InDesign and print using Riso after your induction*

POSTER EDITING *Edit work using fixing tools and add and format type in PS*

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2022|2023 CURRICULUM
LEVEL 2: SB1

21 Sept Week 1	**1:2:1 Tutorials - Digital Skills Office all day**
28 Sept Week 2	**VS - Digital Textures I - Photoshop Printroom** Using masks, selections, clips, pattern fill and blend modes to add texture to all work, both digital and traditional
5 Oct Week 3	**Animated Editorials** Grids, guides, GIF and Mpeg 4 making and type to create animated online versions of still editorial images
12 Oct Week 4	**Digital Textures II - Illustrator Half-tones** Adding halftones and roughed scuff areas to flat colour artwork in AI to give a retro finish.
19 Oct Week 5	**Working with Type** An overview of type, hierarchy, grids, guides and kerning, tracking, leading and experimental typography in InDesign and Illustrator.
26 Oct Week 6	**Blending in Illustrator** Use Blend tool to create line and colour transformations and create animation assets for After Effects or Photoshop.
2 Nov Week 7	**Riso | InDesign Booklet** Make a mini booklet of collage images, and explore how these print using the Riso Printer
9 Nov Week 8	**Animation - After Effects I** Make an AR 2.5 D poster, looking at cameras, keyframes and more to take AE projects to the next level.
16 Nov Week 9	**Prototyping for Information Illustration** Making mock up interactive websites or app designs to promote tour information illustrations (Narrative/Info)
23 Nov Week 10	**360 Panoramas** Draw a virtual 360° environment that you can look round on web platforms - all from Photoshop!
30 Nov Week 11	**Animation - After Effects II** using timelines, motion paths and speedgraphs to get a thorough understanding of a world leading animation program
7 Dec	**1:2:1 Tutorials - Digital Skills Office all day**

2022|2023 CURRICULUM
LEVEL 2: SB2

24 Jan Week 1	**Animation - After Effects III -** Get textures moving in After Effects, looking at stop frame, pre-comps, effects, masks and track mattes
31 Jan Week 2	**VS - Scanning and Glitching - Photocopier and scanner fun!** Use the scanner to create glitches, collage material, and play with the photocopier to create plates and experimental artwork
7 Feb Week 3	**Speeddraw - Premiere video editing -** learn how to make a sped up drawing video for Insta, Snapchat or TikTok
14 Feb Week 4	**Warp Drawings -** experiment with filters, smart objects, layer masks and mixer brushes in Photoshop to see how distortion can explore character and message.
21 Feb Week 5	**Illustrator - the Basics -** drawing tools, shapebuilder, editing and recolour, and puppet warp to understand vector drawing
28 Feb Week 6	**Digital Textures III - ProCreate -** Importing textures, alpha locking, adding textures to brushes to give work individuality
7 March Week 7	**Wacom Painting -** explore setting up a drawing tablet if you've not used one before, and how to control linework, colour, pressure and make new brushes with sensitivity built in.
14 March Week 8	**Isometric Illustrator** -Use Perspective drawing tools to create in vogue 3D spaces with simple colour palettes
21 March Week 9	**Channel Masking and Tinting -** Edit and understand channels from backgrounds, work underneath on layers or edit colour
28 March Week 10	**InDesign Type -** repeat session for those who missed in SB1
04 Apr Week 11	**1:2:1 tutorials**

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WOW

*Wednesday Open Workshops, or **WoW sessions** are held on Wednesday afternoons accross both campuses in a range of technical areas, from digital painting to film edting, paint mixing to canvas stretching.*
*Check out what's available on the WoW Learning Space page and sign up to as much courses as you like **here***

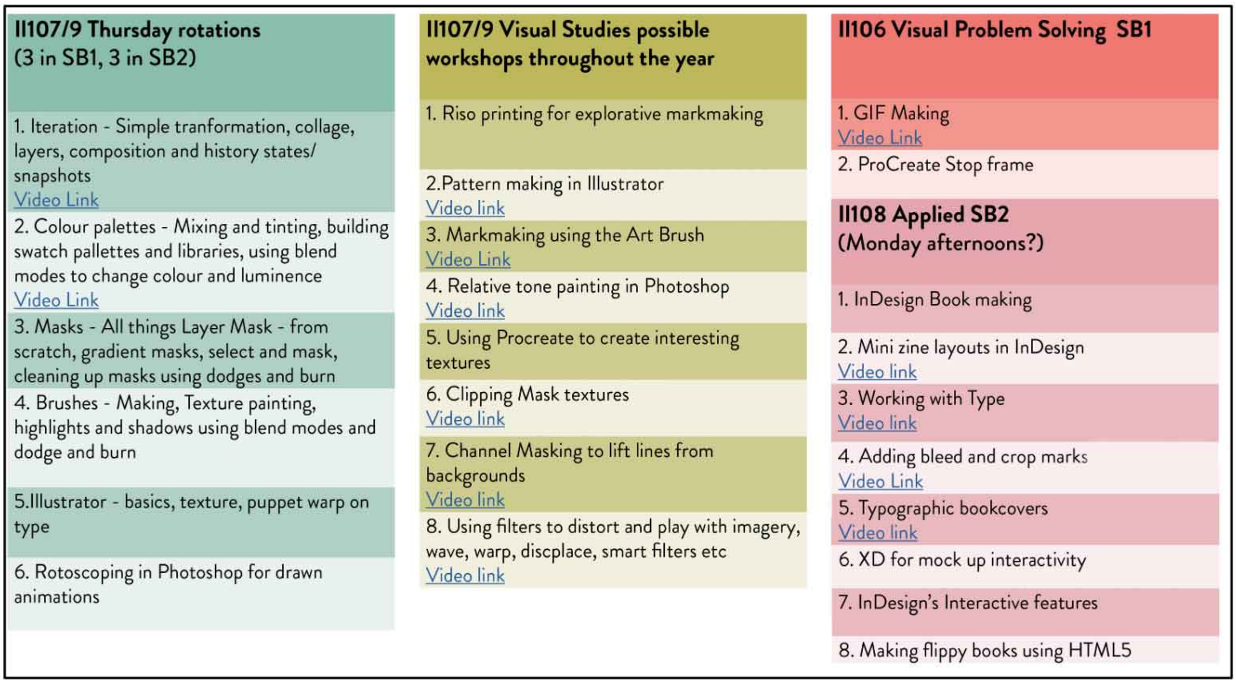
WSF

*The **Workshop Festival** runs through out assessment periods in January and May every year. Technical, Professional Practice and transferable skills workshops run over both campuses, from bowl-turning, CV writing, French and 360° animation classes*

*Check out the website and book on to courses **here***

APRIL 2022

Example 7: Timetable and software tutorial library



II107/9 Thursday rotations (3 in SB1, 3 in SB2)

1. Iteration - Simple tranformation, collage, layers, composition and history states/ snapshots
Video Link
2. Colour palettes - Mixing and tinting, building swatch pallettes and libraries, using blend modes to change colour and luminence
Video Link
3. Masks - All things Layer Mask - from scratch, gradient masks, select and mask, cleaning up masks using dodges and burn
4. Brushes - Making, Texture painting, highlights and shadows using blend modes and dodge and burn
5.Illustrator - basics, texture, puppet warp on type
6. Rotoscoping in Photoshop for drawn animations

II107/9 Visual Studies possible workshops throughout the year

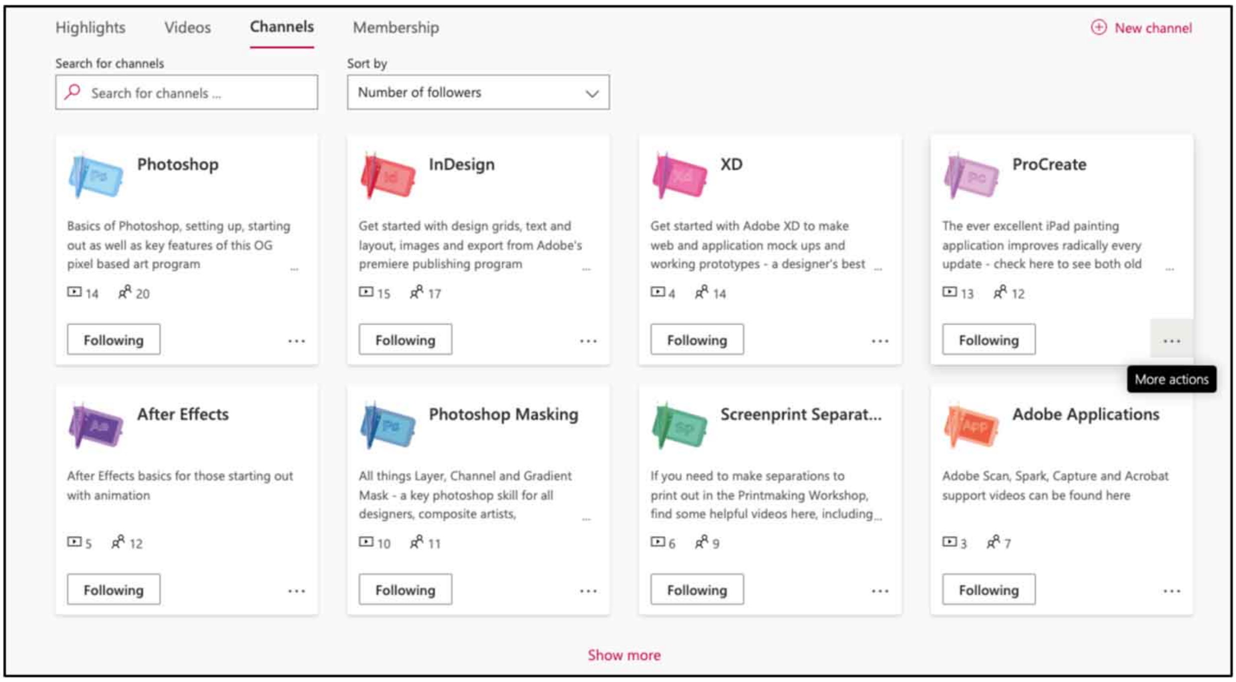
1. Riso printing for explorative markmaking
2.Pattern making in Illustrator
Video link
3. Markmaking using the Art Brush
Video Link
4. Relative tone painting in Photoshop
Video link
5. Using Procreate to create interesting textures
6. Clipping Mask textures
Video link
7. Channel Masking to lift lines from backgrounds
Video link
8. Using filters to distort and play with imagery, wave, warp, discplace, smart filters etc
Video link

II106 Visual Problem Solving SB1

1. GIF Making
Video Link
2. ProCreate Stop frame

II108 Applied SB2 (Monday afternoons?)

1. InDesign Book making
2. Mini zine layouts in InDesign
Video link
3. Working with Type
Video link
4. Adding bleed and crop marks
Video Link
5. Typographic bookcovers
Video link
6. XD for mock up interactivity
7. InDesign's Interactive features
8. Making flippy books using HTML5



Example 8: Screen-printing induction handout

MIX YOUR INK

[1] Decant Daler-Rowney printing medium into a plastic cup or container with a sealable lid.

[2] Mix in acrylic colour. 1 part acrylic paint to 2 parts printing medium. Put at least 60% medium in mixture. If there is too much pigment the ink will dry on the screen. For opaque colours - maximum 40% pigment and for transparent colours - minimum 5% pigment. The ink should be the consistency of double cream.

[3] Always do a dab test on scrap paper to see the actual colour mixed (thin layer).

[4] There is pearlescent paint that you can mix into your colour to create a shimmer effect.

[5] Special bases are available for printing onto textiles, glass, perspex, wood, metal etc - see technician.

TIP If the colour is drying on the screen, mix in retarder - max 10% of mixture. If you don't mix thoroughly you may end up with streaks in your prints.

PRINT CHECKLIST

[1] Print table should be clean, dry and ready for use.

[2] Put parcel tape on all non-printing areas on the back of the screen – including the edges.

[3] Lift the screen onto the printing table and line it up with the angle of the brackets at the back of the press.

[4] Secure the screen firmly in the brackets by pulling the blue handle towards you. Make sure both the clamps are tight but if they don't click with moderate pulling you will need to loosen them off first. Turn the rod in a clockwise direction to make it tighter and counterclockwise to loosen it, the screens vary in thicknesses so it will take a bit of adjusting.

[5] Check snap – screen frame/height to suit print run. Fix 2 of the metal feet onto the front of your screen, and move the bolt up and down to adjust the front height. Then adjust the dials at the back of the press to raise or lower the rear edge of the screen. If in any doubt, speak to the technician.

[6] Prepare paper and place on table, register paper and place registration tabs.

[7] Mix ink and place on the trolley (not on the paper table.)

[8] Select correct size of squeegee – one that overlaps the image on either side by at least 3 cm.

[9] Spread out plenty of ink in front of the image.

CHECK SNAP

[10] Lift up the screen and flood away from yourself.

[11] Put frame down and print pulling towards yourself with the squeegee at a 45° angle.

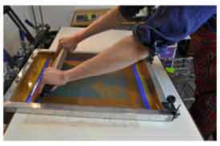
[12] Print edition and hang prints in the marble drying rack.

[13] When you have finished printing switch off vacuum.

[14] After printing, remove excess ink from screen and clean screen, squeegee, spatula and print table.

TIP Have all paper cut to size before printing.

TIP Once the screen is inked, print as quickly as possible to stop the ink from drying. If the ink dries, use a damp sponge and clean blocked areas, do a few tests on newsprint, then resume printing.



REGISTRATION METHOD [1]

Traditional Method

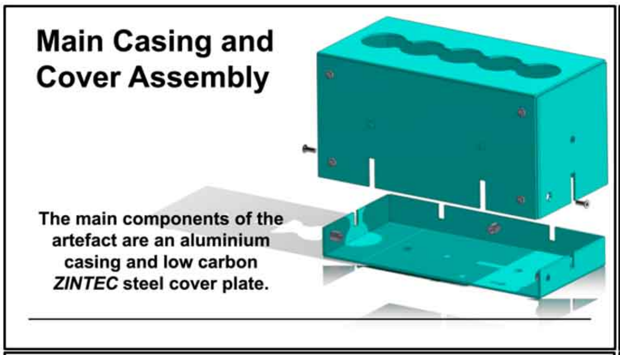
[1] Lightly stick the separation onto your paper with masking tape.

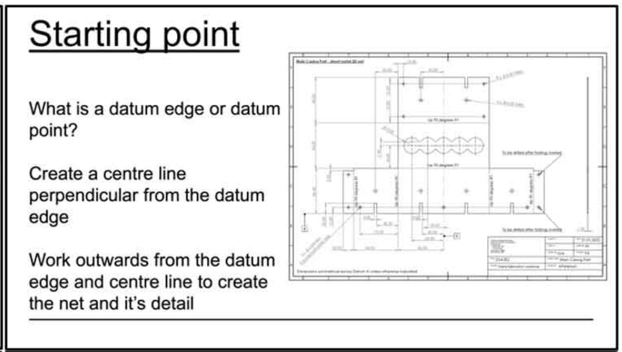
[2] Carefully move this around under your screen until it is in the right place.

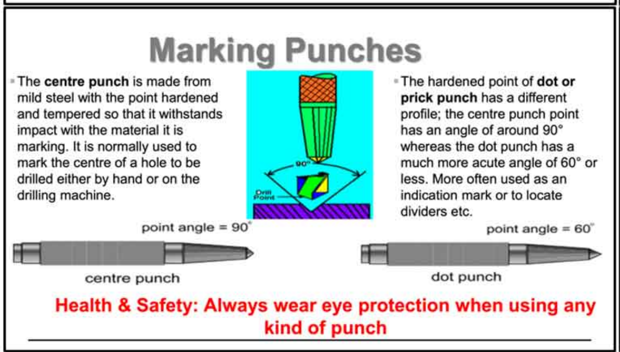
[3] Once in the correct place switch on the vacuum.

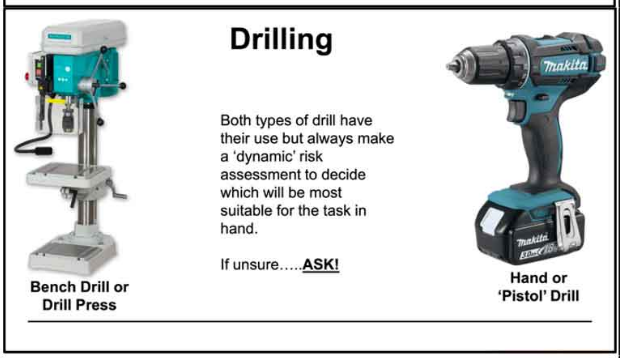
[4] Place registration tabs in the corners and lightly mark paper with a pencil.

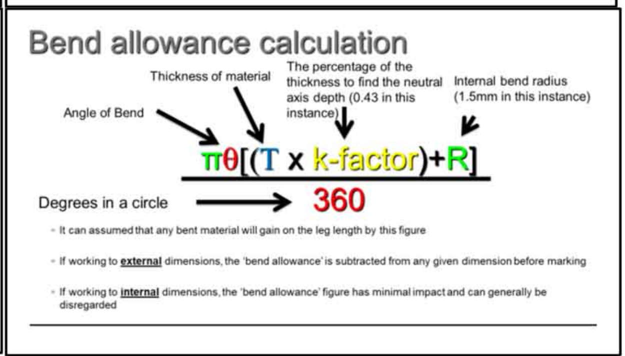
Example 9: Metal fabrication PPT (selected slides)

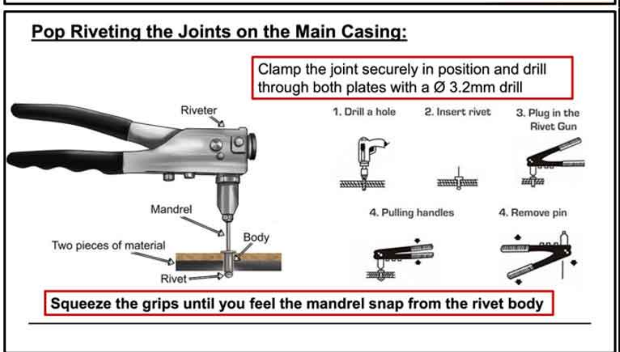


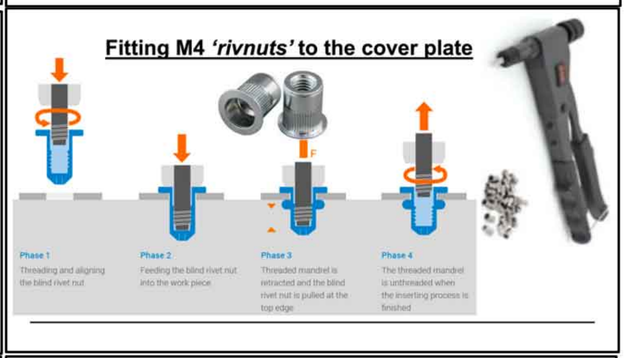


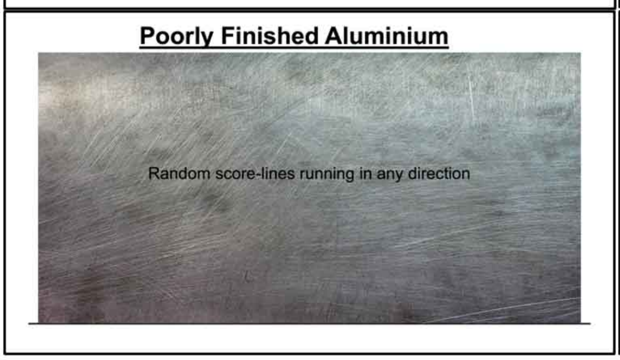


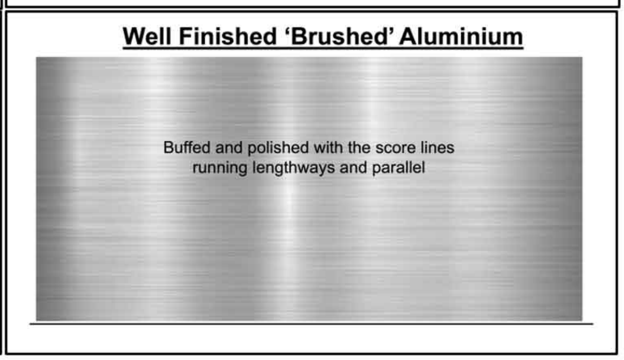












Example 10: Help sheet (colour blending modes)

5

[redacted]

HELPSHEET | MAKING PALETTES

Following on from *Handout 4 | Blend modes*, we're going to use the ***Color*** blend mode to help making ***Monochromatic and Harmonious*** colour palettes.
Read the previous hand out if you're unsure about Blend modes.

Firstly, if you like, goto the fly menu of the ***Color Panel*** in Photoshop to change over to the 2019 introduced ***Colour Wheel*** *fig 1*

NB a useful shortcut for this exercise is to use ***CMD + Backspace*** *to utilise* ***Background Fill.***

Click on the ***Background Colour swatch*** in the ***Color*** panel and this will work with ***Background fill*** to quickly get colour onto your page

This will change the background colour as you work - so remember to click back on ***Foreground colour*** when you get round to painting with your new palette

fig 1

FILL MARQUEES OF COLOUR ON YOUR PAGE

This exercise is particularly impressive if you pick hues that clash - colours that would never normally work together. Draw ***Marquees*** using the ***Rectangle Marquee*** tool onto the page and use ***Background Fill (CMD + Backspace)*** to drop colour onto the page. Dart around all over the hue cube, getting tints, shades, saturates and desaturates to work with. A large range of tones and hues is good *fig 2,3,4.* When finished, make sure you hit ***CMD D*** to deselect any remaining marquee selection.

fig 2

fig 3

fig 4

CREATE NEW FILL LAYER

At the bottom of the layers panel select the ***Create new Fill or Adjustment icon*** *(See Handout 2 | Workspaces and Layers to learn these icons)*
Select ***Solid Colour*** *fig 5* and then pick the colour shade you would like to infuse your palette with. I have selected a muted pink shade here *fig 6*

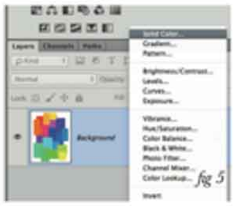


fig 5

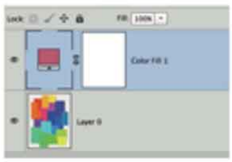


fig 6

APPLY COLOR BLEND MODE

Click on the ***Blend Modes*** *(under Normal)* and apply ***Color*** to the colour fill layer This will tint your hues the shade you chose for the colour fill layer. They have formed a ***monochromatic*** palette of that colour. *fig 7.* ***If you adjust the opacity on this layer your palette will change to a harmonious one as your shades all become greys of that chosen colour.*** See *fig 8 + fig 9* for 75% and 50% opacity

fig 7

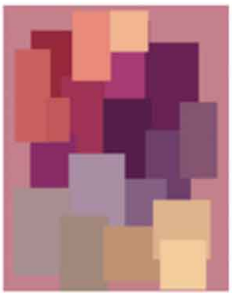


fig 8 - 50%

fig 9 - 70%

SAVE SWATCHES

Go to the ***Swatches*** panel now, and shift select swatches you don't want and hit the ***Trash*** Icon ***fig 10*** or in 2020, Create a ***new Swatches Folder fig 11***

Use the ***Eyedropper tool*** to select the colours off your page and click in the now empty swatches panel to add your swatches into the panel. *fig 11*

fig 10

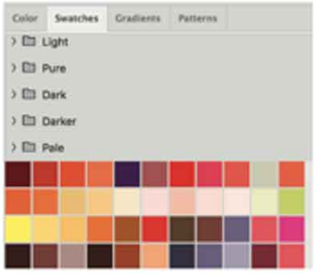


fig 11

SAVING SWATCHES FOR LATER AND LOADING

When the Swatch save dialogue box pops up for individual swatches, you'll see a tick box for saving swatches to your current Adobe library. **If you're signed in and using Adobe Libraries this is a useful way to save swatches on the fly. fig 12**

But to save out sets of swatches, use the ***Save Swatches*** option under the ***Swatches fly menu. Save Swatches for Exchange*** if you want to load your swatches into Illustrator and InDesign also. Use the ***Load Swatches*** option here to load your previously saves swatches too.

fig 12

TINTING AND SHADING COLOURS

Use a marquee of black and a marquee of white paint fill bucketed onto a new layer over the top of your tinted document, and drop the opacity to pull out lighter and darker shades and tints of your colours *fig 13*

DESATURATING COLOURS

Instead of a colour blend mode try a ***Saturation*** one instead. I set the Colour Fill layer to a dark purple this time. Then the Blend mode to Saturation. Again, set the opacity to taste. This was 100% opaque. Add these colours to your swatch palette *fig 14*

COLOUR INTERACTION

Change the colour fill layer to the *opposite* colour on the colour wheel to created a clashing ***Complementary*** palette. Repeat the steps to add these colours at various opacities to your swatches panel Layout stripes of your colours in a new document and spot with colours you've created to witness colour interactions. Some greys will sing out against their clashing hue, and colours of the same tint will harmonise. This exercise is useful for picking palettes for designing images where colour leads the narrative or what you wish the viewer to focus on *fig 15*

fig 13

fig 14

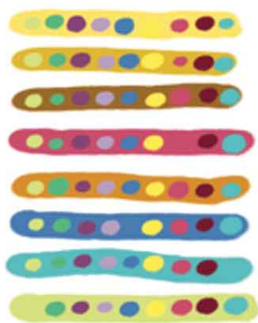


fig 15

Example 11: Making literacies (guest speaker programme)


[redacted] 3D Lab
[redacted]

3D Lab Guest Sessions

3D Lab Guest Sessions are online technical talks or collaborative workshops hosted by [redacted] We seek conversations that reflect the richness of thinking through making, technical research and development, and practical learning and teaching. We aim to provide a learning resource and develop an archive for a community keen to articulate tacit knowledge and making literacies that underpin making practice.

If you'd like to join our mailing list to be notified of our next session please email us [redacted] 3D Lab Guest Sessions in the subject. [redacted] staff and students can also access these sessions on our Streams channel [redacted]

"I had a blast exploding work all over my studio for the [redacted] 3D Lab discussion with [redacted] lways nice to revisit and reconsider old work and see how the dots are connecting as we move forward. [...] thank you to [redacted] for putting together a really valuable forum for creativity and making, and for inviting me to participate." [redacted]

"Each event emphasises 'the richness of thinking through making'. I cannot stress how valuable these conversations are for anyone that feels like an outsider peering into this wonderful world of experimenting, fiddling, handling, thinking, creating, arriving at answers through the physicality of making. [...] The talks felt like a warm, supportive breeze; reminding me of the three years I spent at [redacted] I felt right at home, strangely, like I was able to return to the college for a brief interval post-graduation. [redacted] is the most phenomenal host and maker, from the introductions at the start of each session to the questions raised afterwards – the open discussions showered me with ideas that have been truly valuable." [redacted]

[redacted]

DIALOGUES
Making Sense
//
Making Literacies
3D Lab

Session 2
Embodied Practice // Disembodied Spaces
A series of three online Dialogues events co-created with [redacted] Session 2 shares the grappling with teaching embodied practice online, thinking through tacit knowledge and experimenting with how best to transfer making principles in an accessible, playful and engaging way; empowering students to be intuitive makers where they are, experimenting, talking into the void, trial and error.

DIALOGUES
Making Sense
//
Making Literacies
3D Lab

Session 1
Making Sense // Making Literacies
A series of three online Dialogues events co-created with [redacted] Session 1 is a panel discussion reflecting collectively upon the shift in thinking and doing around design and making practice; on new practices emerging from responding to the constant change in the learning landscape, by exploring what embodied making looks like in a disembodied online environment and the hybrid blended environment.

[redacted]

3D Lab
Guest Sessions
Welcome to designer & Co-Artistic Direction of interactive design studio, Stand + Stare
Barney Heywood

Barney Heywood
Stand + Stare develops innovative and beautifully-crafted ways to share stories that combine digital and physical experiences. Their work spans commissions within the heritage and museum sector, one-of-a-kind experiences for commercial clients, academic collaborations and direct engagement with local communities. Their projects connect people through multi-sensory experiences in the form of interactive exhibits, apps, performances and workshops. They make work that is accessible, creating shared experiences that a whole community can enjoy.

3D Lab
Guest Sessions
Welcome to textile artist and designer
Arantza Vilas

Arantza Vilas
The session unfolds the trajectory of Arantza's studio, Pinaki Studios, in developing textiles for costumes for Film and TV as well as interiors and projects on food design, all underpinned by an ongoing exploration of the passage of time and its patina on surfaces. Arantza shares her playful approach to the possibilities of textiles, materials and processes which has most recently led to research into colour

[redacted]

from food waste and pleated electronic textiles affiliated to the Wearable Computing Team at UdK (Berlin).

EPIC
WIN
3D Lab
Guest Sessions
Welcome to kinetic designer and artist
William Waterhouse

William Waterhouse
Will kicked off our very first 3D Lab Guest Session back in 2019 as part of his solo show, 'Epic Win' in the Wimbledon Space Gallery. For this session we ask Will to revisit this body of work over a year later by way of a springboard to unearthing his playful but highly considered approach to making. Will masterfully invites you into the wonder and awe of making whilst generously exposing how the magic is made in the earnest desire that you too might be enthralled as much as he.

3D Lab
Guest Sessions
Welcome to designer, artist and educator
Ameet Hindocha

Ameet Hindocha
We talk to designer, artist and educator Ameet Hindocha about his passion for geometry. He is a nationally and internationally sought after specialist in the creative exploration of geometry. We discuss geometry as a fundamental making literacy, as the framework often underpinning the physical world around us and its vast applications in design and making.

[redacted]

3D Lab
Guest Sessions
Welcome to site-specific performance makers
Forster & Heighes

Forster & Heighes
The 3D Lab has enjoyed lively and pertinent discussions about making and the making environment with Ewan and Chris before, during and after their recent residency at Wimbledon. We're excited to share with you a continuation of these conversations and in particular how they use the language and practice of making to shape and compositionally inform their work and their approach to performance.
Links mentioned in this session:
Speculation in Unimagined Space podcast
Trig Point map

3D Lab
Guest Sessions
Welcome to kinetic artist and educator
Oscar Peters

Oscar Peters
We talk to Oscar, live from Amsterdam, about his recent project *Volta* at the Electriciteitsfabriek in the Hague. Oscar uses kinetics and mechanics to explore violence, humor, the perfomative nature of objects and our interaction with them. Jonathan Armistead joins us to discuss making as an embodied process, material as performative and how Oscar attempts to democratize making in all aspects of his practice as a maker and educator.

[redacted]

3D Lab
Guest Sessions
Welcome to VR artist and designer
Alexander Walmsley

Alexander Walmsley
We talk to Alexander Walmsley, a Virtual Reality (VR) artist and developer specialising in the creation of immersive and interactive experiences. Alexander generously shared, live from Berlin, about his recent project *Stade 1620*, the multiplicity of narrative in VR, the material research behind historical reconstruction and translating the physical world into an immersive digital environment.

Accessibility Statement   Theme accessibility   Terms and Conditions

[redacted]

Appendix 13: Comparison of outcome spaces

Teaching Perspectives Inventory (TPI) Pratt *et al.*, (2000)	**Approaches to Teaching Inventory (ATI) Trigwell *et al.,* (1994)**	**Conceptions of Teaching Creative Practices (Drew, 2004)**	**Conceptions of Technical Pedagogies within the Creative Arts (This study).**
Transmission perspective: delivering content effectively.	Approach A: Teacher-focused strategy with the intention of transmitting information to students.	Approach A: Teaching is offering students a range of practical and technical skills.	Demonstrator: To increase awareness, confidence, and competence in the use of specific equipment, materials, or processes to enable independent and safe practice.
Apprenticeship perspective: learning through application and practice .	Approach B: Teacher-focused strategy with the intention that students acquire the concepts of the discipline.	Approach B: Teaching is developing students' critical, practical and technical skills through student interaction.	Instructor: To equip learners with the abilities to experiment and express their ideas per the requirements of their programme of study, and to become competent, capable, and employable practitioners.
Developmental perspective: building bridges between present and desired ways of thinking.	Approach C: A teacher/student interaction strategy with the intention that students acquire the concepts of the discipline.	Approach C: Teaching is developing students' skills and conceptions in the context of professional practice.	Consultant: To support and guide learners to identify, understand, and resolve problems to expand their practice beyond their current level of knowledge.
Nurturing perspective: providing safe and trusting spaces for learners to take risks, and make mistakes, celebrate success to build self-efficacy.	Approach D: A student-focused strategy aimed at students developing their conceptions.	Approach D: Teaching is helping students change conceptions.	Collaborator: To collaborate with learners in their processes of exploration and discovery in creating new knowledge.
Social Reform perspective: dominated by explicit, well-articulated social, political or moral ideologies.	Approach E: A student-focused strategy aimed at students changing their conceptions.	Approach E: Teaching is helping students to change as a person.	Transformer: To expand learners' skills, perspectives, and conceptions of their practice, challenging pedagogical norms to facilitate individual and institutional transformation and improve the world through graduates.