

On the fabric of the human body in seven text-iles

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On the fabric of the human body in seven text-iles: The multimodality of learning anatomy

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journals.sagepub.com/home/mas**Anna Harris***Maastricht University, the Netherlands***Keywords**

Anthropology, body, education, embodied modes, ethnography, multimodal practices, senses, sensory, touch

Introduction

When Andreas Vesalius made his now famous anatomical text *De humani corporis fabrica libri septem* (Latin for ‘*On the fabric of the human body in seven books*’), he attempted to address a cross-modal conundrum that continues to delight and perplex medical educators and learners to this current day: how to evoke the visceral, dynamic, friable, complex materiality of the human body in a shareable form, other than with flesh itself?

In this Multimodal Sensations essay, I move beyond the often written about art

of anatomy (e.g. Kemp and Wallace, 2000), to expand upon another aspect of anatomy and its education, written in Vesalius’ own series title – the fabric of the body. I draw on my, and my research team’s work, on the materials and artefacts of teaching sensory skills to medical students. Our field-sites were medical schools in Central and Western Europe and West Africa and our methods were ethnographic and historical, something I expand on further in the following section. This long-term project, called Making Clinical Sense, took sharing sensory knowledge as its driving methodology as

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well as one of its core research questions. It is one of the first cross-cultural and ethnographic-historical studies of medical education to date. By focusing in this essay principally on the textures and textiles of anatomical education, I consider the findings of this study on medical education through fabric – that is, the fabrics of the body.

The essay is presented across two columns which are in dialogue. I want to reverse the relations of the more academic part of this essay which looked at how textiles and materials from everyday life (wool, oranges) enter the medical learning environment, to look at how everyday textiles and materials at home, may open up anatomical knowledge in different ways, maybe even to new audiences.

Through the right-hand column of the essay, I thread in a running textile-essay of anatomical lessons. With images from home, the piece uniquely expands anatomical education to domestic spaces, a timely rendering considering the pandemic-related changes to education occurring at the time of writing. This pays homage to the idea that anatomy can be learned from simple fabrics and textiles that could be found in cupboards and drawers.

In the right-hand column, I explore how medical students learn anatomy, and how our research team studied and simulated these practices for learning anatomy *outside* of the medical school. I braid this ethnographic-historical material with other works and literatures. I take inspiration for example from embroider Fleur Oakes and Paul Craddock, who are paving fascinating new paths in scholarly-artistic ways of thinking about the textile body (Craddock, in press; Kneebone and Oakes, in press) work inspired by semiotic approaches to multimodality (Kress, 2010). I am informed myself by literature in the tradition of multimodality in anthropology (Collins et al., 2017), work that brings textures and surfaces (Ingold, 2017) to the fore. In this column, offer a more academic essay, starting with a brief outline of the multisensory methods which informed our project. I ultimately make one main point that the role of multimodality in medical education, that is, the cross-modal solutions to the conundrum of sharing bodily knowledge, is to explore the boundaries of sensory analogy. Sensory analogy is a term I borrow, from the philosophy of science, in particular the work of Mary Hesse (1966), to explore the role of teaching materials in medical schools. It is a term of potential interest to multimodal scholars, teachers and others exploring questions of how to traverse forms and materials.

Lessons for learning anatomy at home, with seven textiles

In this column I present a running textile-essay, which pays homage to the idea that anatomy can be learned from simple

Multisensory team methods

In order to study how sensory skills are learned in medical school, our research group quickly realised we needed to experiment with documentation tools and sensory

fabrics and textiles that could be found in cupboards and drawers. Like the title of this piece, it plays with Latin again, this time through their textural roots.

The Latin terms used in medicine for anatomical parts often have an etymology referencing historical practices, jobs and objects outside of contemporary medical students' experience, yet these words need to be learned as part of a re-orientation to a very particular way of knowing bodies. For example, front and back becomes anterior and posterior. Sides are medial and lateral. The new terminology means that medical students can talk to each other and their teachers, about the same parts of the body they are learning, and later in relation to patients in clinical practice.

The textile-essay offers some material lessons for learning these anatomical words at home, using objects that could be found in cupboards and drawers. Specifically, this is a lesson for learning anatomical terminology using fabrics and textiles. The idea behind this collection of images (Figures 1-14) draws from previous experiments and writings in our research team on digital learning and the power of sensory analogies from simple materials.

The associations in the essay are drawn from *The Secret Language of Anatomy*, a beautifully illustrated book which traces the meanings of anatomical words. The authors divide these meanings into themes and note that the sheer volume of fabric-related anatomical terms is remarkable. These words mirror a particular history of medical knowledge, offering windows and traces of the worlds of European anatomists opening up the body and naming it. Focusing on the words in the book's 'Fabrics' section, I offer seven renderings of anatomy through fabrics, seven lessons for learning anatomical terminology at home.

methods. Drawing insights from a methodological proof of concept study we conducted on team sensory ethnography (Harris et al., 2020), we continued to experiment throughout our simultaneous fieldwork. We conducted a series of weekly activities, where we gave each other a task to do focused on collaboratively made sensory probes. This was intended to allow for comparison. Unexpectedly they did much more. We were surprised by how these interventions led to an opening up for each other into our ethnographic imaginations. Several of the probes focused specifically on texture, touch and materials, and through these prompts I became ever more attuned to the textiles and textures of the medical school I was spending time in in Maastricht, the Netherlands. This interest grew as I realised the care involved in maintaining the textiles of medical education, the stitching and other repair practices. I followed, with historian on the team John Nott (Nott and Harris, 2020), the sticky threads of objects, such as a knitted uterus, to learn more about how they were made. This unpacking of the making practices of teachers opened up new avenues of exploration through making. I will delve further into the possibilities of making methodologies for multimodality research in the conclusion, but now a brief background on anatomical education and its long history of practice through multimodal forms.

The multimodality of anatomical education

The history of anatomical education is often told through the gruesome and visceral practices of human dissection (Richardson, 1988). When anatomy education expanded to encompass larger audiences, skills in blackboard artistry (Allison, in press; Harris, 2015) were

Plexus (from ‘to plait’ = to weave strands of material into a braid, cord or rope)



Figure 1. Homemade braid. Photograph: Author’s own.

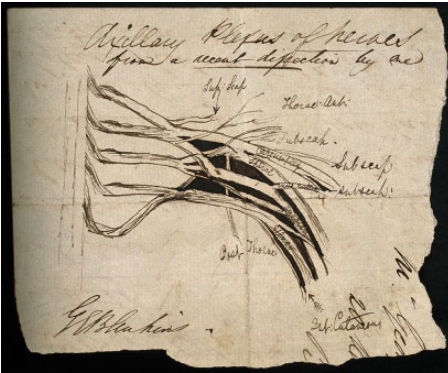


Figure 2. Axillary plexus of nerves. Pen and ink sketch by GE Blenkins, 1894. Credit: Wellcome Collection. Attribution 4.0 International (CC BY 4.0).

required, and mass-produced anatomical atlases accompanied the printing press (Daston and Galison, 2010), reaching even larger audiences, this time, the public too. This brought about challenges in how to create a three-dimensional body for the lay reader, who could not attend the elaborate dissection rituals in the wooden lecture halls. Pop-up books were created which allowed for some three-dimensionality and dynamic movement. Meanwhile in the medical schools, physical models became more elaborate and produced on a larger scale, instructors wanting more simulated realities of bodily experience – the fluids and motions, the sensations of a vital body (Owen, 2016). More recently we see the role of computer scientists and designers in making virtual dissection tables (Prentice, 2013) that evoke haptic vision (Marks, 2002) through slicing motions and other ways of interacting physically with the screen.

When I was a medical student myself, over two decades ago now, we learned anatomy from blackboard lectures, 2 years of dissection classes and richly illustrated anatomy texts. I vividly remember building my anatomical imagination about the journeys of arteries and nerves, through hand drawn pictures and words. I have intense sensory memories of these learning events – the smell of formaldehyde lingers, still, as do the tracings I made of bones in pencil or copying dusty blackboard images into my notes. From her fieldwork in an anatomy department in Budapest, Rachel Vaden Allison, an anthropologist on the Making Clinical Sense project, describes how materials like chalk, have particular affordances that allow this kind of texturing of the body, through layer, colour and sound. In Maastricht, I mostly saw anatomical education through the physical examination lessons that took place in the

Ligament (from *ligamentum* = bandage, band or tie)



Figure 3. Bandage. Photograph: Author's own.

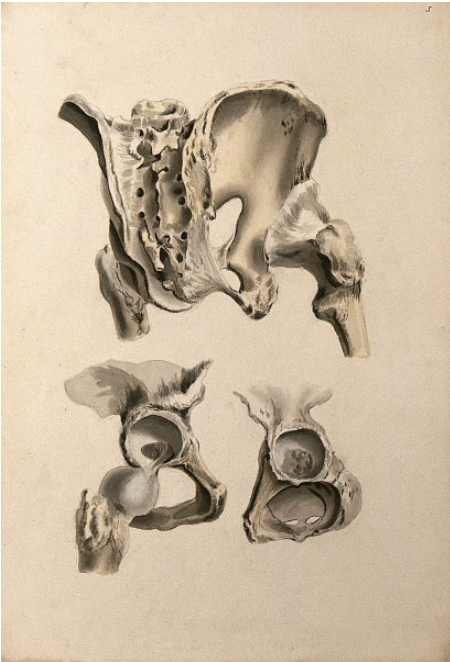


Figure 4. Ligaments of hip-bone and femur (thigh-bone). Ink and watercolour, 1830/1835?, after W Cheselden, ca. 1733. Credit: Wellcome Collection. Attribution 4.0 International (CC BY 4.0).

Skills Laboratory where I did fieldwork. Here the students learned not from dissected corpses, but from the fabric of their own living breathing bodies.

Learning from the fabric of your own body

One of the most overlooked materials in medical education is the student's own body, and to some extent, the teacher's too. The teacher's teaching body becomes evident in anatomical training when they contort their limbs or features into anatomical forms – I recall one anatomy professor becoming a uterus for example in front of our stunned class. In my fieldwork in Maastricht I saw teachers scrunch their fists into cervixes and other body parts. Teachers use their clothing too, pulling white coats taught for a heart murmur or using the Velcro of their shoe to demonstrate a plural rub.

In the Skills Laboratories where Andrea Wojcik and I spent our time in Ghana and the Netherlands respectively, the model of education is one where medical students practice a lot of their clinical skills on each other, meaning they learn from their own and each other's bodies. Andrea put herself more actively in this role than I did, learning about the techniques of touch that she now focuses on in her research, through being prodded, manipulated and examined by novice doctors.

In these acts of learning on and from each other and themselves, the students considered their muscles folds, asymmetries, and dermatome distributions in greater detail. Like a tailor with chalk, they mark up the body with 'skin pencils' – tracing out outlines of the lungs or heart from their percussion practice or measuring out distances with tape measures. There is a long tradition of teaching

Fimbria (a textile fringe or border)



Figure 5. Knitted blanket by author and author's husband. Photograph: Author's own.

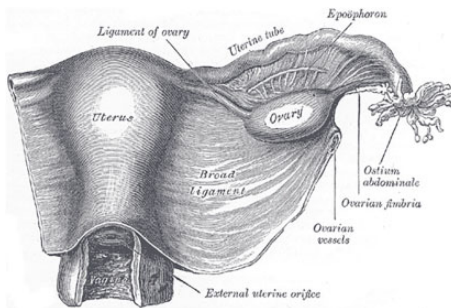


Figure 6. Uterus and right broad ligament, seen from behind. The broad ligament has been spread out and the ovary drawn downward, in public domain from Wikimedia: <https://commons.wikimedia.org/wiki/File:Gray1161.png>.

anatomy through surface anatomy classes, and in Maastricht, the classes where they drew organs on their skin was popular. As the anthropologist Tim Ingold (2017: 103) writes, surfaces are not important in themselves, but for what they disclose – ‘the surface is simply the outer envelope of a form, separating what is inside the form from what is outside’. This surface anatomy training is a training of the imagination and it is this imaginative work entailed in moving from the surface to visceral organs and tissues inside the body that has such educative potential. In the next section, I explore how imaginative leaps are also created through other teaching tools, and how this relies on sensory analogy.

The sensory analogue

As David Edgerton (2007) points out in his history of technology, old and new technologies consistently overlap in all areas of life, and the medical school is no exception. Entering the field with the premise of studying digital learning, I was increasingly drawn to the homemade and simple teaching objects, often crafted from textiles and other tactile materials. There were the gynaecological models for example, with shammy cloth repairs. There were balloons drawn on with markers, used to teach gastrointestinal disorders. There was a knitted uterus, made to teach labour stages and knitted dolls made by a teacher for the paediatric lesson on hip examinations. Along the way, I learned about other simulations of bodies used in medical education, such as oranges for cervixes and fruit and vegetables for all kinds of surgical procedures (Harris, 2019).

Perplexed by their role in teaching, I gradually realised that the power of these ‘simple’ teaching materials was in their

Tunica (a garment or shirt)



Figure 7. Linen shirt. Photograph: Author's own.

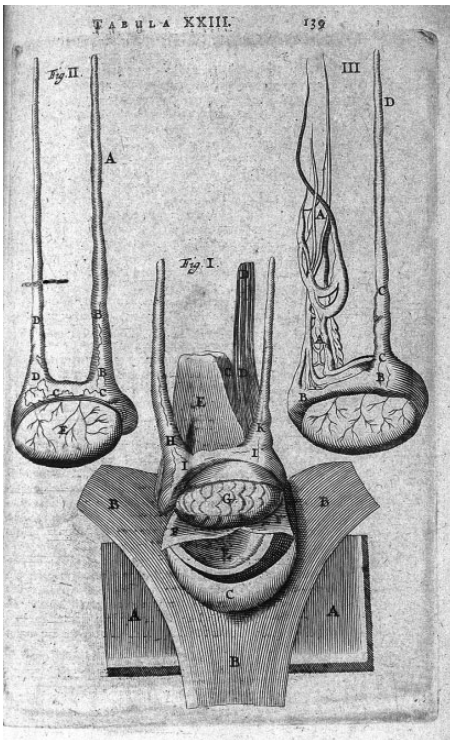


Figure 8. T. Bartholin, testium tunica, and substantia. Credit: Wellcome Collection. Attribution 4.0 International (CC BY 4.0).

potential as sensory analogues. In medical education, the discussion on simulation has tended to focus on fidelity and authenticity of simulations (Hamstra et al., 2014). Yet these textile objects often hardly resembled anatomical bodies as we know them. The knitted uterus for example, may have been red, but that was as far as the visual resemblance went. What was important instead were the sensory features of these materials – how they felt when punctured, how the wool expanded when a doll was pushed through it, how the shammy cloth softly submitted on palpation.

Analogy, like simulation, is a term with a long theoretical and philosophical tradition. It is a way of comparing relations, where the relation is between things which are comparable in significant ways. The philosopher of science Mary Hesse (1966) expanded upon this with the idea of a material analogy in the 1960s, as comparative features which are observable and are shaped by cultural and personal significance. With my colleague Christine den Harder I have refined her term to think of sensory analogies, which helps to highlight the importance of textiles is in the multi-sensory domain of touch-sight, texture-movement, sound-feel, surface-exterior. The students need to make their own multi-sensory comparisons and connections. It is the leap in imagination that is powerful and impressionable here, between the analogy and the bodies of past, present and future people in their clinical and personal lives.

Making bodies

To understand more about teaching these imaginative leaps using sensory analogy, I made some of the teaching tools we studied. This is a form of material thinking (Carter, 2004), that is common in various

Suture (a seam)



Figure 9. Jeans repaired by author. Photograph: Author's own.

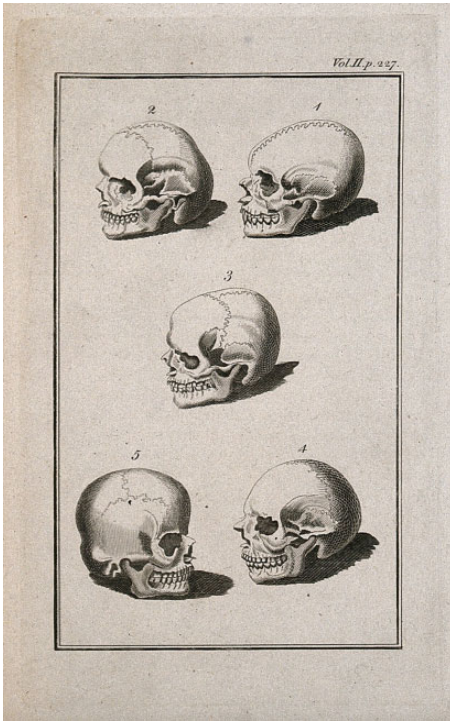


Figure 10. Human skulls showing sutures: five figures. Line engraving, 1780/1800?. Credit: Wellcome Collection. Attribution 4.0 International (CC BY 4.0).

disciplines such as craft research, architecture, artistic (or practice-based) research, design anthropology and more, that considers making (Ingold, 2013), as an important avenue into knowledge production. In my case, I made a uterus out of wool and cotton (sourced by Andrea from Ghana) (see Figure 15) to understand more about what a medical student learns about the cervix, and its dynamic stages of dilation during labour, with such materials. I followed a pattern found by John in the Wellcome archives, a pattern for midwives to soften the effects of childbirth for mothers in the 1950s. It was in following the pattern that I had to think carefully about the size of the simulation (how many stitches), about what other materials would be included (a doll?), about how to achieve the dilation effect (through ribbed stitches), and how to hold and work with the teaching tool once finished. It was through making this object for teaching a multisensory lesson, that I learned about the potentials of the form.

I have subsequently made other anatomical teaching tools – including pop-up books and papier-maché models. Through working with and making the textiles we found in our medical schools, I learnt more about the surfaces and textures of the very technologies that strike our interest, the properties that make them sensory analogies of the human body and the importance of these multimodal education practices in embodied learning. I learned that the educational task here is to constantly interrogate the conundrum of sharing knowledge in multimodal ways, and in the case of anatomical education, to explore the limits and boundaries of sensory analogies.

Sartorius (from *sartor* = a tailor)



Figure 11. Handmade tie by author. Photograph: Author's own.



Figure 12. Muscles of the thigh, seen from the front. Engraving after G de Lairese, 1739. Credit: Wellcome Collection. Attribution 4.0 International (CC BY 4.0).

Conclusion

Medical students are increasingly learning anatomy using online textbooks and through digital dissection tables where they use finger or pen strokes to ‘cut’ through the layers of the body. Not all students have access to these expensive dissection tables, yet during the COVID-19 pandemic pretty much all medical students at some point had to turn to digital resources to learn anatomical knowledge. This has consequences for how students will orientate to the body, and build their sensory knowing of/for future patients. While it is difficult to make causal links, the work of the Making Clinical Sense project shows that learning materials are deeply implicated in how students learn to perceive, know, embody and practice medicine. The modalities entailed in different teaching objects and their multisensory affordances, connect with different kinds of lessons.

It is important to learn more about the kinds of materials used to teach bodies, and the role they play in embodied learning, whether in medicine or other fields of bodily practice. In this essay, I addressed this topic by looking at anatomical education materials, focusing in particular on textiles. I did so through a more conventional academic text, as well as with an accompanying textile-essay in which I offered anatomical lessons for the student at home, whether medically trained or not, for learning Latin phrases through textiles. The images in this textile-essay work, I suggest, as a way of aiding anatomical memory through an imagined tactility, texture and grain. My photographs of home objects sit alongside anatomical sketches from the Wellcome Images collection. This juxtaposition highlighting and demanding a more democratised

Rete (a net, snare or network)



Figure 13. Hat. Photograph: Author's own.

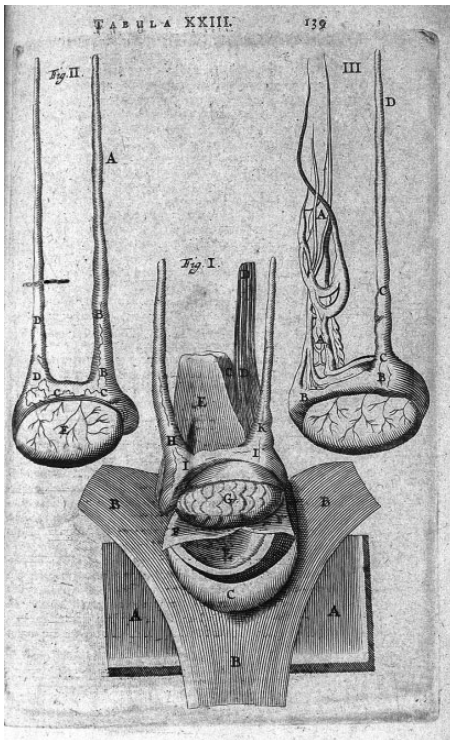


Figure 14. T. Bartholin, testium tunica, and substantia. Credit: Wellcome Collection. Attribution 4.0 International (CC BY 4.0).

engagement with medical terminology and ways of knowing, especially in the current situation.

What does this Multimodal Sensations essay add to the field of multimodality studies? The research on which it is based is inspired by developments in sensory ethnography (Elliott and Culhane, 2016; Howes and Classen, 2014; Pink, 2015) and multimodal anthropology (Collins et al., 2017) and can be seen as following Ingold's call to theoretically attend to the texture of the world, with its materials and everyday actions, whether that be a knitted uterus in a medical school or a pair of jeans at home.

One of my contributions to these currents of thought has been to expand such ideas into textiles, not as a textiles researcher or a craft researcher, but as an anthropologist of medicine interested in tools and technologies, in the multimodality of learning in digital and analogous forms. By considering anatomical education in domestic and institutional contexts, I have explored ways in which textured imaginations of bodies can be crafted through sensory analogies, a term that has relevance beyond medical school, for the way it tries to interrogate the features of similarity and different across modalities, and how it opens up imaginative leaps and possibilities. The essay seeks to democratise anatomical knowledge, and offers an invitation to multimodal scholars to attend to craftwork and other making practices when considering their objects of study. And lastly, this piece is experimental in form, playing with what a textile-essay might be, and what it might allow for storytelling that wants to attend to materiality, modality and sensoriality in form as well as content.



Figure 15. Knitted uterus. Photograph: Author's own.

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