THROUGH THE EYE OF THE NEEDLE: WHY TEACH TO MAKE BY HAND IN THE DIGITAL AGE?

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Abstract

This study uses the experience of designing and teaching two contrasting sewing projects to explore the purpose of learning practical creative-technical skills in the digital age. By focusing on the activity and reflections generated by these projects in relation to established academic and professional descriptions of the making process, both inside and outside mainstream education, it has been possible to re-evaluate the purpose of a practical creative-technical curriculum as a vehicle for educating a diverse range of learners in the Digital Age.

New digital technologies are changing the way in which people interact with each other and with their environment. This inevitably challenges the relevance of established agendas for learning the practical skills we traditionally use to facilitate these interactions. This field of education has been hotly debated for decades and has been subject to many reformulations of the curriculum, the most recent being the new 9-1 GCSE in Design and Technology in England. Yet in many educational establishments, the process of teaching practical creative-technical skills has seen little change over time. By comparing policy documents with records of the practical experiences of both teacher and learner in different educational contexts, I aimed to distil and define key characteristics of this subject area. In so doing, I hoped to distinguish this type of learning experience relevant to digital natives and to students of all ages who participate in these activities today and to invite further debate about the value of teaching to make by hand in the digital age.

Chapter 1. Introduction.

“Truly I tell you, it is hard for someone who is rich to enter the kingdom of heaven. Again I tell you, it is easier for a camel to go through the eye of a needle than for someone who is rich to enter the kingdom of God.” [Matthew 19:23–24] (The Holy Bible, 2011)

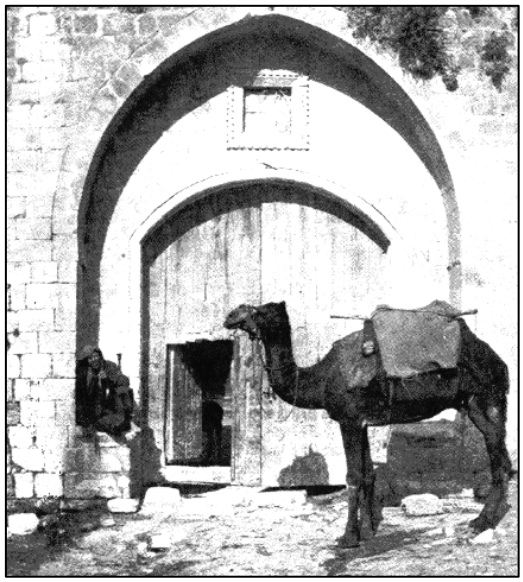


Fig.1. Example of an ‘Eye of a Needle’ doorway in Palestine. (Bible Picture Gallery, 2018)

The description of passing a camel through the eye of a needle is referred to in the Christian Gospels and the Qur’anic verse as a metaphor for the challenge of passing with ease or difficulty, from mortality here to possible eternity in the future. (Galadari, 2018). The *‘eye of the needle’* was also used to describe the small doorway in an entrance to inns in Palestine. (Bible Picture Gallery, 2018). Here, the eye of the needle can be seen as a metaphor for the narrow space which guides our focus and demands concentration in order to pass from plan to future result, or from novice to master. It can be viewed as a physical decision that demands our attention when moving forward, observing the interaction between mind, body and the choice of path ahead. Finally, the process can be seen as part of a broader set of choices which will impact our collective human destiny: how should we channel our efforts and in what direction? For this study, I describe two teaching projects where

students were required to engage in the activity of threading a needle, one with a group of adult learners and the other with a class of secondary school students. I invite you, the reader to consider the broader implications of the human act of repeatedly passing a thread through the eye of a needle.

1.1 Why bother learning to sew by hand in the Digital Age?

"Threading a needle may seem like a simple thing, but it's a skill that takes the meditative concentration of a samurai" (Redgrave & Hundley, 2015)

Fig.2. Threading a needle by hand.

Threading a needle is one of the simplest and yet most challenging practical tasks you can ask a student to do. I discovered this to my cost with a group of teenagers. When I started teaching in a mainstream secondary school last year, the thought of asking Design and Technology students to learn to sew by hand in six one-hour lessons, at the age of fourteen, seemed faintly ridiculous. It is time-consuming, fiddly and infinitely frustrating whilst the end result would be of limited service. So, with all my years of experience of designing practical skills projects, how did I end up in this predicament and, more importantly, why bother trying?

Hand craft makes no sense in an age of labour-saving devices and super-fast satisfaction. As a clothes-making tutor, people would often ask me, *"Why bother*

making clothes when it is so much easier to buy them?" Having repeatedly returned to the physical act of making during my own career, I have often asked myself the same question. When teaching others, I came to realise that I am not alone in this counter-logical behaviour. The evening classes I ran were often over-subscribed. Students would turn out every week, in the rain and dark to come to class. They arrived tired and drained after a day's work, and then proceeded to remake a pocket for the fifth time or spent half the class unpicking a zip they had put in upside-down. These people were not obliged to put themselves through this effort, so why bother?

Fig.3. Student unpicking a zip

Fig.4. Student revisions of a patch pocket

The dedication of these students appears to reflect a broader phenomenon whereby the more we seek to reduce the physical and mental labour of our work through digital technologies the more we seem to manifest greater demands for physical and mental focus in our lives. Practical engagement in sport, music, theatre, bakery and craft are all examples of this. There is a remarkable contradiction in the static nature of human activity generated by technological advances and the dynamic nature of human activity motivated, consciously or sub-consciously, by a desire to move to counter this immobility. The craftsman Peter Korn was recently quoted as saying *"craft has taken on a new life as a counter-virtual ideology"* (Lovelace, 2018). It is these motivations in relation to learning a craft that interest me.

If these activities represent a manifestation of some basic human needs, then what are these needs? What role do they perform? What do we gain? What is so essential about these types of activities that we not only decide to try them, but continue to go back to them in spite of the challenges? And if they are so fundamental to our being, as this engagement suggests, then what implications does this have for the educational opportunities we offer to our children?

These questions seem at once irrelevant in the face of technological progress and yet urgent in view of the human behaviours they manifest; too huge to contemplate and too enmeshed in the fabric of educational doctrine to unpick. For this reason, I chose to narrow the focus of my enquiry onto my own practice of sewing. I wanted to examine what happens as a result of trying to pass a thread though a needle, repeatedly over time and what happens when you try to pass that skill onto others. In this way, I used the activity of sewing to elucidate principles and beliefs associated with the diverse range of material disciplines that start with making something by hand.

What started out as a general interest in the motives for learning practical creative-technical skills, soon revealed to me a distinct contrast between the objectives enshrined in mainstream educational agendas and those voiced by students and educators both inside and outside this framework. I wanted to understand precisely why there appears to be such a disparity and to identify the features of this type of learning that have direct relevance to the lives of students now. This led me on a journey of enquiry into how we describe practical making skills, both inside and outside mainstream education, and how this corresponds to the value we confer on these activities. The culmination of this study is presented in the following pages.

1.2 What does making do for the maker?

The conundrum of, *'Why bother making clothes when it is so much easier to buy them?'* lead me to question what the process offers people beyond the face value of the product resulting from the invested effort. I asked myself *'What does the making process do <u>for</u> or <u>to</u> me?'* This generated some interesting reflections. I wondered whether my experiences were shared by other makers. What did learners gain from the process and how did they describe this? At the time, I was teaching a variety of community sewing classes to a broad range of adult students, including people with dementia, young parents, victims of abuse, professionals, office workers, graduates, immigrants and the long term unemployed. Verbal feedback from this broad spectrum of students often praised the courses for benefits beyond the technical skills prescribed by the course outcomes (see fig.6). Based on these, I started to add questions to course evaluation forms to stimulate comments to try to record some of these:

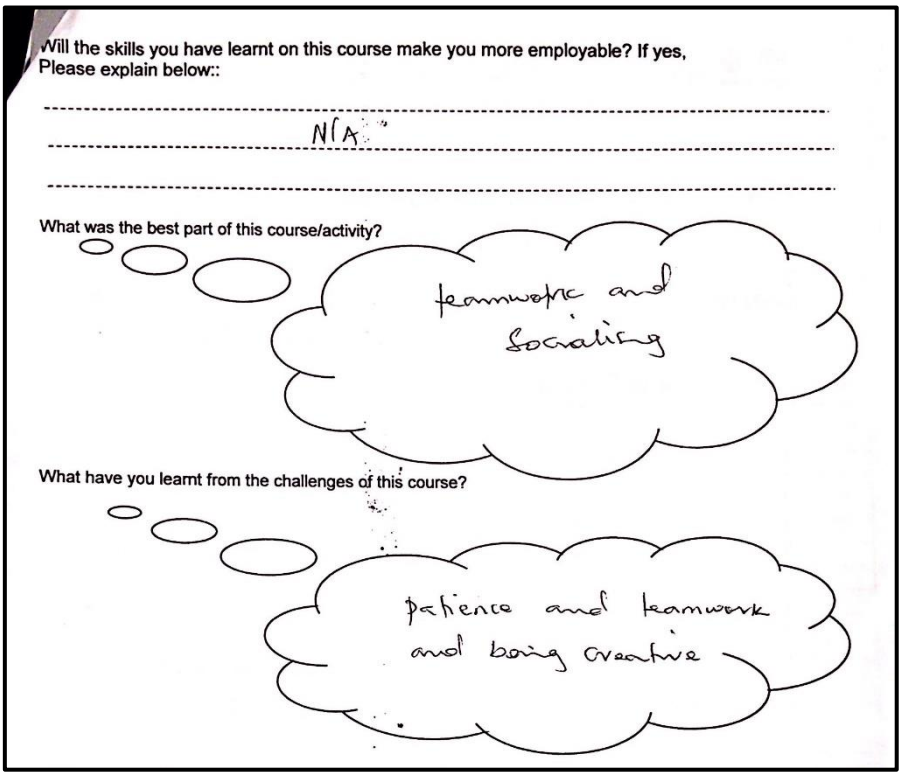
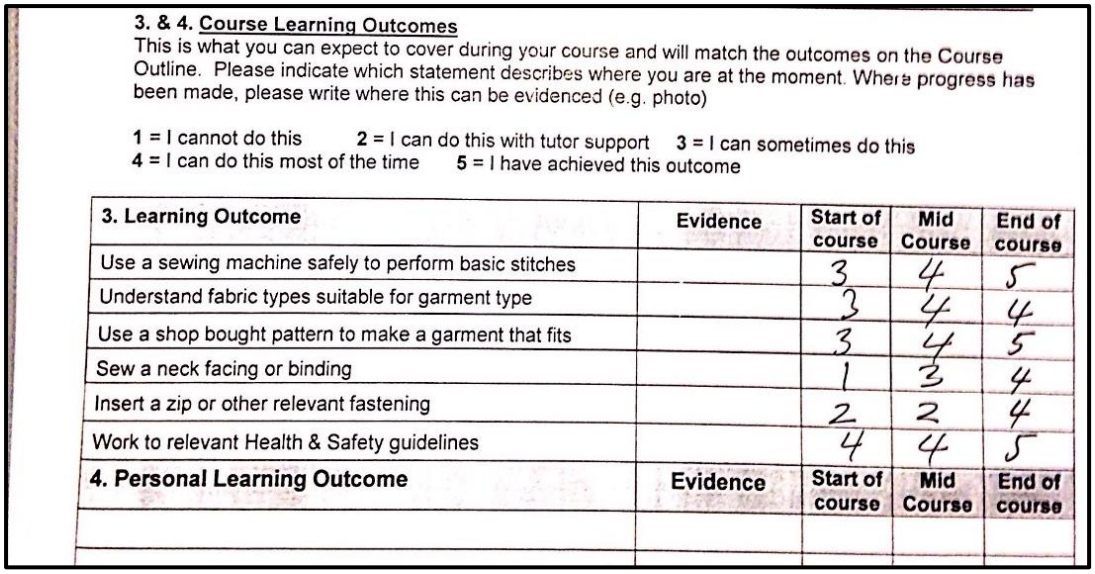


Fig.5. Part of an adult learner end of course evaluation form.



3. & 4. Course Learning Outcomes

This is what you can expect to cover during your course and will match the outcomes on the Course Outline. Please indicate which statement describes where you are at the moment. Where progress has been made, please write where this can be evidenced (e.g. photo)

1 = I cannot do this **2** = I can do this with tutor support **3** = I can sometimes do this
4 = I can do this most of the time **5** = I have achieved this outcome

3. Learning Outcome	Evidence	Start of course	Mid Course	End of course
Use a sewing machine safely to perform basic stitches		3	4	5
Understand fabric types suitable for garment type		3	4	4
Use a shop bought pattern to make a garment that fits		3	4	5
Sew a neck facing or binding		1	3	4
Insert a zip or other relevant fastening		2	2	4
Work to relevant Health & Safety guidelines		4	4	5
4. Personal Learning Outcome	**Evidence**	**Start of course**	**Mid Course**	**End of course**

Fig.6. Figure 1. Extract from an adult education Individual Learning Plan used to record student progress.

The results of these initial student responses generated the question that drove the central focus of this enquiry:

'What does the making process do for the maker?'

This is an open question which can relate to the activity ***and*** the results. I used this to as a vehicle to probe into how we describe and relate to the process of making. Rather than looking for a direct response, I wanted to access a broader sphere of understanding which may carry attached or subconscious meanings. The notion that the process does something to you suggests that there is a change during the activity of making, whilst the act of making assumes there is a motivation to make something at the end of it. The challenge then became how to shape a methodology that would capture both the *'face value'* articulation of this experience as well as the less obvious aspects that are perhaps incidental or under the radar.

1.3 Thesis Structure

My thesis title makes several personal and cultural assumptions which I needed to unpick before I could look afresh at the evidence in front of me. What is being made by hand and why is this worth looking at? What distinguishes the experience of students in the digital age from those of any other era? I needed to look at how we describe the process of making things. The collective 'we' also needed further examination; who is using the language and is there a consensus of understanding?

I start by setting out the linguistic terms of reference used in this study. This introduces the diverse range of origins and agendas represented by the words used to describe this field of education. I discuss these in more detail in Chapter 2. These terms of reference have, in turn, informed the methodological approach used for the collection and analysis of data, explained in Chapter 3. In order to contextualise the study and generate new insights, I describe the experience of planning and teaching two contrasting sewing projects; the first for adult learners in a community college (Chapter 4) and the second as part of a school Design and Technology General Certificate of Secondary Education (GCSE) course (Chapter 5). The patchwork of observations resulting from these courses provides the basis for a reflective analysis of the characteristics and purpose of teaching practical creative-technical skills (Chapter 6). I conclude by presenting recommendations for the provision an active educational making experience relevant to learners in the digital age (Chapter 7).

1.4 Comment on Glossary of Terms: Making, Craft, Design or Technology?

"It is significant that modern English has no word, equivalent to literacy and numeracy, meaning the ability to understand and appreciate and value those ideas which are expressed through the medium of making and doing. We have no word, equivalent to Science and the Humanities, meaning the collected experience of the material culture." (Archer, The Three Rs, 1979, p. 19)

In the title of this study, I use the phrase *'make by hand.'* In the introduction, I have used the phrase '*practical creative-technical skills.*' These are the terms I settled on after grappling with a variety of modern English language semantic interpretations of activities associated with the word 'craft.' A recent article in the American Craft Magazine introduces a range of views on this with the comment, *'"craft" is a curious word. We think we know it, but do we?* (Lovelace, 2018). The word has a variety of historical social and cultural connotations which I felt would confer a prescribed meaning to the handwork process I was trying to openly explore. Equally, this master's course referent for 'craft' is '*practical aesthetic skills'* which in British English, would misrepresent the skill as a discipline focused on visual appearances, which excludes the physical and technical demands and constraints of the craft process. Here it is also important to define what I mean by *'make by hand'*: I use this in the context of a craft where handwork is aided by simple tools and machinery; the projects at the centre of this study both use elements of hand and machine sewing.

As a result of background research into existing descriptors of the subject, I settled on '*practical creative-technical education'* as an umbrella phrase for the subjects that involve making things, including traditional crafts and engineering as well as making processes which embrace any number of new descriptors for technologies and materials. When referring to the simple act of using tools to manipulate materials into a useable form, I return to the word *'making.'*

I have summarised my research into the words associated with the process of making and learning to make in the glossary of term shown in Appendix 1. The meaning of many of the words has shifted over time. For this reason, I include both dictionary and documented definitions, alongside personal articulations of my understanding of the semantic referents of the word derived from my position as a native British English speaker and as a professional practitioner and teacher in this field.

Chapter 2. Understanding: Theory, Policy & Folklore.

2.1 A patchwork of language and practices

When I started to look for documented research into the teaching and learning of practical skills, I found the discourse around practical education to be fragmented, being generated by separate communities of educators. More tellingly, the language used to describe practical skills education is diverse and has changed significantly over time. Yet many of the processes the language seeks to describe have changed little in thousands of years of human history. Sewing clothes is said to be one of the earliest recorded human activities; our Paleolithic forbearer will have held a fishbone needle between the finger and thumb to thread with fibrous strands in just the same way that I and my students hold a metal needle today to push through a piece of polyester or cotton thread.

Fig.7. Magdalenian Upper Paleolithic bone needles (17,000 to 12,000 years ago) (British Museum)

The fact that I am still teaching a practical handwork process today, in the age of the digital economy, raises questions about the purpose and priority of this type of activity in a modern educational curriculum. This is not a new question. Penfold introduces an article about the ideas and policies that shaped the then named

subject of *craft design and technology* by saying, *"The pendulum of change has swung violently, propelled by rival personalities and pressure groups."* (Penfold, 1987, p. 34). In the developed world, the relationship between the economic needs for a practically skilled work force and the growth of new technologies has continued to shape our cultural and establishment perceptions of the role of making in the classroom. The books *Teaching Technology* (Banks, 1994), *Issues in Design and Technology Teaching (Sayers, Morely, & Barnes, 2002)*, and *Debates in Design and Technology Education* (Owen-Jackson, 2013) all discuss the resulting push and pull between policy makers and educators that have shaped this field of education during the past fifty years. When I looked more closely at the documented learning objectives this has generated in relation to my own understanding of professional and personal motivations to make something, I became uncomfortable with the scope and purpose assumed by the subject currently defined by the national curriculum under the term *Design and Technology (DT)*. I am not alone.

2.2 A cacophony of experts

In his book Teaching Technology (1994), Frank Banks presents a range of authoritative and evidenced challenges to the rationale and attainment targets defined by the national curriculum for this subject in England and Wales. In chapter 5, Robert McCormick describes how the subject was born out of a number of *'antecedents'* including *"craft, art and design, science, home economics and science, technology and society (STS)"* (Banks, 1994, p. 42). He goes on to describe how *"Most subjects are created by a long process of development, perhaps involving universities. Technology, on the other hand, was created by committee,"* (Banks, 1994, p. 50). Here, McCormick is talking about the *'technology'* descriptor of the subject. The same could be said of the *'design'* descriptor. He notes numerous government funded bodies and influential voices who contributed to the formulation of the subject in the late 1980's (Banks, 1994, p. 44). One interesting detail is his comment about the background of the people on the Design and Technology

Working Group, who advised the government on the scope and content of the subject in the national curriculum:

"The listing in the final report (DES/WO, 1989, p. 102) *indicates that of this group only one member represented the world of practising technologists (Denis Filer from the Engineering Council), with another from 'business.' The other ten were, in one way or another, associated with education"* (Banks, 1994, p. 50).

This is notable as a marker of the disconnect that had already manifested by 1989 between professional bodies and educational advisors in relation to the construction of what was, and is still, culturally perceived as a vocationally motivated group of subjects. It is also notable for the reference to the only *'practising technologist'* as being from the Engineering Council. Today, the *'technology'* referent of the subject has migrated from this original association with the practical technical know-how of engineering and manufacturing towards a largely cognitive appreciation of digital technologies such as smart and modern materials, computer-aided design and systems control (Ross, 2017). Despite numerous subsequent reformulations of Design and Technology in schools, this original conception seems to have succeeded in not only seizing *"the opportunity to sweep aside the special interest groups that might have lobbied for their own brand of design and technology,"* but also in organically disconnecting it from its cultural and economic raison d'etre.

The book *Understanding Practice in Design and Technology* comments that *"in the early 1960's the subject did not even exist in anything remotely like its present form."* (Kimbell, Stables, & Green, 1996, p. 9) and that, *"It is because of this newness that it is so unstable, and this instability makes it vulnerable."* (Kimbell, Stables, & Green, 1996, p. 10). For this very reason, this subject at general certificate of secondary education level (GCSE) has already undergone several name changes in my life time. When reading the following list, consider the implications of subjects such as Physics, French or History undergoing similar re-branding exercises.

1950's -1970's: Separate courses: **Woodwork, Metalwork, Technical Drawing, Needlework and Dressmaking, Home Economics (**previously **Domestic Science)**

1987: Craft, Design and Technology introduced to amalgamate these pre-vocational courses, while earlier courses persisted.

1989: Design and Technology defined by the new National Curriculum in England and Wales

2007: The antecedent subjects had persisted and were rebranded to incorporated new materials and manufacturing processes.

GCSE Design and Technology: Electronic Products

GCSE Design and Technology: Food Technology

GCSE Design and Technology: Graphic Products

GCSE Design and Technology: Resistant Materials

GCSE Design and Technology: Systems and Control

GCSE Design and Technology: Textiles Technology

GCSE Design and Technology: Product Design

2017: GCSE Design and Technology - the different GCSE curriculums above have been remerged into one subject which has consequently resulted in most schools who teach textiles choosing to teach GCSE Art Textiles instead. Food Technology reclaimed its function as a separate food preparation and nutrition subject in 2015

These word changes are used to include or exclude certain types of activities associated with the methods and motivations to make. To complicate this further, the subject has been expected to absorb a broad variety of new activities which have been introduced as a result of the assumption that these subjects are 'pre-vocational' and that as such, schools should be preparing students for using new technologies

in the work place. These are represented here in the diagram published in the book *Debates in Design and Technology Education* (2013)

Skills	*Up to 1960s*	*1970s*	*1980s*	*1990s*	**2013**	*Future?*
Hand tools						
Machine tools						
Drawing skills						
Designing skills						
2D CAD						
3D CAD						
Rapid prototyping						
Knowledge						
Properties of materials						
Materials processing						
Manufacturing systems						
Strategic knowledge						
Technology and society						

Fig.8. Skills and knowledge in the teaching of design and technology (Owen-Jackson, 2013, p. 65)

Since this was written there has been the addition of skills such as customer research and knowledge such as sustainability and *'the work of others'* (Ross, 2017). Clearly the addition of extra skills and knowledge into a finite school timetable creates further opportunities for debate about what has value and what should receive less attention. Owen-Jackson questions: *"Are all the skills still necessary? Is all the knowledge still relevant?"* (2013, p. 66)

The diversity of antecedent disciplines that have been amalgamated into the subject of Design and Technology and the corresponding diversity of opinions about its value and purpose have continued to confuse and complicate the subject. A book written nearly ten years after the national curriculum conception of the subject introduces new teachers to Design and Technology by saying:

*"Teachers may consider Design and Technology to be a **'competence-based'** subject, teaching pupils **how things work** and **how to carry out practical tasks**. Others may see it as **preparing young people for work,** yet others may see it as a way of helping pupils **develop their knowledge and understanding of themselves**. These different views will be held by teachers whom you meet and work with and their different views will influence the way in which they teach the subject."* (Owen-Jackson, 2007, p. 5) Bold added for emphasis.

When we look beyond the educational context to the associated practices and professions that this subject area represents, we are faced with a broader complexity of cultural assumptions which have shaped the subject and which continue to contribute to its instability and identity crisis.

2.3 Hierarchy vs. Holism

The aim of the national curriculum in England and Wales (Department for Education, 2013) was to introduce consistency to the knowledge and skills being taught in schools. The idea that student learning should be a structured system of knowledge which progressively builds understanding of a subject originates from debates around the aims and practices of education at the start of the twentieth century. Prior to this education was a community or private enterprise, not a government concern. By the 1930's, the vocational impact of mass industrialisation, combined with research into developmental psychology and pedagogy, had led to a landscape of hugely diverse educational theories and practices. Dewey's attempt to navigate a path through the conflicting agendas of progressive and traditional education is summarised very eloquently in his book (Dewey, Experience and Education, 1938). Ten years later in 1948, at the Convention of the American Psychological Association, Benjamin Bloom led a forum to discuss the nature of thinking and acquisition of knowledge. Bloom became preoccupied with distilling the most important factors influencing educational goals and objectives. Working with a group of educators he identified three domains involved in the process of learning:

- **Cognitive** – knowledge based domain: thinking, analysing, understanding, etc.
- **Affective** – attitudinal based domain: emotions, feelings, impulses, behaviours
- **Psychomotor** – skills based domain: physical movements and practical doing

Interestingly, these echo Aristotle's division of educational disciplines into the **theoretical, the practical** and **the technical** (Aristotle, 2004). At the time Bloom acknowledged that the Cognitive Domain was the easiest to classify because of the wealth of existing scientific study providing material to classify. The result was the *Taxonomy of Educational Objectives. The Classification of Educational Goals, Handbook 1: Cognitive Domain* (Bloom, et al, 1956). Handbooks for the Affective and Psychomotor domains were never written by Bloom.

It is no surprise that a guide to scaffolding knowledge that was generated out of a psychological academic study should be adopted with enthusiasm by the academic community in order to facilitate and proliferate this interpretation of the education system. Today, Bloom's Taxonomy has entered the realm educational folklore. The 2001 revision of the taxonomy acknowledges that most teachers do not have the time to read the original so rely on others' interpretations (Anderson, Krathwohl, & et al, 2001, p. xxiii). The revision has slightly re-ordered the original hierarchy of knowledge skills to align with a modern understanding of developmental learning; creativity is now placed at the top in place of evaluation. The book also presents an overview of alternative interpretations of how we think and learn, however it still focuses on the cognitive domain, to the exclusion of all else.

In a search for subsequent descriptions of the psychomotor domain I found three interpretations drafted in the 1970's: (Dave, 1970), (Simpson, 1972), (Harrow, 1972). These identify a similar scaffolding approach to practical skills to the cognitive scaffolding described by Bloom's Taxonomy; observation or imitation of skills is placed at the bottom; natural, efficient performance at the top. This assumes a hierarchical learning model which has already accepted a dissection of the practical creative process and which confers relative value judgements on the separate aspects of the process. Notably, this does not correlate with other models of practical skill acquisition described by proponents such as Otto Aron Salomon (1898), Rudolf Steiner (Hauck, 1968), Mahatma Ghandi, Maria Montessori, and currently Aonghus

Gordon and the Ruskin Mill Trust (2018). These models are often referred to as 'holistic' because they describe a 'hands on' approach which integrates other developmental aspects of learning. This is distinct from the academic hierarchical model. To demonstrate this, I ask you to consider these two popular illustrations used to represent two different learning models, the left is a diagrammatical interpretation of Bloom's Taxonomy and the second is an illustration drawn by Leonardo da Vinci around 1490 known as Vitruvian Man, sometimes referred to as the Proportions of Man:

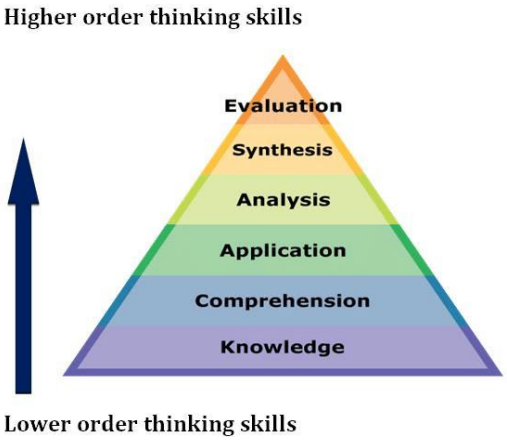


Fig.9. Bloom's original Taxonomy of Educational Objectives (Ilyas, 2016)

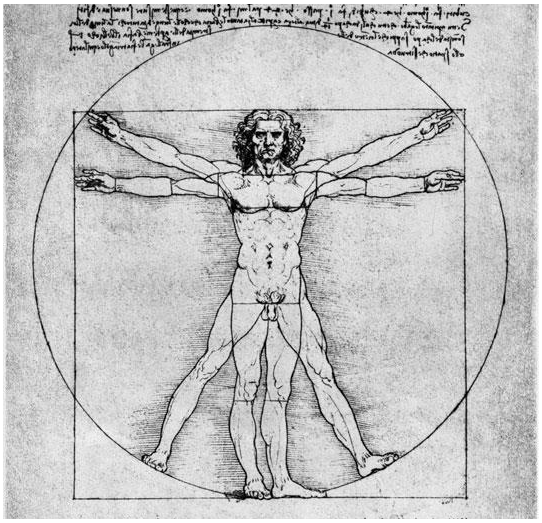


Fig.10. Leonardo da Vinci's Vitruvian man (Richter, 1952, 2008, p. 139)

The triangle used to explain Bloom's academic construction of the cognitive hierarchy represents only one of three aspects of learning. Leonardo da Vinci's Vitruvian man is often used to represents an organic or holistic interpretation of learning and applying knowledge, and was used on the cover of Richard Kimbell's book *Understanding Practice in Design and Technology* (Kimbell, Stables, & Green, 1996). This illustration forms part of da Vinci's extensive study of *"the life and structure of things"* which included *"four universal conditions of men"; "mirth, weeping, strife and labour;"* plus *"attitudes and movements"* and *"the nature of the five senses."* (Richter, 1952, 2008, pp. 137-8) In this drawing, Leonardo da Vinci integrates human and scientific proportions and references movement of the human

body with the overlaid dual positioned image. This suggests an interrelationship of man with science and nature through senses, movement, emotions and behaviour.

Leonardo da Vinci was working at a time when the various branches of academic study did not exist. By the time Bloom was contemplating the classification of learning processes, the divergence between the holistic (practical) and the scientific/academic (cognitive) interpretations of knowledge and learning had already been clearly set in stone. The Western distinction between physical processes and mental processes of study were constructed in separate institutions: Universities for academic study and 'Arts & Technology' colleges for vocational and practical studies.

Fig.11. Christchurch College, Oxford (About Britain, 2016)

Fig.12. Old Brighton Technical College (Right Move, 2016)

In his book *Homo Deus. A brief history of tomorrow,* Herari describes the current diverging patterns of natural and algorithmic human behaviour in the digital age as '*the Great Decoupling*' (Harari, 2016, pp. 356-408). He notes that when one belief system becomes more dominant and successful than another, the other becomes redundant. In education, this happened when the desire to create greater unity between these two systems was reflected in the Robbins Committee report of 1963. Whilst acknowledging that different institutions may perform different functions it nevertheless placed a higher value on academic achievement:

"when institutions of higher education teach what will be of some practical use, we must postulate that what is taught should be taught in such a way as to promote the general powers of the mind." (Robbins, 1963, p. 6)

The Robbins Report called for a *"principle of equal academic awards for equal performance,"* (Robbins, 1963, p. 8). Since then there have been several attempts to formulate the design and make process in order to accommodate parity of perceived value with other academic subjects, the most notable being the work of Richard Kimbell and his colleagues under the government Assessment of Performance Unit (APU) research which spanned a decade and which became instrumental in shaping the subject of Design and Technology as it exists today across many countries (Kimbell, Stables, & Green, 1996, p. 7), (Stem Learning, 2013).

The desire to understand the design and make process and to *'stabilise'* it into a standardised model for teaching and learning the subject, led to many articulations of the subject in the 1980's and 1990's, (Penfold, 1987), (Banks, 1994), (Kimbell, Stables, & Green, 1996), (Sayers, Morely, & Barnes, 2002), (Owen-Jackson, 2013). These were largely researched by academics and teachers, not by industry professionals or practitioners. As a result, the dominant academic interest in cognitive processes and the positioning of creativity as a form of higher order thinking (Anderson, Krathwohl, & et al, 2001), led to a structural focus on individual cognition and achievements:

"Since …1990, there has been a change in the philosophy towards D&T, from it being a subject dominated by practical skills to one that, at its best, challenges pupils and engages them in decision making, problem solving, analysing, justifying, evaluating as well as developing practical skills." (Owen-Jackson, Debates in Design and Technology Education, 2013, p. 27)

Note, this statement, attaches a higher value to the cognitive processes over practical skills. This reflects a mind-set which views repetitive manual processes, such as those developed during the clothesmaking course I describe in Chapter 4, as having a lesser or inferior value (Kimbell, Stables, & Green, 1996, p. 28), (Wolf, 2011), (Sennett, 2009) (Korn, 2013).

Richard Sennett, in his book *The Craftsman*, discusses our uncomfortable relationship with the act of making in greater depth. He describes how "*in Western*

history practical activity has been demeaned, divorced from supposedly higher pursuits" and *"pride in one's work treated as a luxury."* (Sennett, 2009, p. 21)

In the meantime, the Robbin's Report recommendations that colleges of advanced technology should award degrees and that some of these institutions should be promoted to university status has resulted in the arts and technical colleges being converted into universities or being closed down. Today, Christchurch College Oxford in figure 11 above continues to offer a range of academic courses, while Brighton Technical College shown in figure 12 now offers a range of residential accommodation. The ramifications of this absorption of the practical knowledge system into the academic system are still working their way through the educational establishment today.

2.4 Words, Words and More Words

To try to understand how this trajectory of change in the creative-technical group of subjects translated to the skills and knowledge that students are required to learn, I sought out an old GCE Needlework and Dressmaking practical exam paper from 1972 and compared it to GCSE Textiles Technology coursework from 2001 and exemplar GCSE Textiles Technology coursework from 2016. The differences are striking. All the exams have a written exam and a practical based exam. Here I compare the practical exams. In 1972 students were required to amend a garment pattern in a preparatory session of 30-40 minutes and then to cut out and sew part of the garment in a two our practical exam. The exemplar 2016 coursework is used to explain and record the practical controlled assessment work of the student. This represents approximately 45 hours of class work covering all aspects of designing and making a whole garment, in this case the candidate has made a dress. I show four pages of the coursework here; the source guidance includes twenty possible similar pages. In 1972 students were only required to write their name and centre number as part of the practical test, by 2016 the amount of written work in relation to the practical making is huge. As a marker of what students were expected to produce just fifteen years earlier, the 2001 coursework shown here was awarded a

grade B despite consisting of considerably less writing. To achieve an equivalent grade today the student would be required to produce a similar amount of writing to the 2016 exemplar. These examples demonstrate the trajectory of the inclusion of more and more words to the assessment criteria of the GCSE exam practical component from the 1970's to the present day. This is a direct result of the progressive attempts to align the practical qualification to that of other academic qualifications.

1972 Needlework and Dressmaking Practical Exam Paper:

650/2

650/2
ORD. LEVEL NEEDLE-WORK AND DRESS-MAKING 2 (PRACTICAL)

Thursday
29 JUNE 1972
Preparation session
30–40 *mins.*
The Test
2 *hours*
Afternoon

UNIVERSITY OF CAMBRIDGE
LOCAL EXAMINATIONS SYNDICATE
General Certificate of Education

NEEDLEWORK AND DRESSMAKING

ORDINARY LEVEL

PAPER 2 (PRACTICAL)

Preparation session for cutting out (30–40 *mins, see Instructions to schools.*)

The Test (2 *hours*)

You are advised to study the question paper carefully with the sketch, the pattern and the fabric, before cutting out.

A pattern (5 pieces) of a dress is provided.
A sketch (View E) is on the envelope containing the pattern. In the preparation session you are to shorten the pattern of the dress and cut out the upper part of the right half of the dress and in the test you are to make up this part of the dress.

N.B. The buttons on the shoulder seam are a decorative trim and should be ignored.

Materials provided
Butterick pattern No. 5703, size 8 (5 pieces).
21 in (53 cm) of fabric about 36 in (92 cm) wide.
A piece of interfacing about 4 in (10 cm) long and 10 in (26 cm) wide.
Sewing thread to match the fabric.
Tacking cotton.

[Turn over

2

PREPARATION FOR THE TEST

Write your name and index number on the envelope provided.

On pattern pieces Nos. 1 and 3 cut along the upper lengthening and shortening line and discard the lower part of each pattern piece. On pattern piece No. 4 cut along the centre front line and discard that part of the pattern which does not bear the pattern piece number.

Place the prepared pattern on the fabric as shown in the layout and cut out the right half of the upper part of the dress. Cut out the interfacing for the half collar.

When you have finished cutting out, place your work and the spare fabric in the envelope.

THE TEST

Make up the right half of the dress to show:

(*a*) working the back neck dart (do not work the back waist dart);

(*b*) joining the front of the dress and the upper side front (you need only show about 4 in (10 cm) of seam neatening to include the point);

(*c*) working the shoulder and side seams;

(*d*) making the half collar, which is to be interfaced, and attaching it to the neckline;

(*e*) joining the armhole facing and neatening the free edge;

(*f*) neatening the armhole with the prepared facing.

N.B. It is important that pressing is done at all stages in the making up.

At the end of the examination sew on to your test a label bearing your name and index number. This label should not cover any stitching and should be on single fabric. Remove the needle and any unnecessary pins from your work. Fold your work carefully and place in the envelope provided but do not include the scraps of fabric which you have left over.

Fig.13. GCE O'Level Needlework and Dressmaking exam Paper 2 (Practical) 1972

2001 GCSE Design and Technology Student Coursework – Cushion Project

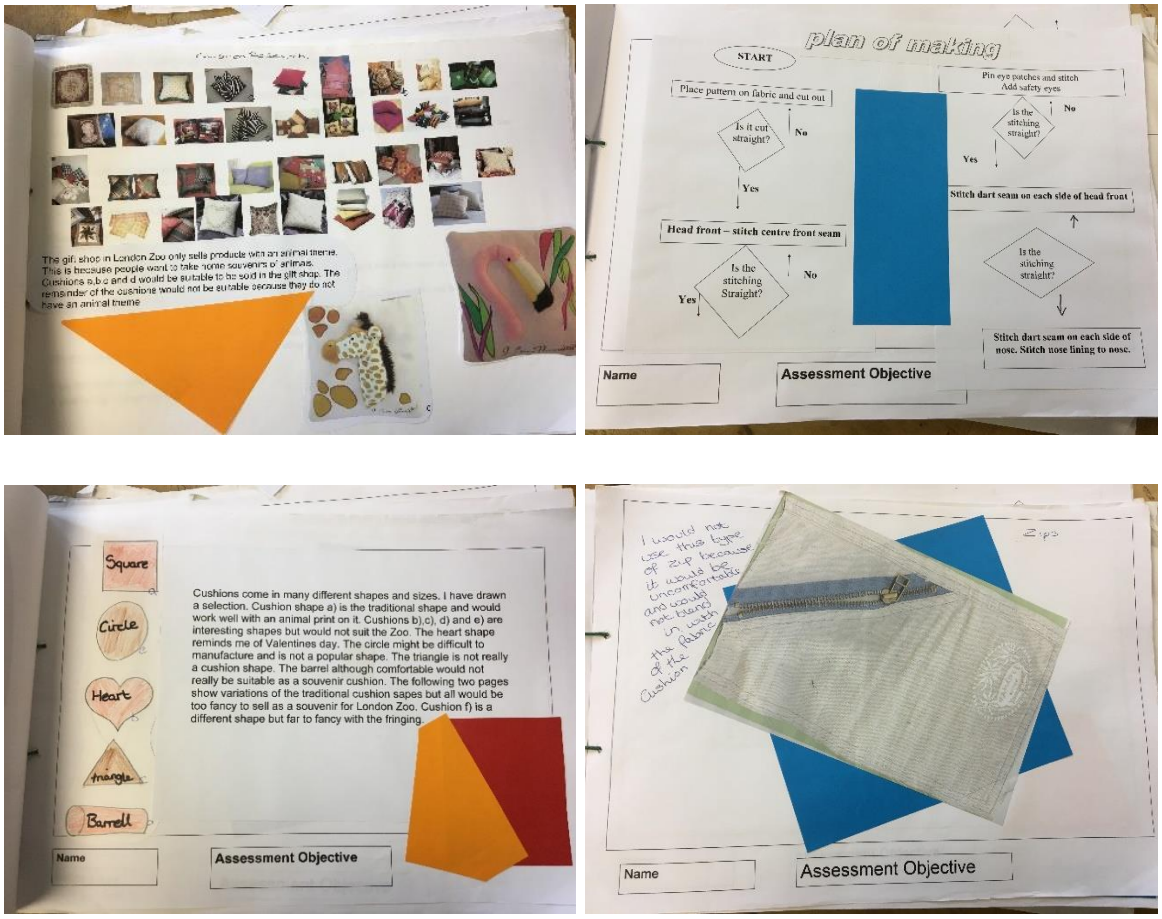


Fig.14. OCR GCSE Design and Technology (Textiles) student coursework 2001

2016 GCSE Textiles Technology exemplar student coursework.

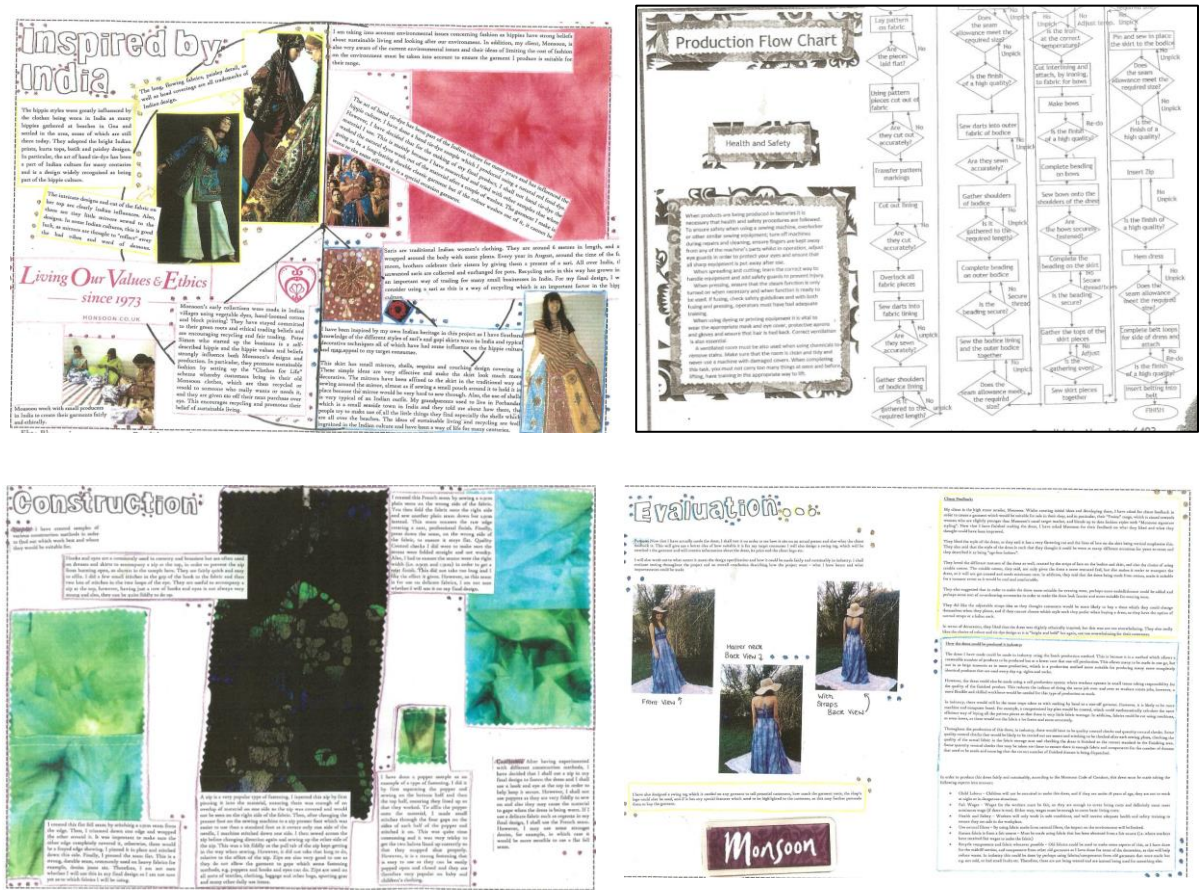


Fig.15. AQA GCSE Textiles Technology 2016 exemplar student coursework. (Surbiton High, 2018)

2.5 How do you measure difference?

The written content has proliferated over time, partly in response to the merging with academic logic and partly as a means to distinguish differences between grade boundaries. The Robbins Report aimed to set up *"co-ordinating principles"* and *"a general conception of objectives"* (Robbins, 1963, p. 5). There are several benefits to this:

1. To create parity with other (academic) subjects.
2. To distinguish unambiguous difference in student work

3. To create clear learning objectives
4. To scaffold student learning
5. To measure and drive up standards

These are all accepted cornerstones of the modern education system. It is hard to imagine an education system that doesn't provide clear learning objectives and the means to evidence and assess progress. The problem here is the word *'unambiguous'* and the assumption that the *'principles'* and *'objectives'* of the separate knowledge systems that had evolved through the two branches of higher education are directly comparable. In reality they were not. The Wolfe Report (2011) was highly critical of this approach in education:

> "*[T]here have been many calls over the years for greater parity of esteem between academic and vocation qualifications, in practice this has meant making what is practical more academic, to the detriment of both*" (Wolf, 2011, p. 6)

The book Debates in Design and Technology Education tracks the impact of this and comes to a similar conclusion:

> *"The problem…is that the same measure tends to be used for a variety of purposes, irrespective of its suitability for purpose…So, rather than raising standards as is the intention, the misuse of assessment data may have a detrimental effect."* (Owen-Jackson, 2013, p. 183)

So, what is the detriment? The answer lies in the data I collect on end of course evaluations. The course objectives and corresponding evaluation forms are clear and unambiguous, however these conveniently or wilfully ignore a diverse range of other outcomes, such as changes in personal feelings or making social interactions. I started to refer to these outcomes as *'by-products'* of the practical learning activities simply because they were not pre-defined outcomes.

Whenever I tried to discuss the omission of these outcomes from the community learning courses I taught, I was told that the difficulty is these are 'soft outcomes' and therefore were not *"SMART*": Specific, Measurable, Assignable, Realistic and Time-related. To me, this sounded like a business framework for setting targets rather than

a means of describing practical learning objectives. It was therefore no surprise to find that the term is first attributed to an article by George Doran in the business 'Management Review' journal:

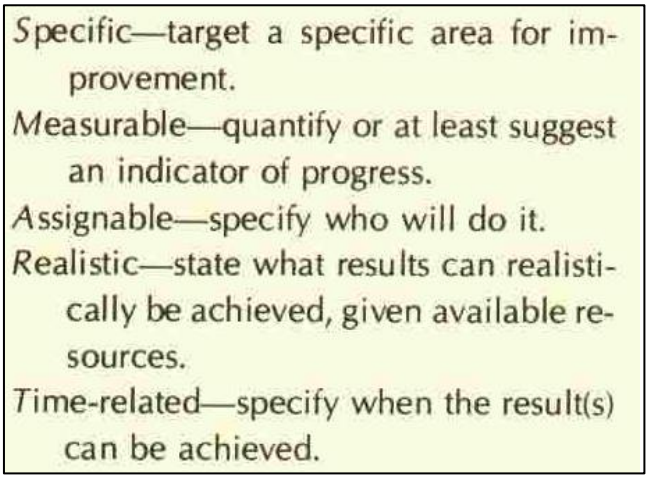


Fig.16. (There's a S.M.A.R.T. Way to Write Management's Goals and Objectives, 1981, p. 36)

The difficulty for me was trying to understand the logic that tried to measure visual, emotional and sensorial outcomes in the first place. Bloom acknowledged the significance of feelings and emotions in the learning process by identifying the 'affective domain' but he shied away from trying to define these as objectives commenting:

"Several problems make it so difficult. Objectives in this domain are not stated very precisely ... It is difficult to describe the behaviors appropriate to these objectives since the internal or covert feelings and emotions are as significant for this domain as are the overt behavioural manifestations." (Bloom et al, 1956, p. 7)

This did not help me. Not only was I concerned that the achievements of my students were not being fully recognised but I was also concerned that these aspects of the making process had been artificially excluded. In an effort to include them, early in 2017, prior to this study, I attempted to measure soft outcomes using the Warwick Edinburgh Mental Well Being Score (WEMWBS) (Warwick University, 2015). This is a structured questionnaire which asks participants to rate the impact of a period of activity or learning. This has proved very popular in the support of funding

bids for organisations such as Kent Sheds (Council, Kent County, 2019), which support community mental health projects. However, from a teaching perspective, I felt the need to pre-define outcomes was counter-productive and that it's use contributes to the conception that outcomes were either *'soft'* or *'hard.'* When viewed in relation to the exam board interpretations of achievements, this distinction seems quite logical:

"Some outcomes do not require specific tools to measure them because they are easily observed. These ***'hard' outcomes****, such as level of qualifications or sustained tenancies, have* ***easily-defined*** *indicators: the actual qualifications received. However, many important* ***'soft' outcomes****, including* ***improved personal capabilities****,* ***self-esteem****, or* ***changing attitudes or beliefs****, are* ***more difficult to measure****."* (Mullen, 2014). I have added bold for emphasis.

However, if the words are removed (see fig 18), then the old dilemma of how do you judge visual aesthetic value leaves the teacher, examiner and government regulators exposed to challenges of validity, rigour and parity. In view of the logic of visual dialogue I discuss in Chapter 3.5, this raises the question of how should we measure difference in creative-technical outcomes without the reliance on linguistic definitions?

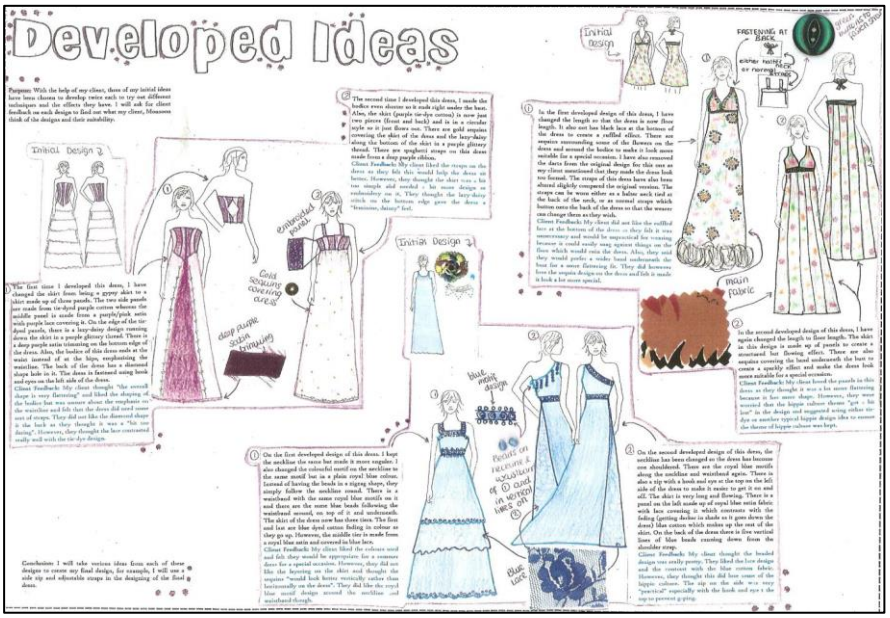


Fig.17. AQA GCSE Textiles Technology 2016 exemplar student coursework. (Surbiton High, 2018)

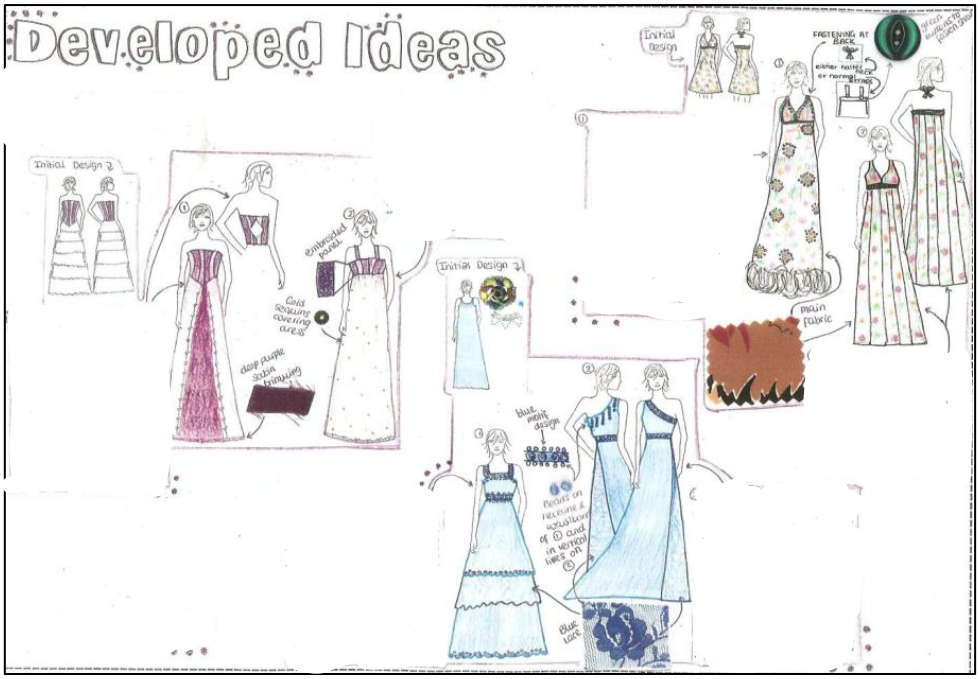


Fig.18. AQA GCSE Textiles Technology 2016 exemplar student coursework. (Surbiton High, 2018) – I have removed the words.

Ultimately the exam board construction results in a broad pre-formulated menu of outcomes, whereas the design-technology process filters a diverse range of influences into a narrowly focused but individual and temporal resolution. The demands placed on students to slot into the exemplar pre-defined outcomes has resulted in complex assessment rubrics and an almost neurotically detailed level of guidance for students about how to 'create' the required outcome (Surbiton High, 2018) but what skills will the student gain from completing this tick box guide and who will would need to read that level of detail? Certainly, in industry, no-one would have the time to write let alone read this type of document. Trying to pin down knowledge to this level of detail reflects a huge amount of misdirected effort.

2.6 The voice of the Craftsman: From manual to monologue

To try to understand how the value of practical creative-technical skills is described and celebrated beyond the establishment educational framework, I looked for historical and present-day articulations of the making process from professionals.

Richard Sennett comments on the lack of historical accounts from the makers' perspective and comments that the written *'tomes'* issued by the guilds consisted of extensive *'know-how-to'* (Sennett, 2009, p. 137). In reality, there is a wealth of tradition and knowledge about making processes which has been passed on to us today but which has not been written down. They exist as signs and symbols scratched onto surfaces or reproduced in technical manuals or pattern templates; see figures 19 & 20 for examples). Or they exist in role-modelled exemplars of work and live master demonstrations.

"What endures, what does not decay, is the technique of focusing on the right angle." (Sennett, 2009, p. 128).

The significance here is that the craftsman's skill and knowledge is disseminated with minimal use of written language and the signs and symbols represent what Harari describes as a partial script (2011, p. 139) which carries sufficient knowledge for the practitioner to use and which, significantly, hides understanding from the uninitiated.

In the past it was not necessary to use language to justify the physical encounter with our material environment, it was simply an integral part of our means of survival. Now however, our growing interdependence with digital technologies has diminished our economic need to use our bodies to make things and has concurrently increased the value of written and numerical data: words and numbers are the currency of trade in the digital economy.

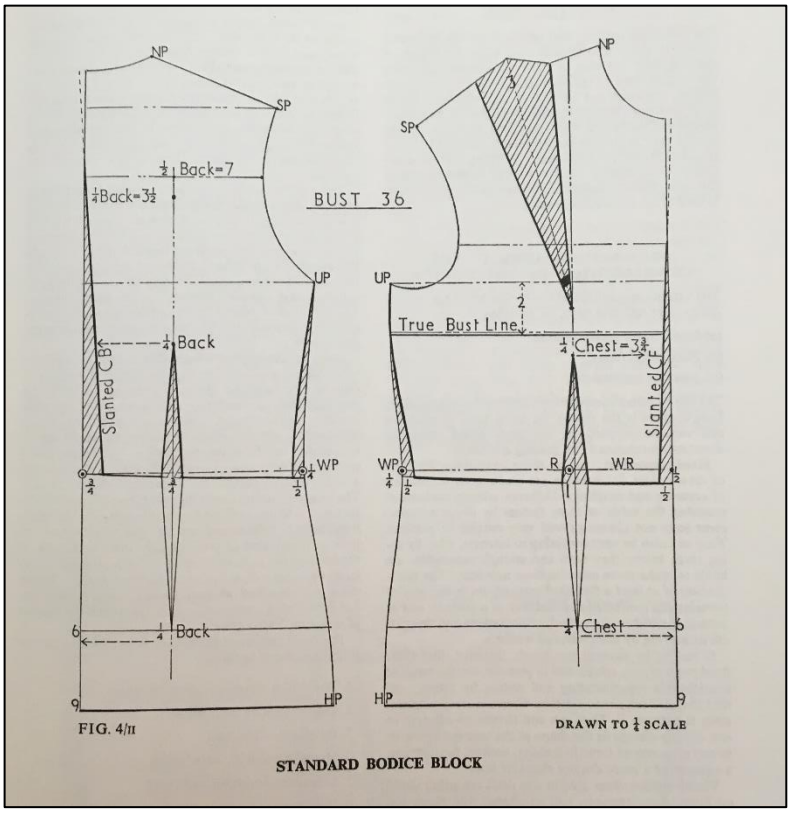


Fig.19. Diagram of how to shape a waist on a garment pattern (Bray, 1970, p. 21)

Fig.20. Student using a pattern to guide the process of making a pocket.

Harari discusses the broader impact this has had on our cultural values in his book *Homo Deus: A Brief History of Tommorrow* (2016). As a historian, I found his perspective of this current phase of human behaviour became helpful when trying to situate the material gathered by this study in relation to the evolution of the broader socio-economic ambitions that have shaped the pre-vocational subjects taught today. Similarly, tracing the origins of the cultural assumptions attached to the term 'craft' led me to the work of Henrietta Lidchi who looks at historical contexts which impact how we attach significance to the items we make and use. Her observation of omissions of value and purpose ascribed by those who are disconnected from the process (Lidchi, 2012) presented parallels with my own thoughts about the interplay of perceptions of purpose between the authoritative course doctrine and the day to day commentary of those engaged with the practice, which I encountered during the course of this research.

When looking for studies of human processing systems which describe how we interact with the physical world around us from a sensory-hormonal-cognitive perspective, I found articles from the neuroscientific community helpful (Kelly Lambert, 2016), (Magsamen, 2010). In particular, I referred to the book by neuro surgeon Frank Wilson, *The Hand: how its use shapes the brain, language and human culture* (Wilson, 1998), and to the work on contextual perception by the philosopher Barry Smith (The Uncommon Senses, 2017).

Today, digital publishing platforms are a rich source of perspectives and accounts from the maker community, (Alabama Chanin, 2018), (Rodabaugh, 2018), (The Do Lectures, 2018) (American Craft Council Stories, 2018). In the past, crafts people had neither the need nor the means to express themselves in mainstream media. Today, the proliferation of internet blogs, posts and videos has, in turn, given currency to these types of accounts, so it is now possible to read journals and books written my makers which are decisively not technical manuals; they are very personal and modern descriptions of the practical creative-technical process and what it offers, often written in some considerable detail.

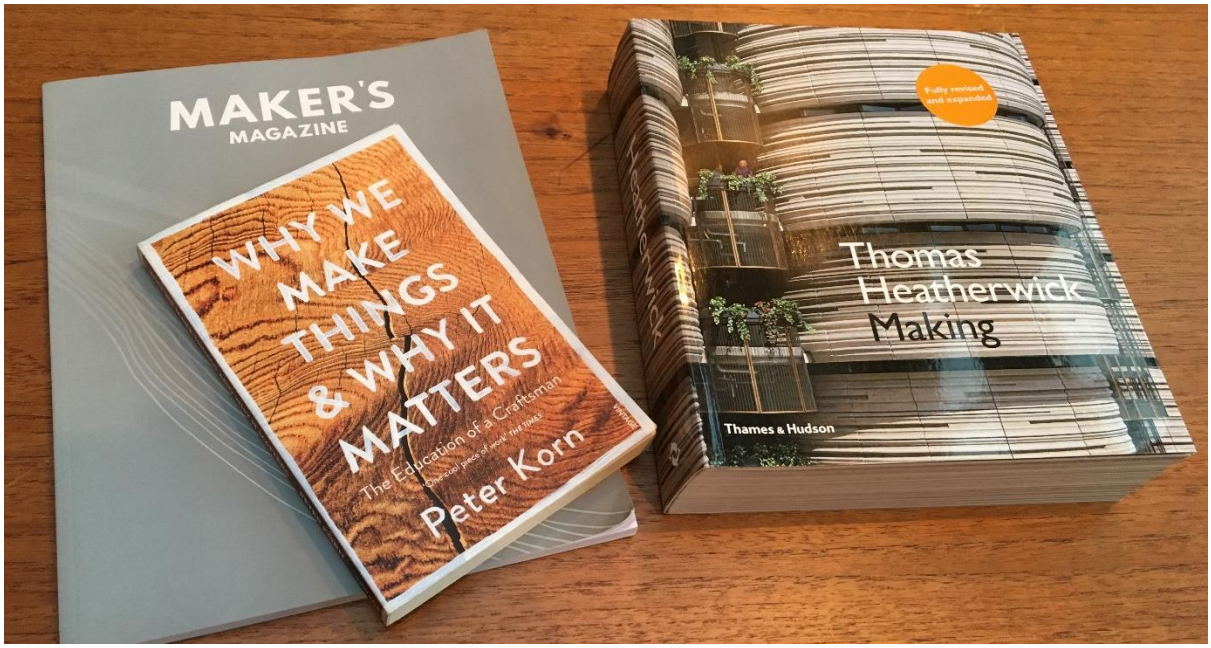


Fig.21. A selection of personal account publications from the 'maker community'

Here, I have referred to Peter Korn's book *Why we make things and Why it Matters* (2013) and Thomas Heatherwick's tome *Making* (2015). Korn's central observation is the spiritual nature of his engagement with the process of making furniture. In this he echoes John Ruskin's ethos for pursuing truth in handwork (Ruskin, 1878). For Heatherwick, the key reflected features of his approach are characterised by the materiality, functionality and the collaborative nature of the design and make process.

This part of my research is distilled in the glossary of terms in Appendix 1.

2.7 What Endures? The Apprenticeship Model

'Anything that we have to learn to do we learn by the actual doing of it" (Aristotle, 2004, p. 32)

When looking for descriptions of practical and vocational learning models, a recurrent theme emerged: that of *'learning by doing.'* This might be stating the obvious for a practical subject but when set against the current national curriculum manifestation of Design and Technology it sheds some light on the conflicts this presents. Equally remarkable is the fact that the first reference to this is attributed to Aristotle (384 – 322 BC) and yet this is the primary method of learning that I applied to the clothesmaking classes I describe in Chapter 4.

The apprenticeship model found in the technical colleges had its routes in the craft guild and journeyman training systems of old. These evolved into some of the vocational qualifications that exist today. I say *'some'* of the qualifications, because on closer inspection it became clear that some of the BTEC qualifications have more in common with their academic cousins than with the apprenticeship model. Those that have closer links to industry reflect *"the old recipe for well-building: Commodity, Firmness and Delight"* (Watson, 1993, p. 9). The assessment methods of observation of doing and end of course demonstration are the same process as those used historically in technical colleges and those used today in on-the-job training schemes. A brief analysis of this traditional apprenticeship approach to assessment demonstrates that cognitive processes are judged as being integral to social and practical markers of success. The only concession to modern academic scrutiny is that this type of approach is justified in terms of being 'holistic marking' that is 'socially' and 'culturally' contextualised. For examples of these I referred to assessment guidelines from City and Guilds (2003) and the Vocational Training Charitable Trust (2015). It appears that these courses have endured precisely because the fluidity of their objectives embraces both the traditional and the contemporary socio-economic demands embodied in this type of training.

A search for a definition of the apprenticeship model of education threw some more interesting descriptions of the practical creative-technical learning process into the mix:

> *"Apprenticeships combine work with **practical, on and off-the-job**, training and study. An apprentice will be employed, working alongside **experienced staff** to gain the **skills, knowledge and behaviours** needed to be fully competent in their chosen occupation."* (Department for Education UK Government, 2018, p. 4)
>
> *"Apprenticeship is a particular way of enabling students to **learn by doing**. It is often associated with vocational training where a **more experienced tradesman** or journeyman models **behaviour**, the apprentice attempts to **follow the model**, and the journeyman provides **feedback**."* (Bates, 2015, p. Chapter 3.5) Bold added for emphasis.

Both these definitions refer to the *'practical'*, active, *'doing'* nature of the learning experience. They also comment on *'behaviours'* in addition to *'skills'* and *'knowledge'* which are learnt through the example of an *'experienced'* trainer or *'tradesman'* and by *'following a model.'* Other references to the apprenticeship model also stress the real-life job contextualisation of at least part of the training.

The Wolf Report Review of Vocational Education celebrated the success of certain industry-based apprenticeships and recommended that the Department for Education and the government regulatory structures and awarding bodies work together to simplify the vocational education system for 14-19 year olds (Wolf, 2011, p. 22). The knee jerk response on the part of these institutions appears to have been to try to further assimilate the vocational assessment criteria into the academic system. An article published by the AQA exam board entitled How should we assess vocational and practical learning? Comments that *"the assessment of vocational and practical learning is a complex, sometimes messy, and rapidly changing undertaking"* and it recommends that *"authentic assessment"* should consider *"five inter-related 'dimensions'"* (Huddleston, 2018, p. 30). Four of these five *dimensions* relate to context: workplace, physical, social and professional. Only one relates to the quality of the outcome and none relate to the inclusion of emotional responses.

What this article seems to miss is that to achieve successful outcomes is not the same as achieving measurable outcomes. This represents a fundamental misunderstanding of the symbolic and temporal nature of the finished results of the creative-technical process. Holistic assessment involves broad marking bands, formative assessment style feedback (Lorin Anderson, 2014, pp. 101-102) (Black & Wiliam, 1998) and trusting the judgement of the teacher or examiner; this necessitates accepting a certain element of human prejudice, discrepancy or fallibility. The traditional counterbalance to this is the use of some form of public acknowledgement and celebration of student work in the form of a sold service, a competition, a publication, an exhibition or a performance. These invite comment from the broader community of people and equally demands the inclusion of the broader community in the conception of the anticipated response to the outcomes, both by the course establishment and the individual participant student.

The most visible example of this type of assessment is played out on television competition shows such as The Great British Sewing Bee (BBC, 2018) and Master Chef (BBC, 2019)

Chapter 3. Methodology Overview: Action Research Study

3.1 Communicating Truth: Techne vs Science

"We must observe techne is the name not only for the activities and skills of the craftsman, but also for the arts of the mind and the fine arts." (Heidegger, 1977, p.12)

The question I used to maintain the focus of this enquiry on the physical activity of making stimulates a reflection on the *'inherent value of craftsmanship'* (Wolf, 2011) and demands a response to a fundamental difficulty faced by those of us who make: namely to describe, in words, the creative process of formation:

'What does the making process do for the maker?'

Making as a process is a direct form of communication in itself which is very effective outside the realms of science and academia. Lidchi comments that *"viewing jewelry as craft… misses a key aspect, namely its function as indigenous adornment, where materials and process are subsidiary to use, color, and communication."* (Lidchi, 2012, p. 70). The difficulty arises when trying to translate this understanding within the field of academic research. Gadamer debates this issue at length in his book *Truth and Method:*

"[T]he human sciences are connected to modes of experience that lie outside science: with the experiences of philosophy, of art, and of history itself. These are all modes of experience in which a truth is communicated that cannot be verified by the methodological means proper to science." (Gadamer, 1975, p. xxi)

The requirement for applying scientific research methods to a practical creative process generates a conflict because scientific protocol is founded on the logic that our understanding of what is true and reliable can be tested in a way that is either reproducible or refutable. The process of making, by contrast, embraces our need to navigate a path through our lives which is inevitably unpredictable, uncertain and transient. John Chidgey, a Craft Design Technology teacher comments that *"Attempts to equate design with science have been unsuccessful due to the ineffable ingredient of craft knowledge gained through non-scientific experience* (A Critique of the Design Process, 1995, p. 91).

This thesis was born out of a master's program which, in its inception, presented a doorway between these two co-existing realms of understanding. The course was generated out of a meeting between research academics at the Inland University of Norway and practitioners at Ruskin Mill Trust who use physical craft processes as a central axis for teaching students who have been marginalised by mainstream education. As a student on the course, the resulting collaboration at once threw into stark relief the contradictions in the two systems of education whilst at the same time stimulating a huge desire to communicate and trade value between the two. I recognised my role here was to act as a tradesman at the doorway between these

two realms. I arrived here when transitioning between a career outside mainstream education to one within it and it was here and for this precise reason that I began to observe broader patterns of discord between the prescribed objectives of practical creative-technical courses and the outcomes described by students and professionals engaged in these activities both inside and outside state education.

In fact, the more I asked the question '*What does the making process do for the maker?*' the more evident this discord became. This led me to probe why this disparity exists and to postulate how a more balanced conception of this subject area might be presented.

3.2 Research Structure and Ethical Considerations

I approached the structure of the research using Craig Mertler's reflexive four-step action research model. In his book Action research: Improving schools and empowering educators (2012) Mertler describes the model as a process that *"allows teachers to study their own classrooms… in order to better understand them and to be able to improve their quality or effectiveness"* (Mertler, 2012, p. 4). This research capitalised on separate teaching projects in two contrasting institutions, so my focus here was not on improving the quality or effectiveness of my classroom but purely on better understanding the context and broader assumptions that shape my teaching practice.

In order to gather evidence of both the physical and mental nature of the craft process, I needed to slow it down into a step by step encounter. The most obvious way to do this was by teaching a practical project and to document this experience, both from my perspective as the teacher/practitioner and from the student perspective. I wanted to take written and visual snapshots as the project progressed. Being a class observer risks introducing *"the problem that observations often disturb the natural setting."* (L. Cohen et al, 2011, pp. loc.21179-21180). The very presence of another person can alter the dynamics of the learning process, By choosing to

study the process with a group of students where I was already positioned as the teacher, I minimised this interference.

The first cycle of enquiry involved asking adult learners in two classes to record their experiences via an end of course feedback questionnaire. One class was for beginners to clothesmaking, the second was for more experienced students. I chose to use a questionnaire because this aligned comfortably with the standard documentation required at the end of a course of further education and because it provided the means to collect first hand reflections from students about what they had gained from the course. Having previously experimented with the questions on course feedback forms, I understood that insights gained often did not correlate with the course objectives. It was these 'by-products' of the practical learning process that interested me, so here I tried to devise questions that would reflect background motivations or that would prompt less expected responses. Refer to the Appendix 3 for a copy

I chose not to give feedback questionnaires to the school design and technology students partly because they were routinely asked to document and reflect on their making process using an online classroom, so I had access to written comments if appropriate. More specifically, their motivations for doing the course were generally aligned with expectations of passing an exam to gain a qualification so questions that invited emotional or evaluative comments about the course may have proved confusing to the students, and hence counter-productive.

"Questionnaire respondents are not passive data providers for researchers; they are subjects not objects of research." (L. Cohen et al, 2011, pp. Loc.16784-16786)

I also wanted to avoid lengthy and complicated data permission procedures associated with collecting identifiable data from school age participants because this would impact on the window of opportunity for planning and teaching this project.

In addition to student articulations, I wanted to capture my own experience of making and teaching this process. I did this by keeping a personal photographic and written journal to record my mental and physical activities while developing two role-modelled teacher samples. The first was for a woven t-shirt for the beginners

clothesmaking class, the second was for an earphone case for a mainstream secondary school class. I wanted to examine this process in particular because I felt it may offer insights into the unspoken transfer of knowledge, as well as skill, during a making class. I then documented the student process of learning to make this sample by taking photographs of their work as it evolved, and by noting their verbal comments and my observations of their practice.

Early in the study, I made a couple of exploratory visits to two schools in my area. I have not included these as part of my research cycles, but I have used some of the photographic and conversation evidence I recorded in Chapter 6.3. Discussions I had with teaching professionals during these visits have also influenced my broader understanding of how practical creative-technical skills are taught in some schools today.

For ethical reasons, before starting the projects, I sought relevant permissions from the schools and community learning providers to engage in the research activity and to collect data for use in the study. Considerations included: briefing adult students about the research; presenting an additional end of course questionnaire; the collection of photographic evidence. I also sought guidance from the Norwegian Data Service with regards to compliance with personal data laws, which I cross referenced against UK data protection laws. A copy of the Norwegian Data approval is included in the Appendix. While most of the images I collected do not include identifiable features, for those that do, I sought permission for the use of these specific images by providing the institution's data manager with contextual sections from this thesis for approval. (Refer to the appendix for copies of the information sheets and questionnaires)

At the end of the first teaching cycle with the adult learners, the questionnaire responses I gathered offered valuable evidence of the learning 'by-products' I hoped to identify, however the comments were limited and mostly reinforced the type of personal capabilities I had noted on other community learning courses. By contrast, my own journal meditations on the process of making the pattern and garment were far more revealing. These reflected other features of the making process which appeared to contradict received assumptions about the value of certain types of

making activities in the curriculum. This prompted me to shift my focus for the second research cycle in the secondary school onto the supporting course documentation. My journal records from the first cycle became a tangible lever for probing deeper questions about the motives and values attached to physical making activities in education. This shaped the planning of the role-modelled teaching sample, the classroom activities and the subsequent analysis of the data gathered in the second cycle.

To summarise the research structure, I have amended Mertler's model below:

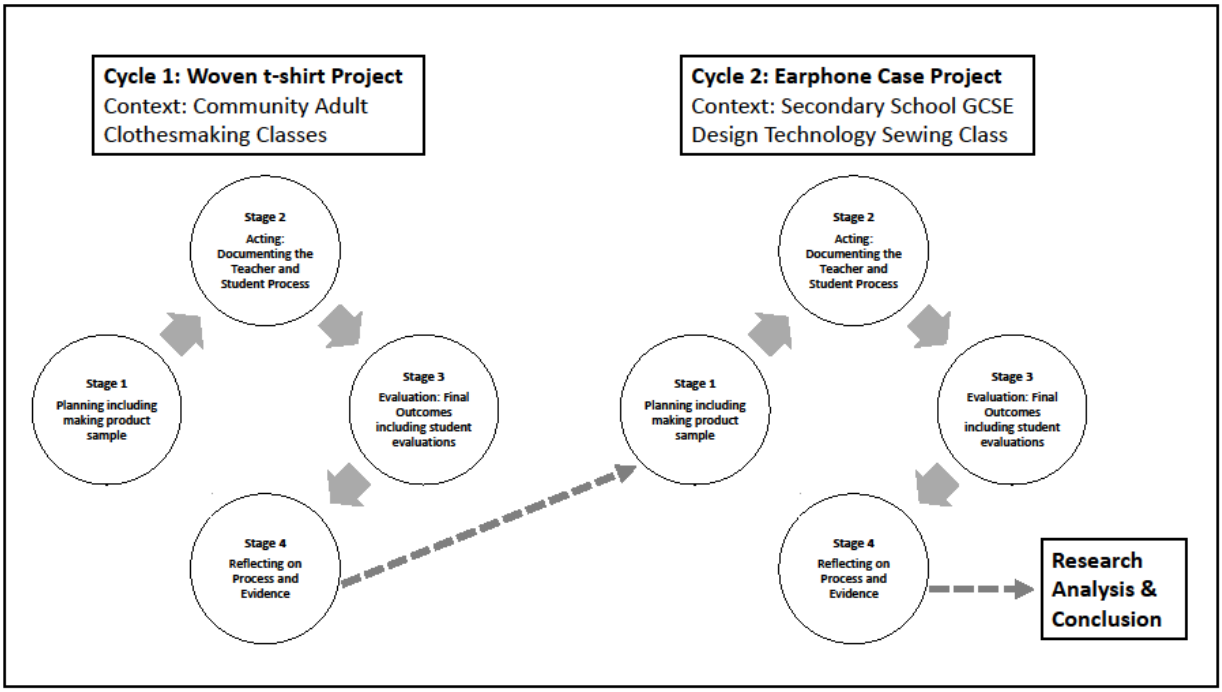


Fig.22. Cyclical process of action research amended from Mertler (2012, p. 38)

3.3 Reflective Analysis: Contrasting threads to create new perspectives

In an effort to find a methodology that could integrate the various strands of reflected data I planned to collect and to present it in a way that would resonate both with the academic and the practical traditions in education, I looked at the qualitative

methods used in sociological studies. The Real Life Methods models developed by the universities of Manchester and Leeds (Manchester University, 2017) were helpful in this respect. This type of mixed methods approach appealed because it uses a variety of data sources, including existing documentation, photographs and individual accounts, in order *"to develop methods and approaches that capture the combination of vital, tangible and intangible dynamics in the way that personal relationships and relationalities are lived."* (Manchester University, 2017)

This system, which juxtaposes contrasting data to elucidate new insights, corresponds most closely to my own process of research which I developed over many years working as a design and trend forecaster. Also, the aim of capturing '*tangible and intangible dynamics*' fits well with a moving physical making process. However, as a practical pragmatist, part of me finds these methods too divergent and resistant to a workable conclusion. The craft/ design/ technology process demands a resolution based on physical and emotional values that are culturally defined and judged at a given point in time. With this instinct, I have also looked towards analysis methods that are tried and tested within the creative and technology traditions. This places a greater emphasis on communication through visual images which are used in combination, with or without words, to coalesce or challenge ideas.

I approached the analysis in two ways:

Firstly, as a means of generating deeper personal reflection on the practical process in the interpretive manner popularised by Dewey (How We Think, 1910), Kolb & Fry (Towards an applied theory of experiential learning, 1974), Schon (The Reflective Practitioner: How Professionals Think In Action, 1983), and more recently Hattie (The status of evidence in education, 2017).

Secondly, as a means of analysing the tangible work produced by both myself, in the form of the role-modelled exemplar, and by the students in response to this exemplar. I set these against establishment descriptors in order to elucidatel how, as Hattie's comments, *"We project our current mindset and assumptions onto the past and future"* (2017). I used these insights to translate the outcomes as a broader

signifier of our individual and collective position, as a way of *'revealing,'* as suggested by Heidegger at the dawn of the technological age in his book *The Question Concerning Technology and Other Essays* (1977). To do this I drew in threads of evidence from other readings and journal entries recorded during the course of preparing this thesis. I have summarised this reflective analysis method in the following diagram below:

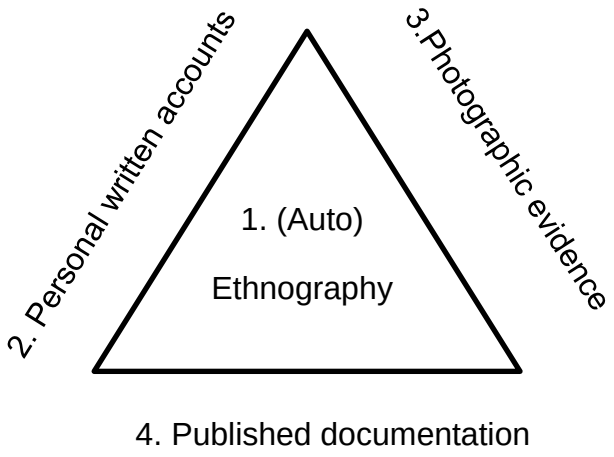


Fig.23. Thesis methodology for reflective analysis of data

3.4 (Auto)Ethnography

"Everyone sees something different, but the mountain doesn't change. It's our lens that we have on, that makes the difference." (Hattie, 2017)

Ethnography is at the centre of this methodology because the nature of this enquiry naturally falls within the qualitative tradition of hermeneutics in the natural sciences. In his book *Ethnography: Step by Step* David Fetterman states that "*ethnography attempts to be holistic"* (Fetterman, 1998, p. 11). This correlates with my understanding of the craft/ design/ technology process as being holistic. The 'auto' self-reflexive prefix is partitioned in brackets in this subtitle because autoethnography is not the central characteristic of the methodology. However, my experience has shaped my decision to choose this path of study and my professional experience will

naturally influence the questions I ask, the type of data I collect and my interpretation of the findings. I am inescapably at the centre of the methodology.

"The ethnographer, as a positioned subject, grasps certain human phenomena better than others. He or she occupies a position or structural location and observes with a particular angle of vision." (Rosaldo, 1993, p. 19)

During the preparation of this research methodology, I was drawn to Renato Rosaldo's book *Culture and Truth* (Rosaldo, 1993) because his description of his need to include his own voice in the context of the analysis of his research whilst being wary of the associated pitfalls, resonated with my awareness of my own motives in relation to the demands of scientific rigour. In justification of this approach, I too would like to think that by drawing upon my own experiences in this way, I will be able to communicate a deeper understanding of what constitutes a creative-technical practical subject in a way that is '*more readily accessible to readers*.' (Rosaldo, 1993, p. 8)

3.5 Visual Dialogue

My favoured method of collecting data is through photographs. The most effective tool I have as a researcher of the made-world, is to be able to present visual representations of products in a context which then demands a response from the viewer which is their own and which they may then reflect upon and utilise in turn. The viewer's response to an image on a pre-cognitive, emotional or intuitive level, is personal and transient and this is a distinct advantage. *"We can analyse visual images in a similar way to that of analysing texts, e.g. through 'reading' the meanings, through disclosing our own views, perspectives, backgrounds and values (reflexivity)."* (L. Cohen et al, 2011, pp. 26169-26171). This type of analysis does not involve a pre-formed system of attaching meaning to what is seen; *"coding risks losing this wholeness, as it is atomistic and fragmentizing."* (L. Cohen et al, 2011, pp. 26196-26197) This may be regarded as unscientific because each individual will have a different response and the conclusion is therefore not replicable, however the

use of visual data in this way is visual dialogue using established visual linguistic codes. To demonstrate the use of this language in the commercial world outside academia I have included two examples of journal pages below. These are not images used to illustrate words, they present a direct visual dialogue without words.

Fig.24. Journal: View on Colour (Banners, 1997)

Fig.25. Journal: Disegno (The Alchemists's Study, 2018)

Those conversant with this language often hesitate to articulate the visual intention or meaning of an image or object using words because this immediately denies the inclusion of the other. The person generating the image or object is the 'I' and this is intended to be viewed by others. *"The reciprocal nature of vision is more fundamental than that of spoken dialogue. And often dialogue is an attempt to verbalize this, an attempt to explain how, either metaphorically or literally, 'you see things', and an attempt to discover how 'he sees things'".* (Berger, Ways of Seeing, p. 9). Hence communicating the personal experience to others. "*From I to we"* (Heatherwick, 2015) is fluid, not fixed in time or meaning. Rather like the semantic

meaning of the word *'craft,'* the *"The relation between what we see and what we know is never settled."* (Berger, Ways of Seeing, p. 7).

Chapter 4. Cycle 1: Community Learning Project: Woven T-shirt

This teaching project evolved out of the need to improve a course for adult learners in community sewing classes. I taught it in the evenings over a ten-week period in the first term the academic year 2017-18. Each lesson was two and a half hours long. The total lesson time was entirely devoted to the task of planning, cutting out and making a simple woven t-shirt top.

4.1 Woven T- Shirt – The Plan

The learning outcomes set by the commissioning community learning college were based around objectives set by local government which stated:

"Programmes will contribute to key public policy priorities in areas such as Health and Wellbeing, support for families, volunteering, community resilience and employment." (Kent Adult Education Community Learning and Skills, 2017)

The original brief for the range of sewing courses that I delivered was that they should focus on acquiring new skills and that the outcomes should be flexible to accommodate personal aspirations. These were to be recorded on an *'Individual Learning Plan'* in collaboration with the students. See Figure 6 on page 7.

The broad scope of objectives gave me a certain amount of freedom to plan the course content. Although the *'skills'* were not defined as being practical, this was assumed. The lessons were to be conducted in a room devoted to sewing, fully equipped with fifteen sewing machines, irons and ironing boards, manakins and large tables for cutting out. The learning outcomes I set for the beginners' class were that the top they would make should be completed within the ten-lesson time frame

and that it should fit the maker or the person for whom it was intended. The learning outcomes for the more advanced class was looser; they could choose their own coat pattern or continue with a previous project.

I designed the teaching sample for the beginners class during the Summer break. I wanted to devise a simply constructed garment suitable for a beginner's class that would accommodate a variety of body shapes and sizes. I had been using a free down-loadable sleeveless pattern but many students found it too fitted and uncovered so opted for alternative patterns. These were often too complicated for a beginner. Consequently, students would become frustrated and discouraged and they demanded a disproportionate amount of my assistance. By devising my own pattern, I could control the introduction of skills into the lesson program which in turn would allow me to distribute my time more evenly amongst the students during the lesson.

4.2 Woven T-Shirt – The Process

As mentioned in Chapter 3, the methodology for my thesis evolved during the teaching term of this project. I kept a journal of the comments from students in both classes and photographed their process. I also encouraged students to record observations about their learning when I briefed them about the end of course feedback questionnaires. The responses were voluntary and while all students completed the compulsory college end of course evaluation with very positive feedback only one student from the beginners' class completed this questionnaire. Fortunately, I gathered six out eight responses from the advanced class.

When comparing the two sets of responses, I came to the conclusion that the beginners were less interested in recording more personal observations because they had registered for the course specifically to learn practical sewing skills. Moreover, as beginners, they often vocalised anxieties and fear about making mistakes which they did not wish to recall at the end of the course, preferring instead to focus on the good feeling of the achievement, which some did record in the extra comments section of the college form. The age of the beginner students also appeared to have an impact on their lack of written responses; most were under 26

years old and commented that they had minimal opportunity to learn to sew in school or at home. By contrast, I realised that the respondents from the advanced class had probably had plenty of time to develop an interest in their own difficulties and pleasures when faced with a sewing challenge. Five out of six respondents from the advanced class were in the older age group of 46-65 and the other younger respondent was a teacher who would have been trained to reflect on learning experiences. Also, the advanced learners had already completed at least one sewing course with me and most had been sewing on and off for many years. Whilst all the students said their motivation for enrolling on the course was to improve their sewing skills, the type of questionnaire responses provided by older students suggests that they did indeed gain benefits beyond the pre-defined sewing skill objectives. Some vocalised these as a motivation for enrolling on the course. I have listed some of their responses here:

6.	What was the best part of the course?	Learning new skills and understanding patterns. Seeing the garment come together. Having the chance to learn through conversation Finishing something Fulfilment of completing two items of clothing The friendliness of the tutor and other students
7.	What did you find most challenging?	Sewing fiddly sections by machine Zips Fitting Inserting zipper into dress Understanding pattern instructions
8.	What have you learnt from this challenge?	Perseverance – I can do it! That I have more persistence than I thought Patience. Accuracy is important.

		I have become more confident in embarking on a bigger project of sewing. How to put pockets on a coat

Many of the comments in the bubbles expanded on these responses. I have transcribed some of them here:

Has the making process helped you to gain or develop any personal skills or knowledge beyond the sewing skills? Yes ☐ No ☐ If yes, then what?

- Don't shy away from something that may look complicated. Have faith in my ability.
- More than anything it has allowed me "downtime." A chance to refresh that is not work or family related
- I have gained admiration on projects from other students
- Patience with myself when something goes wrong.

Any other comments:

- I find my classes a complete relaxation where the focus of sewing means I can switch off from everyday stress.
- Thoroughly enjoyed it. Made friends
- Something I enjoy…my time for me!

Overall, these comments followed a similar pattern to the responses I had gathered on previous end of course evaluations. The pleasurable experiences of enjoyment and relaxation, and the recognition of improved personal capabilities such as gaining confidence and learning patience, were commonly reported on courses which had been commissioned for people living with mental health or social integration challenges. In this sample, however, the students were representative of the general population. Therefore, these offer clear examples of the type of benefits and 'soft skills' I had come to understand as being 'by-products' of learning to sew, regardless of the ability or background of the learner. Interestingly, the students in this sample all associated these gains directly to the practical challenges of sewing a garment that fits, or of sewing in a zip, evidenced in the responses to questions 7 and 8 on the questionnaire.

At the end of this first cycle, I wanted to understand what characteristics of the practice of sewing generated these feelings and learning experiences. In order to gain a better insight into the process I returned to my own notes and photographs recorded whilst preparing the sample pattern and garment for the beginners' course. My record is more meditative and in depth than the reflections gathered from my students. This is partly because I was working alone and my motivation was to produce a teacher sample rather than to learn new skills. The nature of my record was also motivated by a deeper desire to understand why I felt compelled to return to the practical creative-technical process despite the fact that I could buy a cheaper garment with ease: *what did the making process do <u>for</u> me?*

Despite my training and experience of making clothes, I noted my endeavour was characterised by a similar element of challenge to that of my students: I found draughting the pattern from scratch more difficult than I had anticipated. At a professional level, the making process tends to be divided into different job roles; my specialism is trend forecasting and design, not pattern cutting. I had to make several revisions to the fitting samples and the pattern until I came up with a workable solution that I wanted to wear. I say *'that I wanted to wear'* because, although the aim was to make a garment suitable for a broad range of body types, the easiest way for me to ensure the students would want to wear the style was to take a

personal as well as professional interest in the design. This aspect of initiating a style was familiar to me so less of a challenge, nevertheless, when reviewing the photographic record later, this part of the process was also noteworthy because it equates to the design and iterative process featured so prominently in the current national curriculum for design and technology (Department for Education, 2013), (Department for Education, 2015) and it exemplifies the real-life demands of meeting the needs and desires of the end user. To illustrate the type of data produced as a result of recording the designing and making of a woven t-shirt, I have included some of my journal entries here:

Fig.26. Research to inform the woven t-shirt garment style

Fig.27. Woven t-shirt teacher sample development

Fig.28. The finished woven t-shirt role-modelled teacher sample being tested out

Meditation on repetitive action:

Repetition is a single word.

Repetition is boring.

Repetition in life takes time.

Repetition generates flow.

Repetition presents an opportunity for mindfulness.

Repetition is individual.

Repetition is not repeatable.

What you repeat tomorrow will not be the same as what you repeated today.

Repetition is formation.

Repetition is growth.

Repetition is exploration.

Repetition is testing.

Repetition is perseverance.

Repetition is a quest.

Repetition is about gaining control.

Repetition is about application of a vision.

Repetition by hand is not the same as replication by machine.

Repetition is a pursuit of perfection.

Repetition is incremental.

Repetition is an opportunity to restart.

Repetition accumulates and erases.

Repetition is effort without a vision.

Repetition is momentum with a vision.

Repetition with group focus is a monumental force.

Repetition without focus and motivation is tedium.

Repetition with desire is rehabilitating:

Repetition Rehab.

Fig.29. Diary entry 9/08/2017

The conclusion of movement is not a conclusion,

it is a pause, or it is inert life.

Reflection after the event only helps to a certain extent.

There in lies the point - how do you respond appropriately now?!

How do you teach that?

You cannot teach that –

all you can do is provide the circumstance,

the arena,

the push and pull.

At some point we need to respond to conflict and pain as it happens.

There is always a reason, an excuse, a fault.

There is always understanding with hindsight.

It is not always a case of finding a solution.

Sometimes it is about getting up and starting again.

Sometimes it is about taking time out.

Sometimes it is a case of being quiet together.

Sometimes it is about observing without changing anything.

Sometimes it is about not finishing, not achieving and accepting second best.

That is only part of the picture.

That is only part of what makes us human.

Fig.30. Diary entry 29/08/2017

4.3 Woven T-Shirt Summary of Findings:

When I set these thoughts and images against the images taken of the students' work, this revealed other considerations about the nature of the learning process of this type of project:

- The activities demand a large amount of time spent on repetitive physical movements, both from the students in the learning process, and from the teacher when making the role modelled sample and when guiding the students. Students often commented on the fact that they liked the mental focus this demanded and the corresponding relaxation from other concerns this afforded. This raises questions about the academic and cultural association of repetitive work with mindless, tedious and low paid (undervalued) work.
- There are certain techniques which I assume will be difficult for beginners, and plan extra sample tuition accordingly.
- Most of the tuition, including these extra samples, is delivered through the use of physical role modelled pieces of work. Whilst simple how-to instructions are given, the majority of the information is communicated through the samples. This represents an unspoken and unwritten transfer of knowledge.
- Questionnaire responses demonstrated a link between the challenge provided by learning new practical skills and a gain in personal capabilities, such as perseverance, patience and confidence, resulting from the need to overcome these challenges; see responses to questions 7 and 8.
- Responses from students are often unexpected. These responses are frequently emotional and very personal to the learner, sometimes linked to previous negative learning experiences, such as mathematical calculations or cutting out shapes accurately with scissors, sometimes linked to emergent challenges such as trying to coordinate a foot pedal that controls the speed of a machine, with hand movements that control the fabric. This type of response is reflected in the answers to questions 7 and 8 on the feedback questionnaire, however the questionnaires rarely reflect the passing

frustration, anger or disappointment associated with failures that are later corrected.

- Some responses relate to cognitive (and by implication, non-emotive) understanding of principles, such as the mathematical addition of seam allowances. Another example revealed a different form of cognitive perception to my own, when a student commented that she had learnt that *"we are not flat,"* referring to her difficulty with understanding how the flat fabric pieces formed three-dimensional shapes. This to me is obvious but was clearly not familiar to the student's internal processing of external knowledge.
- The end results of the student work was diverse and personal, despite the simple directed nature of the project replicated by all the students.

Fig.31. Student woven t-shirt project finished garments. Note the diversity of outcomes despite starting with the same teacher role-modelled sample.

Chapter 5. Cycle 2: School Based Textile Project: Ear-phone Case

I delivered this project to a group of teenagers, aged between 13-14 years old, in a mixed non-selective mainstream secondary school; 27% of the students were higher ability; 27% of the class were lower ability; two out of twenty-two students had registered special needs and one had English as a second language. The school has a team of special needs support staff, and all lessons are differentiated to support a wide range of abilities. This project included sewing by hand and by machine. It provides a small reflection of the challenges surrounding the teaching of practical creative-technical skills in schools. I taught this project in the last term of the academic year 2017-18.

5.1 Earphone Case - The Plan

I had been briefed to develop a practical project to introduce the textile component of a year 9 course leading to a GCSE qualification in Design and Technology. Having looked at the exam board scheme of work and knowing that the students had no previous sewing experience in the school Key Stage 3 Design and Technology curriculum, I initially suggested that we deliver the required course content through a series of garment dis-assembly and theory-based exercises. However, I was encouraged to centre the lessons around a practical project because the students understand the subject better when they can apply the theory directly to a physical process and *'learn by doing'* (see Chapter 2.7).

Keen to rise to the challenge, I agreed to devise a practical project. This demanded a variety of considerations:

1. The published exam board course content including the exemplar teaching material and the authorised text book (Ross, 2017)
2. The assumed lack of student practical skills in this type of work

3. My concern that most, but not all, of the students were boys which, experience told me, meant they would be resistant to sewing because of its historical British association with being a female profession. Most had chosen to do DT because they enjoyed the projects which they had done during their first two years in the school which included working with wood, metal, acrylic and electronics.
4. The lack of equipment and table space in the school DT workshops for appropriate for carrying out a sewing project. I had found two sewing machines that could be used and some pieces of fabric but little else.
5. The limited timetabled allocation (6 hours) for the practical element of the course against the lack of foundation learning in the subject.

The lack of sewing machines dictated the inclusion of an element of hand sewing. Having taught young children to sew by hand, I understood that the end result would look neither neat nor beautiful. I therefore devised the task to embrace a certain amount of irregularity and imperfection which would be acceptable by virtue of its contribution to the hand-made nature of the product. See figures 32-35 showing contextualised research to link the hand stitching to current market trends. I further justified the hand-made aesthetic by including this in the design brief. See Appendix 4 for pages from the accompanying student work book I produced to support the theory part of the schedule of work.

I included a small amount of fabric printing and machine stitching because experience had taught me that these activities would engage the students and because they introduced tools and techniques that are identified in the AQA approved course textbook (Ross, 2017, pp. 206-208). I was also keen to include an electronic textile element for similar reasons and to give further purpose to the requirement to sew by hand; in schools-based electronic textiles, the conductive thread is hand stitched into fabric to connect the battery and components. I used a common snap fastener to create a switch for the circuit.

I experimented with several versions of the project and settled on an earphone case which combined all these elements and was small enough to be able to use scrap materials and that would require a limited amount of sewing. These last two points

satisfied the need to reduce the cost of the project and the time to make it. See figure 36 for photos from my sample development journal.

Fig.32. Earphone project research: Visible mending hand stitching (Rodabaugh, 2018)

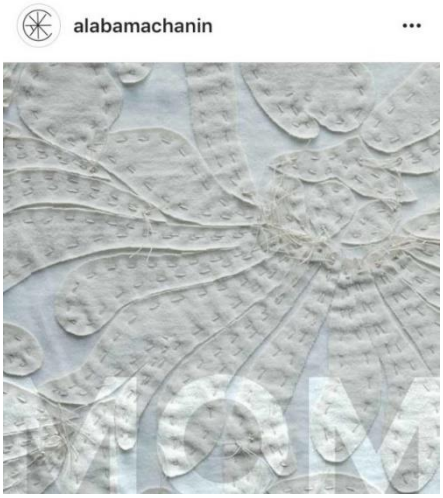


Fig.33. Earphone project research: Hand stitched applique feature on a garment (Alabama Chanin, 2018)

Fig.34. Thread doodle sample for student project context

Fig.35. Theme development for earphone project

Earphone case role-modelled teacher sample development

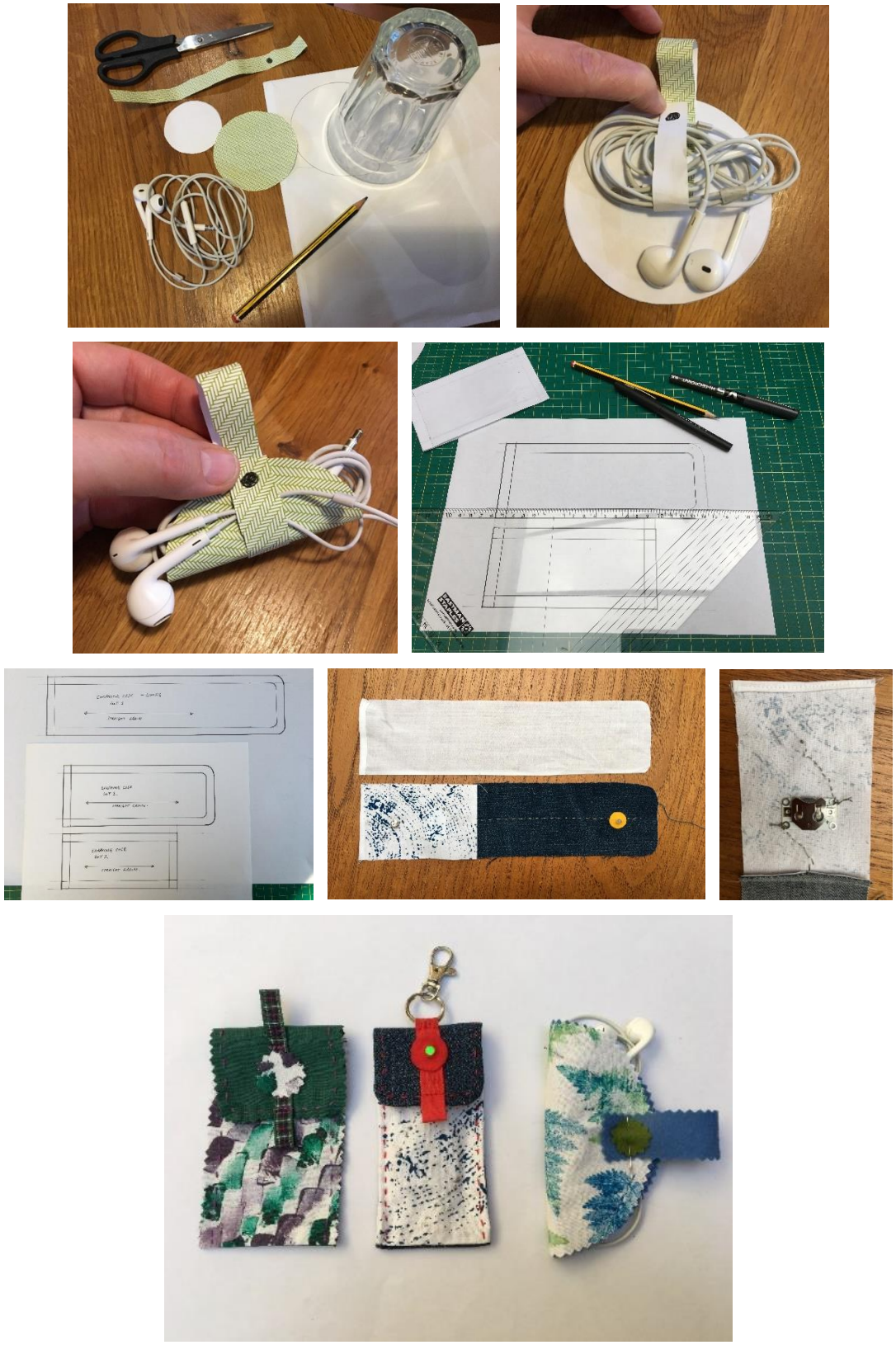


Fig.36. Photos from my earphone case sample making journal

5.2 Earphone Case – The Process

The project began well with students gaining an understanding of basic categories of fabric construction. I introduced the printing element early on to overcome anticipated and vocalised student prejudices against participating in a sewing lesson. This certainly worked; most wanted to continue perfecting their printing beyond the time I had allocated for the activity.

I provided a pattern template to use when cutting out the fabric. Most students where happy to be given a task which did not require thinking about how to construct an alternative three-dimensional shape in an unfamiliar medium. Using fabric scissors to cut out accurately is a notoriously difficult task so I was reasonably pleased with the results. The students had already had experience of cutting out paper from a template so this used similar skills.

The activity of hand sewing, however, went demonstrably less well. As explained earlier, I had allowed for the basic quality of the hand sewing to be imperfect. What I had not anticipated was the students' disappointment at the quality of their own work. They complained that it looked like a two-year old had done it so they wanted to have another go to improve their effort, or they protested that what they had done was rubbish and promptly threw it in the bin, so all evidence of their learning (and failure) was lost. The students couldn't proceed with the project if they didn't persist with the hand sewing and by disposing of their work, I couldn't demonstrate student progress. I felt that I had failed on all accounts.

Fig.37. Example of student hand stitching from earphone class project.

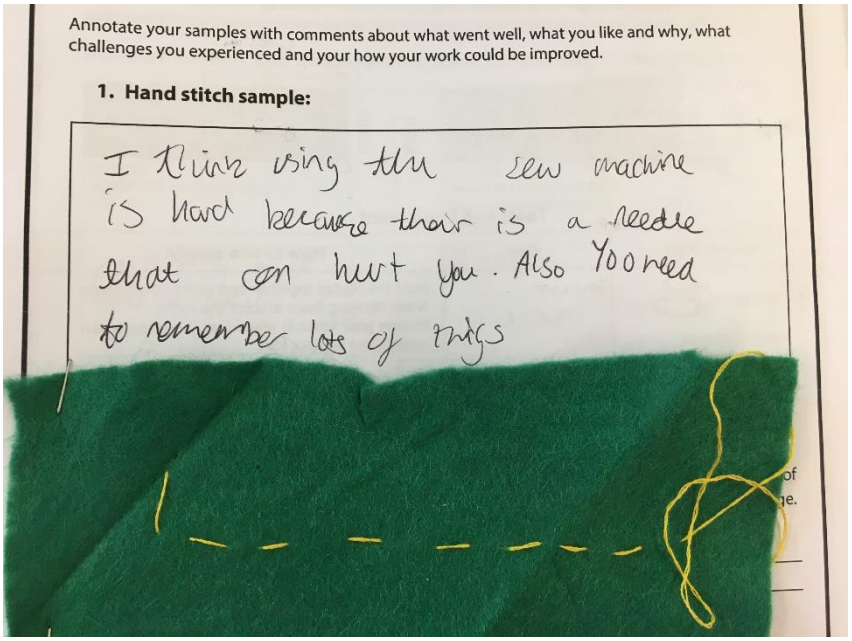


Fig.38. Example of student hand stitching from earphone project. The student workbook comment reads: "I think using the sew machine is hard because there is a needle that can hurt you. Also you need to remember lots of things."

To compound my problems, the electronic components and extra equipment I had ordered for the project didn't arrive due to a budget misallocation. I therefore decided to focus on the basic practical project which afforded some extra time for students to repeat the practical tasks they wanted to improve. However, once I had introduced the use of the sewing machines, most of the students rejected the hand sewing altogether. The only two sewing machines in use then became an unwelcome distraction from completing the other elements of the project. They had certainly succeeded in capturing the interest of the boys, but often to the exclusion of everything and everyone else in the class.

I brought in an extra machine to try to alleviate the problem but this became another piece of equipment I had to set up at the start and end of the lesson. In the end, the lack of equipment, the lack of appropriate work space and supervising students who hadn't had any foundation learning in the basic skills and knowledge of the subject became insurmountable barriers to the student's completing the project successfully.

Behaviour for learning was another consideration: it is easier to control a lively group of teenagers in a workshop if they are keen to engage in the project. The practical nature of the tasks kept the students fully occupied while they could access the appropriate equipment. Due to the shortage of sewing machines, several students returned to the printing activity to improve on their results, or simply because, as several of them commented, they found the process very soothing or relaxing. The photographs below show some of the reworked pattern designs and the unfinished cases; notably these are sewn by machine; the hand sewing is absent.

Fig.39. Unfinished student ear-phone cases.

When I came to reflect on the delivery of this project, I felt inclined to draw a line under the episode and move on. This study encouraged me to reflect on my impact on student learning in the context of the broader set of assumptions that underpin the institutional frameworks in which I found myself. I discovered that this experience generated more questions for me about the conception of practical creative technical skills within the mainstream school curriculum. There appeared to be an even greater disparity between the reality of practice and the pre-defined course objectives than I had witnessed in community learning documentation.

For this reason, I chose to investigate the source of the course curriculum and to reflect on this in relation to the practice recorded in my journals. I have presented

some of this research as part of the background theory in Chapter 2 and some I have used to elucidate the analysis in the following Chapter 6.

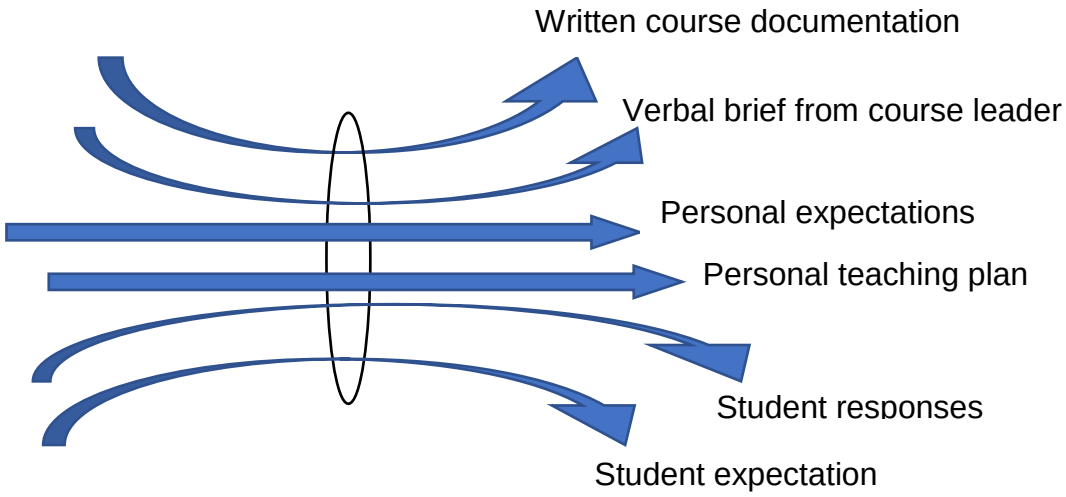
5.3 Earphone Case - Summary of findings:

- The use of a template and a role-modelled sample is remarkably similar to the apprenticeship model of the woven t-shirt project where all students make the same project. This is an example of a teacher-led *'focused practical task'* (Kimbell, Stables, & Green, 1996, p. 112) which those who favour the cognitive hierarchy model denigrate for being unchallenging and unimaginative. (Choulerton, 2016). Nevertheless, all the students produced work that reflected their own individual personalities (see figure 39).
- Previous practical skills development is integral to the success of completing the project. Students cut out reasonably well because they had experience of cutting out shapes in paper and card, while the hand sewing did not because most had not done this before.
- The difficulty of introducing an unfamiliar material discipline into the GCSE course demonstrates that the subjects can't be integrated physically in the same way that they can be compressed and homogenised into a textbook
- The factual density of the 'theory' content demanded a prescriptive force feeding of the properties of fabric but the students were working with only one type of fabric and the pieces were too small to gain any useful physical experience of the fabric property.
- The artificial complexity of the task demanded more time.
- The students responded to the challenge of the making task in a similar manner to the adult beginner learners in the woven t-shirt project but the need to incorporate written theory conflicted with their desire to take ownership of the project.
- The fact that students were disappointed with their own work not only highlighted the problem of trying to fast track the serviceable development of manual skills, but also raised questions for me about whether there was also a mismatch with the developmental age of the students.

- Students demonstrated very strong emotional responses to the various activities, from frustration and disappointment to surprise and delight. These feelings had a direct impact on the nature and quality of their work but are not acknowledged as part of the summative assessment framework of the course.

Chapter 6. Analysis & Reflection: Competing Agendas

Developing and subsequently teaching these projects provided an eye of the needle moment for me as someone who is relatively new to the teaching profession. It forced together several competing agendas into one tiny space in time. These presented themselves to me as a combination of written documentation, personal expectations and student responses:



In an effort to understand the logic of both the establishment and my own agendas for teaching these projects, I interrogated the descriptions of process and outcomes from documentation, theory and personal accounts in more detail. I summarise these findings below.

6.1 The Choice: Response-able or Response Dis-abled?

6.1.1 Response Dis-abled

"some primary defect in contemporary culture severs the satisfactions of individual agency from the things we actually do." (Korn, 2013, pp. 11-12)

My experience of teaching the textiles-based earphone case project made me aware of a number of negative consequences of this latest Design and Technology GCSE reformulation of the subject. This additional material discipline forces schools to focus on theory content due to the lack of appropriate equipment and suitable work space. The now huge scope of the subject has meant that, in order to present the different classes of theory in an easily digestible format, the technical terminology has been re-coded into artificial categories that fit into reference tables naming tools and processes; see the student work book page in the appendix for an example. The subjects have been homogenised to such a degree that the exam questions are now so basic as to fall into the realm of general knowledge (see fig. 40), or demand a degree of cognitive analysis that most teachers did not encounter on their own degree courses and, that I would argue, has little value in the work place due industry specialisation and the division of roles.

Picture of product	Description of product	Property
 (Source: © Borislav Bajkic/Shutterstock)	A fleece hat	(1) (iv) .....

Fig.40. Example DT GCSE question which asks what property of the material of the hat makes it suitable for the product.

Recently, there has been widespread protests from teachers about the demand to cover more material subjects (McGill, 2018). Schools can only realistically be

expected to service two or three material subjects due to teacher expertise and budget constraints. The exam boards have countered this by saying that students only need to produce practical coursework within one subject specialism. This misses the fact that their schedule of work represents a subject about the making and manufacture of three-dimensional products which is akin to art history in relation to the practical subject of art. This has echoes of Heatherwick's comment about writing about his design projects:

"Our projects are normally about three-dimensional form. This time, the task has been to find ways of crushing our own projects down into flat two-dimensional images and text, like putting flowers into a book, in order to squeeze them into a book." (Heatherwick, 2015)

Like pressed flowers, the educational establishment has also succeeded in squeezing the life out of the subjects. The earphone case was contrived to fit the exam board schedule and had minimal real-life value due to the inclusion of the crude electronic circuit and battery. When we look at the trajectory of these practices as a whole, we can see that there has been a huge increase in the volume of written content. Correspondingly, the focus today affords less value to the physical making process and supports the cultural assumptions that making by hand has pejorative associations with menial labour and people who are less academically able.

The re-merging of subjects that are naturally divided by the physical demands of different materials and tools completely disregards the fact that the tools and materials are integral to the process. Without these it becomes imaginary. Based on the current incarnation of the British school results league table system 'Progress 8' (Department for Education, 2018), this is of little importance because the subject has become an also-ran, carrying half the numerical value of Maths and English and is not being listed as a core subject.

The combined impact of these value-laden interpretations of the subject has had to some quite significant consequences in recent years:

1. The practical process represented by the revised national curriculum and the corresponding scheme of work for the new GCSE Design Technology exam describes a subject where 50% of the exam is coursework (AQA Education, 2017). This requires students to learn how to describe and analyse the process in words. When added to the 50% of the exam which is a timed theory paper, this equates about **85% written work exam content.**
2. The subject in schools has been progressively distorted to such an extent that there has been a **41% decline in the number of students opting to take Design & Technology GCSEs between 2007/08 and 20014/15** (Pooley and Rowell, 2016). With my experience that many students enjoy practical work this is of no surprise.
3. **45% of schools have closed their workshops altogether** (Turner, 2017). The reason cited for this is the cost of running the facilities, however my research would suggest there are other influencing factors which may be less measurable.

These figures represent other more insidious value judgements which are playing out in people's lives. If you only look for answers in the written word, you will only potentialize those who are adept at navigating the demands of the written word. What of those who can solve a practical problem quicker than those who can write an articulate evaluation, or solve a complex mathematical puzzle? What of those who diffuse emotional conflicts with ease but who cannot visualise a theoretical concept? What of those who have endless physical energy but who become semi-comatosed or agitated in a static theory lesson? Even these characterisations are over-simplistic generalisations, so how do you evidence the diverse skills and abilities that we need to nurture for our mutual benefit and wellbeing?

"The paradox of equality in education is that it is only when the educational diet of every child is different from that of every other, that we can really hope that we are near to achieving it." (Downey & Kelly, 1979) cited by (Kimbell, Stables, & Green, 1996, p. 87)

Here it is worth highlighting the negative impact the focus on written work inevitably has on many students with special educational needs in mainstream schools.

Anecdotally, in response to my explanation for the need to write a design specification, one dyslexic student said to me, *"So I am being judged on my ability to write about the subject and not on my ability to do the subject?!"* Many teachers have registered concerns about the impact of the new curriculum on students with *'relevant protected characteristics'* such as disability (Department for Education, 2015). When we consider the growth in the written content of the subject in conjunction with the concurrent growth in the numbers of students diagnosed with dyslexia[1] then it is easy to see the many contradictions and omissions reflected by the government *Design and Technology Subject Knowledge Equality Analysis Report*:

"We acknowledge that the increased demand [of the subject content] may have a greater impact on some students who have protected characteristics which can make aspects of academic curricula more challenging, for example pupils with dyslexia or those from other national backgrounds for whom English is not their first language. However, we believe appropriate provision can, and should, be made to mitigate and support pupils with any additional challenge…" (Department for Education, 2015, pp. 8-9)

The report justifies the new curriculum using the Robbins Report (1963) logic of parity of standards with other subjects and suggests that textiles has been included in order to rebalance the subject's gender bias, which has been historically favoured by boys (Department for Education, 2015, pp. 9-10). For me, this last point, is yet another indication that the government is using the subject as a vehicle for addressing assumed cultural imbalances instead of taking an interest in the developmental value of the subject for children.

The really depressing ramification of this dominant institutional behaviour, is that the trajectory is resulting in the alienation of a broader and broader group of students:

[1] Dyslexia was first recognised by the government in 1987 (University of Oxford, 2019) and now it is estimated that 10% of the population are dyslexic (British Dyslexia Association, 2019).

- Government success parameters are published in relation to attainment of A*-C grades at GCSE. In 2017, **just under 50% of all students did not gain 5 or more GCSEs at A*-C grade** (Department for Education, 2017)
- The Wolf Report found that *"A small minority follow entirely academic GCSEs, but most 14-16 year olds take some form of vocational qualification,"* and **two-thirds of students do not take *"the conventional 'academic' route"* in post GCSE education** (Wolf, 2011, p. 20).

The Wolf Report comments that *"These failures are not despite but because of central government's constant redesign, re-regulation and re-organisation of 14-19 education."* (Wolf, 2011), which begs the question: why did central government respond with more redesign of the subject content and the regulatory system? The educationalist and policy advisor Ken Robinson has repeatedly highlighted the systemic problem in schools today:

"The students who feel alienated by current systems of standardization and testing may walk out the door, and it's left to them and others to pay the price in unemployment benefits and other social programs. These problems are not accidental by-products of standardized education; they are a structural feature of these systems." (Robinson & Aronica, 2015)

I would add to his comment the price paid in ill mental health and the corresponding demand for mental health services. I say this because the evidence gathered during this study indicates that the opportunity to engage in physical making projects directly promotes personal capabilities such as self-confidence and improved self-esteem. Furthermore, my experience of community teaching demonstrates that local government and health organisations are actively using making activities for the purpose of improving mental health, self-confidence and social inclusion.

Fig.41. Signs for community craft and sewing classes for well-being.

6.1.2 Technology vs Response-ability

"Everywhere we remain unfree and chained to technology, whether we passionately affirm or deny it. But we are delivered over to it in the worst possible way when we regard it as something neutral; for this conception of it, to which today we particularly like to do homage, makes us utterly blind to the essence of technology." (Heidegger, 1977, p. 4)

In his book *A Question Concerning Technology and Other Essays* (1977), Martin Heidegger describes how modern technology is a means of *bringing-forth,* of revealing ideas and thoughts in a material form, to be viewed by others. In this respect he counsels against our 'blind' attachment to the notion that technology is an objective means to an end based on scientific discoveries, because this ignores the fact that science and, by association, technology are human constructs. (Heidegger, 1977, pp. 167-174). This, in turn, separates us from our individual ability to reflect on and respond to the world around us.

Heidegger wrote about our relationship with technology a long time before the emergence of personal computers and smart phones. Today, we are only just beginning to understand the implications of the *blind homage* to technology that he identifies. At the dawn of the technological age in the 1970's and 80's, the addition of

‘technology’ to the school curriculum was embraced as an exciting way to modernise the traditional subjects, such as woodwork and needlework, that had fallen out of step with the needs of the labour market. Now however, the obsessive inclusion of new technological developments from industry seems to be more about a preoccupation with forecasting the future job market and less about a consideration of the fundamental skills these entail, and even less, what learning these skills will do for the learner. (World Economic Forum, 2016), (UK Parliament, 2017)

Having worked in an industry where new materials are being created continuously, the idea that the GCSE Design Technology curriculum should include the generic structural detail of textiles on the one hand and the gimmicky properties of smart materials on the other, is faintly ridiculous. This does not help the human body to develop the sensory knowledge necessary to distinguish the properties of a fabric to be able to understand how to manipulate its functional possibilities.

There is indeed a problem with trying to identify the needs of future generations because as Gert Biesta states, “*this quest keeps us away from engaging with life itself—it keeps us away from the things that are right in front of our eyes, the things that really matter and that require our attention, right here and right now*.” (Biesta, 2013, Ch.1 p.13)

Technology in its simplest form is about picking up a needle and piece of thread to join two pieces of material to make a bag to carry more than we can hold in one hand. If the needle is not strong enough or our hands do not work fast enough then how do we modify our tool in order to do a better job? Technology is firstly technical know-how. Without this foundation of bodily ability combined with cognitive and sensory understanding, technology becomes disembodied cognitive and ability without understanding. It divorces us from our ability to respond, it separates us from our senses and severs us from our responsibilities.

Harari paints a bleak picture of the likely trajectory for all those people whose very existence has been negated by our enthusiasm for new scientific technological developments:

“Some economists predict that sooner or later unenhanced humans will be completely useless. Robots and 3D printers are already replacing workers in manual jobs such as manufacturing shirts, and highly intelligent algorithms will do the same to white-collar occupations.” (Harari, 2016, p. 363)

Here, I surmise that the academic model imposed on practical learning today in mainstream education, not only devalues and distorts the practical process, but also, directly devalues those who engage in practical work and dis-ables all those who are not given the opportunity to do so, regardless of their academic ability or disability.

6.1.3 Response-able

“Even when thinking on the broadest, most strategic level, the preoccupation is with how to use materials and forms at a human scale, the scale at which people touch, experience and live in the world.” (Heatherwick, 2015)

Despite my dispiriting findings, I am still optimistic that, in the end, fundamental human behaviours, not ideologies, will continue to furnish us with the abilities to adapt to our inevitably uncertain future. The developments and practices I have witnessed outside the mainstream educational framework, are testament to this; here I refer to the clothesmaking course I describe in Chapter 4 and the school initiatives I present next in Chapter 6.3. I favour Wilson’s view that humans are endlessly able to respond to the physical reality in which we find ourselves:

*“We, the beneficiaries of this incomprehensibly long [evolutionary] process, arrive with a selective but deeply imbedded, widely distributed “knowledge” of our own past and acutely primed to adapt to a future we cannot possibly predict. We arrive with our own secondary heuristics: “**intrinsic curiosity**,” **responsiveness to the human and material contexts** into which we are born, hands and brain like none other on the planet, and the ability to build trust in our own **instincts**, **skills,** and **judgment.**”* (Wilson, 1998, p. Loc. 5282) I have added bold for emphasis

Wilson identifies the psychological, emotional and physical interaction we have with our material circumstance as being a central feature of human socialisation inventiveness and, ultimately survival (Wilson, 1998). The fact that people do display emotional or physical gestural responses to the situations in which they find themselves, stimulates the self or others to reflect and respond in return and thus propels our motion from where we stand today to the change in our circumstance tomorrow. This is motivation. This is response-ability. The challenge then, is how to embrace these intrinsic responses within our educational framework rather than dis-abling them because they do not fit into a measured or predictable model.

Gert Biesta echoes this concern when exploring the broader role of education in our society in his book *Beyond Learning* (2006):

"While learning as acquisition is about getting more and more, learning as responding is about showing who you are and where you stand…What might it mean to provide such opportunities? It requires first and foremost the creation of situations in which learners are able and are allowed to respond." (Biesta, 2006, pp. 27-28)

Wilson acknowledges the difficulty this presents and simultaneously identifies a solution that already exists when he asks this question:

"How does, or should, the education system accommodate the fact that the hand is not merely a metaphor or an icon for humanness, but often the real-life focal point—the lever or the launching pad—of a successful and genuinely fulfilling life?" (Wilson, 1998, p. Loc. 5048)

The answer is that the education system does still embrace handwork as a means of engaging children in learning by doing, as was demonstrated by my brief to teach the practical sewing class described in Chapter 4. The book *Understanding Practice in Design and Technology*, demonstrates the intrinsic link between thought and action (Kimbell, Stables, & Green, 1996). The diagram below of *'the interaction of mind and hand'* can be seen as a representation of the hand as *the real-life focal point* that Wilson identifies.

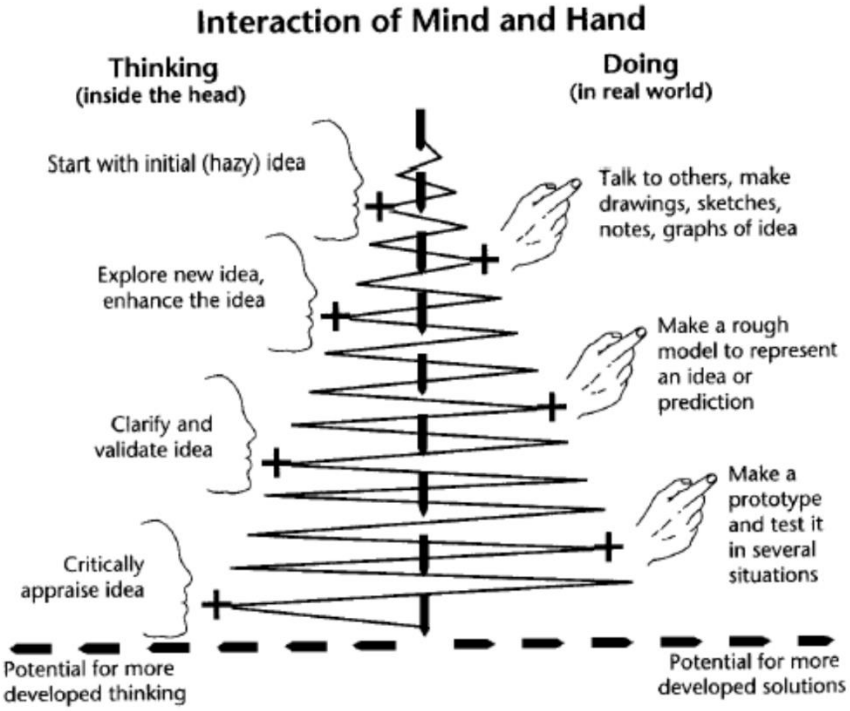


Fig.42. The APU model of interaction between mind and hand. (Banks, 1994, p. 62)

The action of sewing a line of hand stitching involves a rhythmic movement which is repeated over and over again. When you reach the end, create a knot and cut the thread. This may complete the project, however, the learnt movement is retained as a physical change in the structure of the nervous system that reaches from the brain into the tips of the fingers and back again, and in the fibres of the muscles that have performed this repeated grasping and letting go of the needle, and in the muscles of the eyes which control the oscillating focus of our intention. This perspective is based on a neuroscientific interpretation of the synaptic interaction of our nerves with the other parts of our body (Morris, 2016) (Kelly Lambert, 2016), and it corresponds with what a craftsman would call *'muscle memory.'* This is embodiment of process, this is development of hand to eye coordination, this is manual dexterity, this is adaption to material availability and manipulation of tools. This is preparation for the next time I need to perform this or similar grasping and letting go processes. This is physical reality that is supportive. In this way I can experiment with materials to locate myself in relation to my own place in the universe now. In this way I am empowered to progress and succeed.

I need to learn this. I need to be allowed to experience what it feels like to pick something up and to play with it, to understand what it can offer me. I need to be able to push it to its limit and break it – interestingly, this is precisely the behaviour demonstrated by many of the students when I asked them to feel and explore some fabric samples. I also need to experience what it feels like to push myself, to become tired in my body, to know when to stop and let go. I need to be given the opportunity to pause after physical activity to enable space not only for mental reflection but also for physical relaxation.

From the perspective of neuroscience, it is easy to imagine a tangible connection between the physical process of manipulating something and the cognitive process of evaluating the situation as it unfolds. Other visceral responses are less easy to discern. What is it about the process that leads students to claim that they have more self-confidence or patience? What happens in the process of learning a craft that could be called transformational?

Here I found the work of Barry Smith helpful when trying to describe my experiences of often transitory impressions during the making process (Smith, 2017). He examines the psychology of perception in relation to our senses. Our conscious narrative often tries to control, predict and stick to known behaviours, whereas our responses may contradict this. Our impulses and emotions are often fast and instinctive, and thank goodness they are. Our thought processes, by comparison are often slow. It is by engaging and observing our full arsenal of responses during the making process that we can learn to successfully navigate the unpredictable and often chaotic nature of our interactions with other people and our environment.

“Whatever you can do with your hands gives you a small world that you can actually cope with, as opposed to the big world, where perhaps you can’t.” (Wilson, 1998, p. Loc.3960)

This way of describing the active process also brings into focus aspects of our behaviours which may otherwise be viewed as unimportant, automatic or unconscious.

*"There are **vital skills** we perform without **being aware of what we do and which cannot be verbalised. Walking, for example**, doesn't work if we consciously try to instruct our limbs."* (Morris, 2016, p. 178) *I have added bold for emphasis.*

The role of the pre-conscious or subconscious are important faculties that are developed and utilised in creative-technical education. When I grapple with the fiddly manipulation of a folded shirt hem, I recognise the grasping for cognition of physical sensations that Serres describes in the process of trying to tie a not:

"*This elementary question is posed when one takes two threads in hand and gets ready to tie a knot, an ancient practice …Discovered, there the unconscious, admirable network of strange stitches and knots*," (Serres, 1997, p. 21)

The strategic use of physical work as a vehicle for self-development is supported by much of the research work of the Ruskin Mill Trust. Alasdair Gordon articulates precisely this element of the practical process,

"*Learning can be transformative for the student…whereby normally unconscious habits can gradually be revealed and made conscious*." And "*by reflecting on their activity…the conceptual content of what the students learn becomes conscious.*" (Gordon, 2015, p. 15)

Transformation may occur in a momentary illumination of a self-restricting habit or it may take months or years of meeting yourself again in the same doorway. It is often during the physical process of trying, and failing, to achieve a target that we meet ourselves in the narrow passage of resistance between difficulty and desire. When a student is presented with a role-modelled exemplar work that has been considered in relation to their needs and wants, as I did for both these projects, they are challenged to match that standard of skill and are hopefully motivated to meet or surpass the challenge. This is why the school students wanted to try again. This corresponds with Dewey's description or motivation in the face of an emotional desire of dislike:

“Emotion belongs of a certainty to the self. But it belongs to the self that is concerned in the movement or events toward an issue that is desired or disliked.” (Dewey, Art as Experience, 1934, p. Chapter 3.)

The difficulty embodied in the role-modelled exemplar or the visualised design generates a resistance to the flow of intention and action. Holding a thread and attempting to push it through a tiny hole in a needle, or picking up a pair of scissors and taking the decision to cut a piece of fabric to the exact shape of a pattern, demands the full attention of all our senses. The complexity and effort to learn and understand and master something which has so many elements which effect the success of the end result demands our complete attention; there is no separation of mind and body at this point.

The repetitive motion becomes supportive so that we can stay with the tensions of possible failure and our natural inclination to desist when faced with resistance to our efforts. We are then able to observe ourselves when tired, irritated and under stress. We can discover what it feels like to strive for consistency and to be supported by the discipline achieved by others. This teaches empathy and appreciation of other’s efforts. We can experience a humbleness that accommodates the opinions of others, even if we don’t agree with them. Then we have the possibility to explore other perspectives and avenues that may help us to pass through the narrow passage of resistance and progress. This facilitates self-observation through doing. This is self-formation through doing: adapting, adjusting, accepting

There is a popular theme linked to this which is promoted by research and discourse about mindfulness and the meditative qualities of performing a simple repetitive action, such as sewing by hand, whilst refocusing our mental attention on that simple repetitive action. This is undoubtably a valuable element of the process but if we isolate this part, we are left with a simple tactile affirmation of our mortality here now. This facilitates self-observation, but without irritation, there is no need to alter from the path we are on. *“Needless to say, such experiences are anesthetic”* (Dewey, Art as Experience, 1934)

In this way, learning to sew offers the student the possibility of self-observation to discover not only their limitations but also their capabilities. This fosters self-belief, self-worth, self-confidence, self-esteem and self-motivation. This interrupts our blind reliance on technology and reconnects us with "*the satisfactions of individual agency from the things we actually do."* (Korn, 2013, pp. 11-12)

It is for this reason we need to offer children throughout their school life, the opportunity to develop fine motor skills in coordination with developing practical problem-solving skills because this helps to merge the digital with the physical and will make the difference between being response-able or response dis-abled.

> *"Before teaching children the console or the keyboard give them something to weave or to knit."* Michel Serres (1997, p. 20)

6.2 Material as Master: A Question of Control.

"The mechanism by which craft activities produce positive effects may be in part by reinforcing and cultivating a greater sense of control within the student." (Sigman, 2015)

"Stated the other way round, those who take part do not feel that they are bossed by an individual person or are being subjected to the will of some outside superior person… this instance illustrates the general principle of social control of individuals without the violation of freedom." (Dewey, Experience and Education, 1938, p. 54)

When we view these statements in light of my descriptions of the way in which the repetitive process of making becomes a vehicle for developing self-reflective skills then it is easy to correlate this with a resulting sense of self-control. By shifting the locus of control in the learning experience away from the teacher, the apprenticeship model creates a space for the learner to judge and take responsibility for their own actions. In this way, a role-modelled sample which controls the introduction of skills, targeted to the level and interest of the learner, has the possibility of stimulating

responses which reflect the individual needs of the learner and which, in turn will be reflected in their individual results.

This supports early research by Rotter into the nature of the locus of control in a learning context. He concluded that people are more likely to respond positively to a learning experience if they can make a connection between their own internal responses and the outcome, rather than the results of their efforts being contingent on some external source of control (Rotter, 1966). This conception of the making process introduces another contradiction between the professional practitioner interpretation of learning to make and the educational establishment interpretation of the making process.

The woven t-shirt project described in Chapter 4, fits into the apprenticeship learning model as described in Chapter 2.8. When viewed from the perspective of vocational education, then the popular assumption is that this is about scaffolding practical skills in a similar way to that described by the 1970's versions of the Psychomotor Taxonomy (Dave, 1970). The assumed flight path of knowledge and skills are indeed described by the diagram of the garment pattern and the role modelled teaching sample. The practical skills are also reflected in the stated learning outcomes of the college and the pre-populated Individual Learning Plans discussed in Chapter 4.1. When completing these forms at the beginning of the course, most students were content with this breakdown of their learning outcomes. This observation highlights the cultural as well as educational establishment attachment to the physical skill building role of these types of courses.

When set against the density and application of knowledge required by the new Design Technology GCSE subject content (AQA, 2017), the woven t-shirt course appears to be very simplistic. The viewpoint that this type of teaching task is too teacher led, repetitive and unchallenging is widely supported by establishment discourse surrounding this type of practical skill based work:

"Regrettably...The design and technology curriculum as it is taught in a considerable number of schools is out of date. In these schools, students have too few chances to engage in a truly iterative design process, develop creative problem solving skills or

design using systems and control technology. There is an imbalance between designing and making activities that involve students following the teacher's instructions and those which involve pupils in innovative problem solving."
(Choulerton, 2016)

The preference for an *'innovative problem solving'* approach to the making process is tightly woven to academic and cultural value judgements about superiority of cognitive analytical and creative processes over processes associated with manual labour. This educational conception of the design and make process is largely based on the iterative model devised during the 1980's and 1990's described in Chapter 2.2. The process that Richard Kimbell describes in his book *Understanding Practice in Design and Technology* (1996) does focus on the holistic nature of the design and make process, however the academic desire to define, control and ultimately measure student outcomes has progressively reshaped this into a procedural and cognitive model which disconnects physical problem solving from the broader understanding that impacts success outside school (Banks, 1994, p. 99).

Based on my professional designer experience, this mind set has resulted in the majority of the vital components of the design and make process having been structurally removed from the curriculum. Both the activity and the end result of making a garment are formulated by processes which have been tried, tested and fine-tuned over centuries of human habit and experience. These are not just physical experiences as the psychomotor taxonomy would suggest and they are not a series of diverging creative problem-solving ideas. Instead, they are integrally shaped by our bodies, our environment, economic forces and our social interactions.

When I planned the woven t-shirt project, I was not aware of *"the old recipe for well-building: Commodity, Firmness and Delight"* (Watson, 1993, p. 9), but these criteria match the expectations I set for the results of this course: *commodity* means that the end result should fit and be comfortable; *firmness* means that the garment needs to be well-made, with attention to quality and finish, so that it can be worn repeatedly without falling apart; *delight* includes the emotional responses of both the maker and those who will view the result of their labour. Viewed in this context, the activity of making something from basic materials, using simple tools, becomes a highly

complex task. John Naughton recognises this characteristic in his discussion of the definition of technology. In the end he concludes:

"The whole thing is always a complex interaction between people and social structures on the one hand, and machines on the other. New technology, in this sense, does not just involve new machines: it also involves new ways of working, and perhaps new types of organisations too." (Banks, 1994, p. 12)

The role-modelled sample used in the teaching of practical creative-technical subjects is not merely a representation of a set of physical procedural tasks; when taken in the broader context of what it represents beyond the confines of the teaching workshop, when taken home and set to use, then a woven t-shirt or wooden stool becomes a physical embodiment of human understanding. All products that we can conceive and make present a complex coded statement that reflects a cultural narrative and that demands debate; they suggest a means to an end which, at the same time, irritates by its attachment to yesterday's ideals and aspirations. They are temporal symbols of social discipline and conformity. It is this that facilitates it as a vehicle of individual and social control in the learning context, and equally it is this that demands an individual and currently relevant response from the student. Furthermore, each material type represents a different cultural library of discipline and dialogue. One practising craft teacher at Ruskin Mill commented that *"there is a life time of learning in one material,"* which certainly contradicts the rationale behind the homogenised theoretical subject content of the new DT GCSE curriculum.

Fig.43. Woven top teaching sample

Fig.44. iPad case sewing teaching sample

Fig.45. Bent wood chair at Ruskin Mill College, Nailsworth

Fig.46. Stool apprentice piece from The John Wallis Church of England Academy, Ashford

The earphone case project, by contrast, offers an example of how the school tasks have been contrived to combine a number of theoretical concepts to fit into a cognitive interpretation of the subject to the extent that it could never realistically be *'firm'* or have *'commodity'* because the student's lack of sewing experience meant that most of the cases would not hold together with use and the electronic

components meant that the cases could not be washed. Not only did this impact the utility of the project but it also denied the students the experience of any form of real-life testing of the success of their work.

This project also highlighted to me several other factors which impact on the learning potential of making projects in schools. The problems I had with the lack of appropriate equipment and the students' lack of previous skill development demonstrates a difficulty with the assumption that the bodily physical sensory process can be leap-frogged by cognitive understanding. When designing the earphone case project, I had allowed for the fact that students wouldn't be able to master this in one or two lessons. What I hadn't anticipated was that the preconceptions brought to the classroom by the teenage participants would reject the quality of their own work.

The expectations of a teenager are clearly different from those of a young child. Young children have no expectation of what their hand work should look like. They have a go, recognise their work as being the valid attempt of a novice, accept the disparity with the teacher's sample and then they carry on. This is true even of eleven-year olds when they start doing DT in secondary schools because they have no preconceptions about the subject. Their own self judgement does not demoralise their efforts. However, in this instance, the teenagers' perceptions about what they should reasonably expect to achieve, is based on their own relative achievements in the subject and those of their peers. Therefore, when comparing their work to the teacher example they subject their own work to far higher expectation and criticism. This in itself became a barrier to progress.

The conflict I felt between the student agenda to improve their work and my agenda to achieve an intended result with a degree of quality within the lesson timetable represents another debate within school Design Technology departments: the relative value of skill development against the quality of finished product. There is frequently a heated discussion about whether a teacher should help a student to overcome a practical stumbling block by helping them to complete the work in an allotted amount of time, or whether by, doing this, the student will learn nothing. Both are right.

In the world of craft education this is a very old debate. This relates to whether you are enabling the learner to fully experience the impact of their own internal locus of control which is something the Sloyd system aims to facilitate (Salomon, 1898), or whether you are focusing solely on the representational impact of the end result with limited regard for the learning process. People who make things justify their actions on many levels. The finished result is there to be judged by the customer, the examiner or the critic, but if the maker became focused on this, the work would become stuck or would look for answers in the result which would necessitate duplicating past successes. What we want now is not what we want or need tomorrow. In the commercial world, repetition and formulae for success are a recipe for decline.

From the point of view of student motivation, completion is a very live dilemma. What value perfection? Who judges the quality of that product? One person's shoddy workmanship is another person's shabby chic! One common ambition voiced by the adult learners was that they wanted to finish their garment; their satisfaction at doing so was recorded in their feedback questionnaires. Correspondingly, if students know they won't use it or that it's only a prototype, then this becomes pretend; the real-life encounter is denied. Hennessy and McCormick came to a similar conclusion when studying how children learn design and technology. They summarise their findings by criticising over ambitious problem-solving activities which result in 'unfulfilled ambitions'

"The present demand for pupils to conceive and develop an explicit design proposal bears no relation to expert practice and the demand for the artificial generation of several design ideas may be counter-productive" (Banks, 1994, p. 102)

Here it is important to note that the nature of a real-life encounter. From the point of view of an educational experience, it is sometimes possible to introduce real life customers, but even this is not always necessary. When it isn't possible, why not, on occasion, remove the need to be commercial, because this equally removes the pre-determined social attachment to value. This is liberating. All of a sudden it doesn't matter if you start and don't complete, if you repeat a process just because you find it

therapeutic, or if you produce something which doesn't appeal to you or anyone else, or which only appeals to you; it doesn't matter if you try and fail.

This level of freedom of outcome doesn't sit well with the need for schools to scaffold and control learning outcomes, however this does correlate with current thinking around the need for more divergent and creative practices in education (Lucas, Claxton, & Spencer, 2013), (Pappano, 2014). Certainly, the current fixation with applying atomised assessment rubrics to the creative-technical processes represents an unnatural restriction of what is essentially an organic process. The rigid control of learning outcomes denies exceptions, denies individual expression and denies evolutionary possibility. This damages not only the learning potential of the experience to explore individual possibilities but, in this context, I would also argue that it is precisely our attachment to craft as vocation that slams the lid tightly closed on all the integral evolutionary possibilities that present themselves when we try to make something.

> *"When I start my design, I don't want to know where it ends up. It's like looking for questions that you can't answer*" (Iris van Herpen, the Most Avant-Garde Fashion Designer in History, 2018)

6.3 What Endures? What Works Well Here, Now?

"The numerous examples of good quality innovation and success are achieved not with the help of our funding and regulatory system, but in spite of it." (Wolf, 2011, p. 21)

Practical work is taught in schools because this is what the children respond to. This was why I was briefed to design a sewing project for the school textiles project described in Chapter 5, and this is why, in schools across the country, children make cakes, cushions, key rings and wooden boxes. Children become emotionally engaged with the activity and the end result. Conversely, as one Design Technology teacher with many years of experience said to me, *"If a project can't be made and*

used, here is no way of pretending to the kids that it is real. They will soon sus you out if they can't create it in real life. You will just lose them!"

Good teachers and schools understand this and have adapted the learning experiences they offer to meet the real life needs of the students in front of them. The evidence I have witnessed on the ground supports the comment in the Wolfe Report above. In some cases, this has meant rejecting GCSE courses altogether, in others they have evolved and fiercely defended robust programs of practical creative-technical education beyond the confines of the national curriculum and established exam board schemes of work. I haven't needed to travel very far to find excellent examples of these.

In my hometown in Kent, Valley Park School provides a huge range of challenging and rewarding creative-technical experiences for their students. These are similar in approach to a traditional work-based learning model. As part of a comprehensive range of curricular subjects and extra-curricular clubs, the school trains students to build life size ceramic sculptures which are fired in two of the largest pottery kilns in the county, it has a working farm which shows award winning livestock at the annual county show, it runs a sponsored team which builds and races their own eco-friendly 'green power' car, and the school produces an annual program of professional standard music and theatre productions. These achievements are all recorded and celebrated in the school magazine which provides a further forum for social recognition and validation of student efforts. The broader beneficial contribution these bring to the school was recorded in their last outstanding OFSTED report:

"The extensive range of activities organised through the expressive arts specialism contributes very well to building students' self-esteem and confidence. The many performances and extra-curricular activities ensure that the school is a vibrant place." (Ofsted, 2013)

Fig.47. (Park Life Magazine Issue 13, 2017)

Fig.48. (Park Life Magazine Issue 11, 2017)

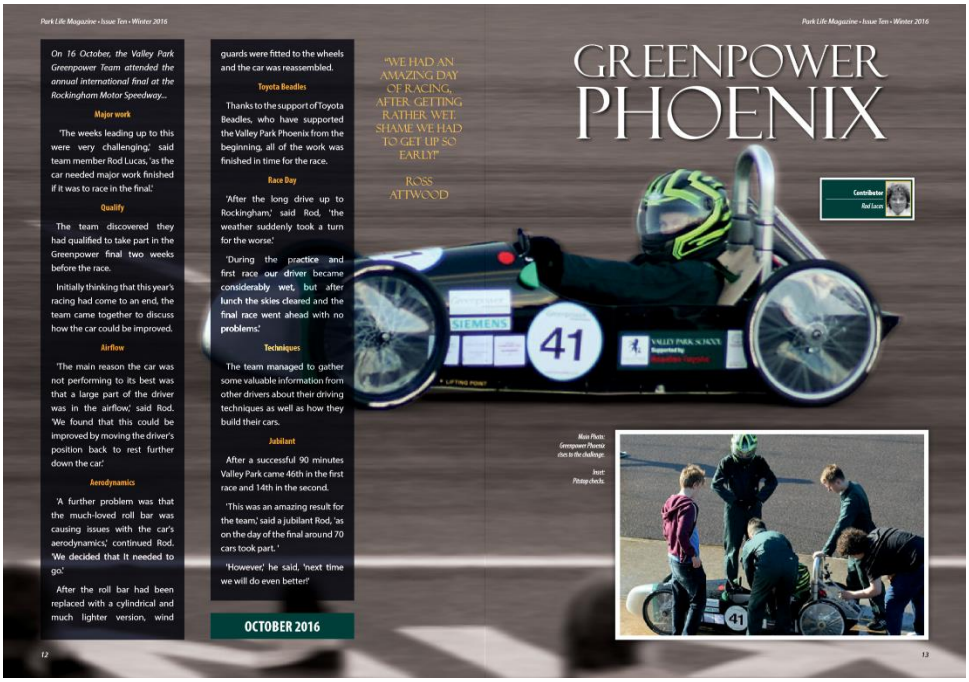


Fig.49. (Park Life Magazine Issue 10, 2016)

As part of my initial research for this thesis, I visited a local school, The John Wallis Church of England Academy in Ashford, Kent, to look at a modern approach to practical creative-technical subjects. At a time when many schools are closing their school workshops, I wanted to understand what motivated this school to build large new vocational facilities. During an informal interview with the Principal, John McParland, and their Head of Vocational Studies, Amanda Court, it soon became clear that the school has developed a program of vocational skills as a central axis which underpins the application of learning other more academic subjects. The Principal, John McParland, explained to me how the motivational qualities of the vocational subjects emerged as a consequence of one of his initiatives to embrace a large number of pupils who had become excluded from the school prior to his appointment in 2010.

The subjects he introduced include ‘Construction,’ ‘Hair and Beauty’ and ‘Retail.’ Having subsequently researched the hairdressing qualification offered at the school, I was interested to find out that the aims and assessment criteria of the course are firmly rooted in the apprenticeship model and have consequently not been distorted

or complicated by any other educational agenda. This qualification is particularly noteworthy because the National Hairdressers Federation, which was founded in 1942, already had a very successful framework for training hairdressers in place long before academic institutions started drafting state National Vocational Qualifications in the 1980's. The scheme of work for the VTCT (Vocational Training Charitable Trust) Level 2 Diploma in Women's Hairdressing states that the purpose of the qualification is to provide students *"with the knowledge, skills and understanding to be a junior hairdresser/stylist."* (Vocational Training Charitable Trust, 2015). It further places an emphasis on **personal and interpersonal skills** such as *"A high degree of* ***manual dexterity*** *… required to work on different hair lengths,"* and the *"need to maintain* ***a professional personal appearance*** *and demonstrate* ***effective communication skills.***" (Vocational Training Charitable Trust, 2015). (Bold added for emphasis.)

The central values conferred by these subjects, are now cemented in the school curriculum in the impressive purpose-built *'Infinity'* building which houses what the Principal, John McParland, describes as 'core subjects' working alongside vocational work rooms providing the learning foundation on the ground floor with Maths, Modern Foreign Languages and other vocationally linked subjects on the two floors above. The Academy places equal importance to vocational subjects as is given to core subjects.

Fig.50. Floor guide in the John Wallis Academy Infinity building showing classroom locations by subject.

Fig.51. Beauty therapy studio in The John Wallis Church of England Academy

Fig.52. Construction workshop in The John Wallis Church of England Academy

Fig.53. Infinity building housing vocational studies on the ground floor. (The John Wallis Academy, 2018)

The building is aptly named in view of the potential represented by the success of this approach. The impact of these less measurable skills on student motivation is now reflected in the school's more measurable academic achievements and the benefits to the broader community beyond the school were noted in a 2015 commendation in the House of Lords by The Lord Bishop of Ely, Bishop Stephen Conway:

"*I cite the example of a cracking diocesan academy, the inspirational John Wallis Church of England Academy in Ashford, in Kent, a three to 19 Academy that is having a really transformative impact on the whole of the community"*. (The John Wallis Academy, 2018)

Chapter 7. Conclusion

7.1 Why teach to make by hand in the Digital Age?

"It's purpose is not to turn out Carpenters, but to develop the mental, moral, and physical powers of children; and it is the most effective instrument yet devised for securing this development." (Salomon, 1898)

I chose to focus this study on the activity of sewing to examine aspects of the making process that are reflected in other material disciplines, such as wood, metal and food. Whilst teaching the two contrasting sewing projects, described in chapters three and four, I often felt that I was being forced through a narrow doorway of time where a number of educational agendas were competing for my attention and loyalty. This presented me with some stark revelations about the theory and practice of the subjects which are variously defined by the umbrella terms *'design and technology,' 'craft'* or '*vocational education.'* By asking the question *'What does making do for the maker?'* I had hoped to identify the features of this type of learning that have direct relevance to the lives of students now, however instead, I repeatedly discovered obstacles to the natural rhythm and context for learning practical creative-technical skills.

The progressive cognitive reformulation of the subject by the government and academic establishment, combined with the national curriculum's structural removal of the student's physical, social and emotional engagement with the process of making, has recently resulted in the erasure of the course altogether in many schools. When considering the work of Wilson, which concludes that *"the hand speaks to the brain as surely as the brain speaks to the hand. Self-generated movement is the foundation of thought and willed action",* (Wilson, 1998, p. Loc.5304) and the work of Kimbell, which demonstrates the link between thought and action (1996), then we must ask: what valuable opportunities are being denied children of all capabilities in mainstream education by excluding the physical experience of making things that offer *'firmness, commodity and delight,'* (Watson,

1993). *W*hat damage is being done to our children by denying them a broad range of complex conditions to fully develop all their human faculties in this way?

When we consider that richer people continue to pay for these types of educational experiences during holidays and as extracurricular activities, it is also easy to apply Herrari's formulation of the growing divide between the rich and the poor, not by something as distant as he suggests, but now, through physical stimulation of children which will furnish them with further economic advantage by developing their ability to adapt and to overcome future challenges.

The proliferation of digital social media platforms documenting human experiences and the accessibility of ever-evolving digital knowledge has generated a climate where the challenges to the assumptions that support the cornerstones of our establishments are far more dynamic than mere expressions of disagreement. This not only tests the logic of an education system that still focuses on the acquisition of written knowledge but also disrupts the traditional logic that links practical skills to vocational training.

A brief review of the government policies that have shaped the system that defines the success parameters on which it bases its logic, reveals that these are shaped by definitions of hierarchical standards which became dominant at a time when academic knowledge and learning were prised as a form of higher human achievement. At the time, scientific psychological research into cognitive learning processes conveniently side-stepped other forms of knowledge acquisition which did not fit into measurable progress outcomes. The assumption that this is a one-size-fits-all approach to learning has led, in turn to the progressive distortion and erosion of other less measurable forms of education. The drive to achieve parity of academic standards across subjects, regardless of traditional or professional practices or modern-day circumstance, has now led to the situation where the gap between the truth represented within academic and government regulatory institutions has become progressively disconnected from the socio-economic reality experienced by the general population outside these communities.

This disconnect has become the focus of much criticism both from within the teaching profession and from the business communities who seek to employ graduating students. I read the Wolf Report into the review of vocational education with the hope that this would offer recourse to the current devaluation of practical making activities in education. The introduction to the report states that, *"It is time, as the Secretary of State has said, that we recognise the 'inherent value of craftsmanship' – the intrinsic richness of manual work, practical and technical competences"* (Wolf, 2011, p. 6). However, the impact of this report appears to have had precisely the opposite effect to its intentions. The report identifies the unhealthy relationship between government funding tables and teaching priorities but it completely misses the fact that the two systems have become mutually dependent. It neglects to acknowledge the impact this has on the practice and very raison d'etre of the institutions it supports. Thus, without a change in government funding practices, the result has been a further imbalance between the academic and the 'vocational' systems of education.

Criticisms of the traditional knowledge acquisition model of education are not new, however, what is new today is the increasingly static nature of classroom learning resulting from the increased focus on literacy and written evidence combined with the increasingly static nature of our everyday lives due to efficiencies of modern technologies. For digital natives, this is normal. So, why should we be concerned about the decline in practical creative-technical experiences afforded to students today? One answer may lie in the societal adoption of making activities as a counter balance and remedy to the emotional, sensory and social disconnection generated by digital technology. Academic research is a slow and ponderous process. If we wait until research has recognised and justified this phenomenon, then the current impartial and measurable conception of making in education will continue to elevate and proliferate the use of novel technologies at the expense of developing more stable and supportive human qualities and capabilities.

We are now at a similar gateway in human development as that experienced during the industrial revolution. This prompted a huge amount of experimentation and debate about the best way to educate our children. My concern now is, that the

current system has become so preoccupied with preparing students for an uncertain future that any pedagogical connection between the developmental stages of children and learning by doing in the here and now has been lost. The methods of educational regulation and the degree of inclusion and equality demanded by government and society has coalesced to such a degree that there is little opportunity to experiment within mainstream education to be able to resolve this.

7.2 What does making do for the maker?

"The answers I have found – through considering the work of my own hands, through the practical education of a life in craft, and through the shared experiences of others – all seem to lead back to one fundamental truth: we practice contemporary craft as a process of self-transformation." (Korn, 2013)

Like Korn, in the end, I found the answer to my question of why teach sewing in the digital age lay in my own practice and in the human behaviours of making and learning to make, that have changed little over centuries, in spite of our enthusiasm for new technologies. Observations from my own experiences of planning and teaching practical skills and the growing wealth of on line and published book accounts of the making process from leading professionals provided a wealth of insights into what the making process offers the maker. This in turn has helped me to describe the value of the contribution of this type of learning as part of an holistic educational experience.

I have discovered numerous descriptions of the making process and what it offers to students; some focus on physical problem-solving skill development, others on the self-discovery and social 'by-products' of the activities. The responses from my student questionnaires suggested these outcomes are directly linked to each other. Professor Richard Kimbell came to a similar conclusion as a result of his extensive research into classroom practice in this subject area:

"The principal justification for the development of Design and Technology capability is that through its unique concrete language it ***empowers pupils*** *to identify failings*

in the 'made world' and … ***encourages independence and resourcefulness*** *and that* ***combines practical, intellectual and emotional challenge****. It* ***builds confidence and self-esteem****."* (Kimbell, et al., 1996, p. 35) Bold added for emphasis.

Interestingly, this summary has echoes of the justification given for learning handwork skills, such as woodwork, written by Otto Aaron Salamon nearly a hundred years earlier, describing the Sloyd method of immersive practical education.

"It ***cultivates manual dexterity, self-reliance, accuracy, carefulness, patience, perseverance,*** *and especially does it* ***train the faculty of attention and develop the powers of concentration****"* (Salomon, 1898). Bold added for emphasis.

Ultimately, we learn to sew by hand today for the same reasons that people have always learnt to sew by hand: the process of making something reflects back to the maker a reality which always has consequences for the maker. This cannot be a tick box resolution because it is always temporal, always individual and always socially defined. Making something demands a response which, if repeated, cannot be denied or deflected onto someone else. We are forced to take an interest in our responses and the responses of others to the result of our activity, and thus, to take responsibility for our actions. There is nowhere to hide. In this way it is the discomfort and the delight of the process that becomes the teacher.

Making by hand is an integrated representational process in its own right. 'Craft' has the possibility for man to remain connected to and navigate through the polarities of our lives whilst retaining a sense of being in control of our own destiny. There have been many attempts to describe this process but words are a different medium and any definition or diagrammatical representation, always leaves something out. Moreover, the *'instability'* of the subject described by Kimbell (1996), has meant that in schools, the process has been moulded into a subject that demands the activity of writing about making in preference to the activity of making itself. Making has nothing to do with human constructs of education; it is not about process and not about the end result; it is not progressive vs traditional; it is not academic vs vocational; it is not science vs art; it is not form vs function; it is not therapy; it is not cognitive problem-

solving; it is rarely ‘higher order’ creativity; it is not technology and it is not design. It is quite simply how we engage with our environment and with each other, how we solve physical problems, express displeasure and delight, and how we earn a living.

Whatever change we can anticipate in the next hour, the next day or the next decade, we still have the same physical body to use to adjust to this. We do not need to look to technology or evolutionary history or neuroscience to understand this; we only need to reflect on our own motivations for selecting and wearing an item of clothing. What is the weather like? Does it need mending? Will it create the right impression? Who made it? Where did the fabric come from? Do I even care?

When looking at examples of schools that offer thriving practical skills experiences to students, it became clear that these succeed in offering a balance to the dominant academic model, precisely because they do not try to please this master alone. Instead they fully embrace the opportunity to focus on the diversity of contextualised human experience that is afforded by productive activities that are not constrained by measurable or pre-defined outcomes or by cultural attachments to vocation. By running apprenticeship-style courses as part of the curriculum and clubs outside the standard school day, achievements are publicly scrutinised and validated through competitions, performances and exhibitions. In this way, these schools succeed in doing what Biesta advocates:

“…that educators and educational institutions show an interest in the thoughts and feelings of their students and allow them to respond in their own, unique ways.” (Biesta, 2006, p. 28)

Furthermore, they succeed in achieving *the paradox of equality in education by providing an educational diet for every child that is different from that of every other.* (Paraphrased: Downey & Kelly, 1979 cited by Kimbell, Stables, & Green, 1996, p. 87). These models of education are inclusive precisely because they are free from artificial value judgements which try to merge everyone into a measurable norm. The activity of making something often does involve following a pre-defined task, but this is represented by an experiential role modelled sample which stimulates individual responses and individual outcomes, as demonstrated during my classes.

Today we have moved far beyond the stage where technology offers a utopian dream. As Heidegger stated at the dawn of the technological age, technology offers a mirror to our very being in all its glory and gore. Technology itself is not the enemy, but we do need to look at how we educate our students to use their own judgement in how they use it and to stimulate their interest in the ramifications of its use. From a pedagogical perspective, it is important to remember that the human mind and body is our primary technical instrument, not machines or digital technologies. This cannot involve a prescribed or a measurable outcome.

As a result of these reflections, I now understand that there is an urgent need to strip back the load of academic learning in mainstream education to make room for a broader range of experiences which will ultimately connect our individual physical as well as mental efforts towards contributing to our collective long-term well-being. The difficulty, as Salomon commented over a hundred years ago, is communicating this to the educational establishment.

“In all countries, too, the direct utilitarian instruction is regarded as of prime importance, whereas the true educational values – the formative part - are estimated at a much lower rate” (Salomon, 1898)

The head of OFSTED, Amanda Spielman, recently said that from Autumn 2019 school inspectors will look much more closely at how a rounded curriculum is being delivered. This is a step in the right direction. However, I don’t agree with her comment that *"There need be no conflict between teaching a broad, rich curriculum and achieving success in exams,"* (Spielman, 2018) unless this is directly linked to an engagement with more holistic funding criteria this will have little impact on the motivations and behaviours of teachers and schools.

In an effort to communicate Salomon’s observation that *the true educational value* of making is *the formative part*, and to answer to the question of why teach to make by hand in the digital age, I offer the following answer: you need to start with something small. The simple act of learning to thread a needle and sewing two pieces of fabric together becomes a vehicle for learning about myself and my possible contribution to my community; it brings me as an individual in direct physical, emotional and

cognitive processual exchange. For a child it demands a physical interaction of hand to eye, which develops transferable skills which go way beyond the atomised prescriptions of assessment rubrics. You can't build a house without first learning how to lay a brick, and you can't build an economy without first understanding how to use and develop your own intrinsic individual capabilities. More than skills acquisition, more than passing exams, more than being independent and resilient, this is about helping people and societies evolve. Physical movement is about not being stuck.

How we treat others, how we value the contribution of everyone in our society and how we connect with each other and our environment has never been more critical. If we lose the ability to repair a door or sew a hem then how will we be able to find practical solutions to the problems that haven't manifested yet, let alone work in a manner that takes into consideration the broader impact of our actions on those around us, on our ecosystem and on our future quality of life?

This enquiry set out to identify the key characteristics that could potentialise the experience of learning to make by hand for students today living in an age dominated by our relationship to digital technologies. However, in view of my findings, I now hesitate to prescribe features or strategies because this would fragment and ultimately distort what is essentially a holistic process. To resolve this, I make recommendations for the provision of creative-technical education. This is not exhaustive and is not dependent on learner age, ability or background. I merely intend to articulate the physical process of making as a relevant vehicle for learning in the digital age.

7.3 Recommendations: Experiential Counterbalance

It is time to acknowledge the practices of practical creative-technical education today and to reclaim them as a counter balance to the dominant academic model favoured by governments and the regulatory bodies they support. Here I make five recommendations which could help to shift the balance. What I propose does not represent a romanticism for a bygone age, an idealism for an imaginary future, or a

paradigm shift; it is simply a revaluation of practices which prevail in education today purely because of the passion and devotion of individual professionals.

1. **Rebalance government funding priorities for education to support the provision and maintenance of the physical as well as academic learning** needs of students. This should include the physical work spaces, equipment and support staff required to facilitate this.
2. **Rebalance the educational diet of children defined by government regulatory practices to accommodate timetabled and evidenced physical activities in addition to traditional static desk work.** This should include individual and team projects and visual discourse. They should allow time for repetition of skills, trial and error, trial and improvement, completion of real, socially validated tasks and time for reflection in and on action. This may be in the form of regular extra-curricular activities. These should be timetabled and funded in equal measure to academic timetabled experiences. To facilitate this, material disciplines should be limited to promote depth and repetition of learning experience.
3. **Rebalance the assessment focus of qualification frameworks and regulatory bodies from the reliance on pre-defined, measurable outcomes, to accommodate holistic and socially defined challenges and celebrations of excellence**, such as local and international competitions, performances and exhibitions. This should be linked to relevant funding.
4. **Rebalance the language of the national curriculum and related regulatory guidelines** away from a focus on intellectual creativity, analysis and problem-solving to use language which celebrates physical achievements and the related social, emotional and spiritual contributions these make to education. **The language selection should reflect positive value judgements and neuroscientific links to formative experiences by favouring referents such as firm foundations, strong frameworks and life-affirming resilience**; this is in contrast to the current choice of nebulous and insignificant terms such as ‘global’ or ‘general’ skills or ‘soft’ outcomes.
5. **Rebalance the focus of funding for educational research away from teacher focused skills and results, to student-centred development.** It is

time to ask anew: What impact does the day to day learning experience have on child development? What is appropriate, not only in relation to the cognitive development of people, but also in terms of transferrable vocational and life skills such as manual dexterity, social interaction, and emotional intelligence?

Chapter 8. Epilogue

When I first came to the Ruskin Mill Trust and met the academic staff from the Inland University of Norway who had formulated this master's course, I felt I had arrived amongst people who had similar interests to my own in relation to refocusing our research, and in turn establishment lens on the simple physical human act of making, and repairing things, by hand.

This research journey has taken me to many different types of educational establishments since then and has been instrumental in my decision to follow a professional path which helps to promote practical craft and creative-technical skills in education. I started both this master's course and my subsequent formal training as a teacher with the belief that I brought with me some valuable experience of the skills and techniques required to teach this subject area. I had trained in fashion design and had worked for fifteen years as a designer. I then set up a small manufacturing and retail business which I sold six years later. I also had several years of experience teaching design, craft and clothesmaking skills to a diverse range of people from the age of 6 to 96.

I have found however, that rather than being valuable, this previous life experience has been extremely difficult to validate within the establishment educational frameworks I have encountered over the past two years. This has, at times hindered both my understanding of and subsequent contribution to the secondary school teaching community in which I now find myself.

The difficulties I have experienced as a consequence have been reflected in the nature of the questioning which became the central axis of this thesis enquiry. I have found such a huge disparity between my own educational and professional experience of making things and that presented to children in schools today that I have found very little common logic for the motivations to make. Partly for this reason, and partly because written language is not my preferred medium of communication, I have found communicating my understanding quite challenging. So much of my assumptions are embedded in habitual physical and cognitive practises that it has been difficult to locate these, let alone articulate them. I chose to focus much of my research on the government and educational establishment literature because it helped to reflect understanding to me by virtue of its contrast and opposition to my experience. I have found that as a result of re-reading and editing this thesis, I have continued to unpick further embedded assumptions and beliefs in my writing and no doubt you will recognise more.

In essence, by starting to work in a mainstream secondary school eighteen months ago, I have completely immersed myself in the object of my study. This has had a variety of consequences. It shifted the focus of my study from being about practical creative-technical education in general to the nature of that field of education that impacts the majority of the population, namely mainstream secondary state education.

During the course of this research study, I have also been studying for a Post Graduate Certificate in Education (PGCE) on an in-work training program. This has further immersed me in literature about education and my subject area specifically. It has also afforded me the opportunity to observe numerous classes and to talk to many experienced teaching professionals in the field. I have also met people who, like me, have professional experience outside education and who have recently transitioned into education. These conversations, combined with the opinions expressed in the literature, have also influenced the direction and discourse of this thesis.

One of the consequences of being surrounded by other teachers who have a vested interest in my successful assimilation into the teaching profession, is that, on

occasion I have felt coerced by the logic surrounding the present formulation of the subject of design and technology, as I have experienced it in school. The question for me, became how to stay connected to the realities of what I observed in front of me and not to become seduced by a brilliant but organically disconnected echo chamber of discourse. If I had not had a different type of educational experience as a pupil, student and teacher of practical creative and technical subjects, I might presume that this is how it should be. In fact, I have realised that many teachers who now lead this subject area have only ever known this theory driven interpretation of the subject and have little experience of it beyond education. They therefore do not question it.

If I perceived that this was having a positive impact on the students I teach, then this would be of little concern. However, the behaviour I have witnessed has left me feeling immensely frustrated with the system. Students in general delight in real-life practical challenges, become exasperated by the lack of practical work as they progress through the school, compliant and numb to the amount of theory and stressed by the incessant demands of the knowledge-testing culture. Their anxiety seems to be aggravated by the externally imposed demands which they have little opportunity to influence, particularly if they struggle to demonstrate achievements in written work. By contrast, the same students become radiant, engaging and inspiring when given the opportunity to perform in art, theatre, music, sport, cookery, engineering, farm skills, hairdressing, construction or any number of other physical activities that schools facilitate, often as part of an extra-curricular timetable. This aspect of school education is often seen as incidental to their main role as providers of academic qualifications and while heads of schools may recognise the contribution these activities make to the attitudes and ambitions of their students, they still necessarily centre their attentions on the static nature of classroom education, because this is validated by the funding system.

When I started planning this research, before entering mainstream education, I had an idea that the educational establishment was missing something by placing so much emphasis on school academic qualifications and university education. Now I am even more convinced that the current trajectory has locked the next generation

into a limiting and damaging educational experience which will continue to have a negative impact for many in terms of poor mental and physical health and limited career aspirations due to the lack of opportunity that has been afforded to them to develop innate skills which are not valued by the academic system.

From a professional perspective, judging by the prescriptive nature of the practical creative curriculums in school, I also doubt whether Britain will continue to be as innovative and aspirational as it has been in the past in the creative professions. Anecdotally, I have heard many college lecturers in the creative and technical subjects complaining that the students who are coming through the system today lack the self-initiative and basic physical skills needed to excel in these subjects.

The nature of this enquiry has also stimulated new discussions with friends and family about the nature of our relationship with new technologies. This has refocused my attention back to my own practice in relation to broader cultural issues concerning how we interface with technology on a human level and how we use this to manifest a conscious, supportive and imaginative existence.

As a result, of all this experience, combined with the huge amount of self-reflection demanded by both my teacher training course and this thesis, I find myself unable to reconcile my understanding of the purpose of what I do, with the current school formulation of what I do. Instead, I feel more compelled, like many other makers, to find a way to express the wonders of the making process in ways that may influence broader cultural and economic logic. This is important because it keeps in focus value judgements about the quality of life they offer, not only for today, but for those who will follow us. This may sound idealistic, but the groundswell of change I have witnessed in the past fifteen years is encouraging. When I started making cakes by hand in 2000, there was no social media and very few hand craft businesses. Now there are enough people doing this for the Craft Council to have commissioned a report about the size of the contribution of craft businesses to the economy (Bennett, License, & Tuck, 2014). Equally the growth of social media platforms has facilitated a huge arena for sharing ideas and philosophies which, in turn is empowering people to redefine their pleasures and ambitions, often in contradiction to government and corporate profit agendas. For the past five years, I have been transcribing interviews

with professionals where they describe their process. I find these illuminating, not as a separate cognitive study of the creative practical process, but, when set against the magnitude of their physical achievements, they highlight human interactions with the made environment which have broader implications for how we relate to each other and how we prosper in the digital age.

Where this journey leaves me professionally, I am not sure. What I am certain of is that engaging in handwork, craftwork, making - or whatever other name we choose to use – offers many benefits with ramifications way beyond the self-evident result of individual effort. As a result of the evidence I discovered during this study in relation to the rigidity and control of government funding and regulatory practices, I am also now convinced that it matters little what research and opinion is published to support these benefits, they will have little impact unless shifts in funding start to realign with the evidence it seeks. Reflecting on the value of this study, I feel satisfied that it highlights these very real concerns and stimulates debate that is relevant to how we shape the educational and developmental experiences today in a world which is increasingly dominated by digital technologies.

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Appendix 1. Glossary of Terms

Word	**Definition** (Oxford English Dictionary, 2006)	**Semantic Associations to Activity**
craft	An activity involving skill in making things by hand.	*"The word 'craft' is a moving target. It is endlessly debated. It is traditionally used in relation to a vocational skill but since the 1960's 'craft' has been adopted as marker of cultural choice by lifestyle and hobbyist makers. Combining these associations has led to attempts to draw distinctions between skilled and amateur craft work with various categories and hierarchies in between"* (Moses, 2015). In recent years the use of the term 'hand-crafted' has often been used to confer a perception of superior quality to a product.
making	From the verb '*to make*': The act of forming something by putting parts together or mixing substances.	The term making has been favoured in recent years by practitioners who wish to articulate the activity of constructing something with simple tools, whilst distancing themselves from the cultural attachments of the word 'craft'
handwork	No definition	The Steiner movement often uses the word handwork to draw a distinction between craft work as vocation and making by hand as a human developmental and communicative activity. (Hauck, 1968)
practical	Relating to the actual doing or use of something rather than the theory	This word is used to distinguish physical and hands on activities used in classes. This can apply to a broad range of subjects including chemistry and sport, so using this word without reference to subject can be misleading.

		Culturally perceived as being ‘easy’ and demanding less intellect therefore of less value than academic learning. *“'practical' carrying pejorative overtones, frequently being construed as the opposite of 'academic'.”* (Penfold, 1987, p. 35)
academic	Adj: 1. Relating to education or study 2. Not related to real situation; theoretical n. teacher or scholar in a university or college.	Note, in relation to practical education, academic is often understood to be the opposite of practical.
techne	An art, skill, or craft; a technique, principle, or method by which something is achieved or created.	Derived from ancient Greek τέχνη often translated as art and craft or craftmanship.
technology	The application of scientific knowledge for practical purposes	The word has become divorced from the original word stem *‘techne’* and now, tends to be used as a euphemism for all digital computer-aided design and manufacturing processes and their resulting products.
Design and Technology **Abbreviation: DT**		Described by the National Curriculum in England & Wales as*“an inspiring, rigorous and practical subject.*” (Department for Education, 2013) These two words are used together, with and without the linking word ‘and’ to refer to the subject taught in schools that has evolved out of predominantly workshop based subjects such as woodwork and metalwork.

creative	Involving the use of the imagination in order to create something	This word has been heavily favoured in academic studies that are critical of the prescriptive nature of the modern mainstream learning environment. (See (Lucas, Claxton, & Spencer, 2013) Creativity is seen as a reflection of original and independent thinking and as such has been placed at the top of the revised Bloom's Taxonomy of educational objectives (Anderson, Krathwohl, & et al, 2001). Creativity is also a quality commonly ascribed to those who draw or make.
aesthetic	1. Concerned with beauty or the appreciation of beauty. 2. Having a pleasant appearance.	In the English language, aesthetics are associated with visual themes and pleasing visual harmonies. When used by non-native speakers, the word carries associations conferred by the word origin from the Greek aisthētikos which relates to perception by all the senses – not just sight.
education	1. The process of teaching and learning. 2. The theory and practice of teaching 3. Information about or training in a particular subject	An umbrella term for all forms of teaching and learning including *'life long learning'* and learning through life experience.
Vocational	Relating to a particular occupation and its skills or knowledge.	The Wolf Report into vocational education refers to the term vocation in parentheses because as it states, "*We have never, in this country, adopted an official definition*." (Wolf, 2011). The report discusses the diverse applications and associations of the term 'vocational education' Cultural link to practical education and manual work so often perceived as

		having less value than academic education
Special	better, greater, or otherwise different from what is usual	
Special Needs	Particular educational requirements of children with learning difficulties, physical disability, or emotional and behavioural difficulties	This term has complex and diverse cultural attachments. The recent growth in recognised learning disabilities such as dyslexia and ADHD have shifted the popular perception from special needs being something which effects the learning abilities of a few to something which impacts the learning of a broader section of the population today. This is reflected in the inclusion policies of mainstream education.
Mainstream education	Mainstream: the ideas, attitudes, or activities that are shared by most people.	Mainstream schools are state funded institutions. According to the Education Act 1996 "mainstream school" means any school other than— (a) a special school, or (b) an independent school which is not— (i) a city technology college, (ii) a city college for the technology of the arts, or (iii) an Academy (UK Government, 1996)
Key stage 3	None	*"The national curriculum is organised into blocks of years called 'key stages' (KS). At the end of each key stage, the teacher will formally assess your child's performance."* (UK Government, 2019) Key stage 3 covers ages 11-14 years.
GCSE (abbrev.)	General Certificate of Secondary Education (in the UK except Scotland.)	The replacement for General Certificate of Education at ordinary level (GCE O' level)

BTEC (abrev.) **Business and Technology Education Council**	None	A level 2 BTEC award is equivalent to a GCSE but is culturally perceived as having lower value because of the association with practical vocational education
Community education	Community: group of people living together in one place	Local government, health organisations and charitable trusts run a variety of courses targeted at the needs of local people. My local authority states: *"Programmes will contribute to key public policy priorities in areas such as Health and Wellbeing, support for families, volunteering, community resilience and employment."* (Kent Adult Education Community Learning and Skills, 2017)
Guild	1. A Medieval association of craftsmen or merchants 2. An association of people who do the same work or have the same interests or aims	The guilds evolved and established practices for teaching practical skills which were later absorbed into the arts and technical colleges in the UK, and which continue to be used in practical work-based training models today.
Apprenticeship model	Learning a skilled practical trade from an employer	Discussed in more detail in Chapter 2.8
OFSTED	None	Ofsted is the Office for Standards in Education, Children's Services and Skills. It a government sponsored body which inspects and regulates services that care for children and young people, including services providing education and skills for learners of all ages.
Digital	1. Relating to information	*"Digital skills have no single definition, but have been variously described to*

	represented as a series of binary digits, as in a computer. 2. Relating to computer technology: the digital revolution	*include a general ability to use existing computers and digital devices to access digital services"* (UK Parliament, 2017, p. 7)
Digital Age	the present time, when most information is in a digital form, especially when compared to the time when computers were not used (Cambridge Dictionary, 2019)	This is an umbrella term used to describe the all-encompassing impact of our relationship with digital technologies: *"Today,... Developments in genetics, artificial intelligence, robotics, nanotechnology, 3D printing and biotechnology, to name just a few, are all building on and amplifying one another… Smart systems—homes, factories, farms, grids or cities—will help tackle problems ranging from supply chain management to climate change. The rise of the sharing economy will allow people to monetize everything from their empty house to their car."* (World Economic Forum, 2016)

Appendix 2. Norwegian Data Approval

Rune Sarromaa Hausstätter

2418 ELVERUM

Vår dato: 05.03.2018	Vår ref: 58550 / 3 / EPA	Deres dato:	Deres ref:

Vurdering fra NSD Personvernombudet for forskning § 31

Personvernombudet for forskning viser til meldeskjema mottatt 20.01.2018 for prosjektet:

58550	*What does making do for me? An exploration of how we describe practical aesthetic skills education within the academic model in relation to what exists outside this framework.*
Behandlingsansvarlig	*Høgskolen i Innlandet, ved institusjonens øverste leder*
Daglig ansvarlig	*Rune Sarromaa Hausstätter*
Student	*Paula George*

Vurdering

Etter gjennomgang av opplysningene i meldeskjemaet og øvrig dokumentasjon finner vi at prosjektet er meldepliktig og at personopplysningene som blir samlet inn i dette prosjektet er regulert av personopplysningsloven § 31. På den neste siden er vår vurdering av prosjektopplegget slik det er meldt til oss. Du kan nå gå i gang med å behandle personopplysninger.

Vilkår for vår anbefaling

Vår anbefaling forutsetter at du gjennomfører prosjektet i tråd med:

- opplysningene gitt i meldeskjemaet og øvrig dokumentasjon
- vår prosjektvurdering, se side 2
- eventuell korrespondanse med oss

Vi forutsetter at du ikke innhenter sensitive personopplysninger.

Meld fra hvis du gjør vesentlige endringer i prosjektet

Dersom prosjektet endrer seg, kan det være nødvendig å sende inn endringsmelding. På våre nettsider finner du svar på hvilke endringer du må melde, samt endringsskjema.

Opplysninger om prosjektet blir lagt ut på våre nettsider og i Meldingsarkivet

Vi har lagt ut opplysninger om prosjektet på nettsidene våre. Alle våre institusjoner har også tilgang til egne prosjekter i Meldingsarkivet.

Vi tar kontakt om status for behandling av personopplysninger ved prosjektslutt

Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.

NSD – Norsk senter for forskningsdata AS | Harald Hårfagres gate 29 | Tel: +47-55 58 21 17 | nsd@nsd.no | Org.nr. 985 321 884
NSD – Norwegian Centre for Research Data | NO-5007 Bergen, NORWAY | Faks: +47-55 58 96 50 | www.nsd.no

Appendix 3. Questionnaire to Adult Learners

INLAND NORWAY UNIVERSITY OF APPLIED SCIENCES

Research Study: What does making do for me?
An exploration of how we describe practical skills education

Adult Sewing Course Participant Feedback Questionnaire

I have read and understood the Research Participant Information Sheet dated _____ ☐
I have agreed to and signed the Participant Consent form ☐

Thank you in advance for taking the time to complete this student course feedback questionnaire. All the information you provide will be used to document the student experience of learning a practical creative skill. This will contribute the research study as outlined in the information sheet dated 26/09/2017.

Course:		**Course Start Date:**	
Student Project:		**Questionnaire Date:**	

	Question	*Please tick one box or write your response below as required:*	
1.	What is your age group?	18-25 ☐ 26-45 ☐ 46-65 ☐ 65+ ☐	
2.	Was this your first experience of learning to sew clothes?	Yes ☐ No ☐	
3.	Have you taken part in other creative practical skills courses?	Yes ☐ No ☐	
4.	Why did you enrol on this course?		
5.	How did the teacher explain what you needed to know to complete the project?		
6.	What was the best part of the course?		
7.	What did you find most challenging?		
8.	What have you learnt from this challenge?		
9.	Did you complete the making project?	Yes ☐ No ☐	
10.	How do you feel about completing/ not completing the project?		

Has the making process helped you to gain or develop any personal skills or knowledge beyond the sewing skills? Yes ☐ No ☐ If yes, then what?

Any other comments:

Your responses will be used anonymously. Your name and signature will be used to confirm your consent for use of your questionnaire responses for the purpose of the research as set out in the information sheet dated 26/09/2017 and will be retained according to your data consent approval.

Contact for information concerning this questionnaire:
Project Leader: Rune Hausstatter. Email: rune.hausstatter@hil.no
Research student: Paula George. Email: 160677@stud.hil.no

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Appendix 4. Earphone Case Work Book Extract 1.

PROJECT BRIEF

A company that sells merchandise for group events has asked you to research and design an earphone case that lights up and can be clipped to a bag. This should include a printed textile surface and an element of hand-crafted stitching.

The case must fit in a cellophane bag with a cardboard header for display on a hanging rack. Cellophane packaging dimensions: 70mm x 150mm.

Analysis of the Brief

Highlight or underline all the key information you need to consider when researching and designing your earphone case.

What do you need to research?

_____

_____

_____

The following designers used surface pattern and colour as part of their brand identity:

Mary Quant	***Vivienne Westwood***
Alexander McQueen	***Gerrit Rietveld (De Stijl design movement)***
William Morris	***Ettore Sottsass (Memphis Milano design movement)***

Based on your research:

1. Identify a group event where your earphone holder could be sold/ given as merchandise.

_____

2. State your chosen theme for this project (what is your inspiration?):

_____

3. Create a mood board to use as inspiration for your project and upload your work to **SHOWBIE** in the 'Research' folder

Remember a mood board should communicate the specific look for your theme and should include references to:

- ***Colour***
- ***Pattern***
- ***Shapes***
- ***Materials and techniques***
- ***Product Use***
- ***Target Market interests/ identity***

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Appendix 4. Earphone Case Work Book Extract 2.

Textile Properties Investigation - Structure

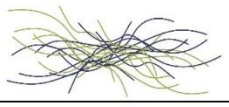
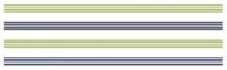
Look closely at the construction of your fabric swatch, then start to pull it apart. Is it woven, knitted felted or bonded? Using your observations, draw labelled diagrams of the three basic constructions in the boxes below (the bonded fabric is a combination of structure types so will not be drawn):

Woven	Knitted	Felted/ Non-Woven

Match the name of each main type of fabric structure to their definition:

Key term	Definition
Woven	Non-woven fabric made from brushed and compressed fibres.
Knitted	Fabrics made using a loom to interlock yarns that run from top to bottom (the warp) and right to left (the weft).
Felted	One or more non-woven fabric that has been bonded, fused or stitched to another fabric.
Bonded	Fabric made from a single interlocking yarn. Construction allows fabric to stretch.

Match the following images and key terms to their definitions:

	**Yarn**	Long, smooth strands, usually from synthetic sources
	**Staple fibres**	A thread produced from spinning fibres together which are then knitted or woven into fabrics
	**Filaments**	Short, hairy fibres usually from natural sources

Extension: How do you think short staple fibres will affect the quality and performance of the fabric it is used to make? Give an example. Write your answer on Showbie in the Extension Task folder.

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