



Making uncertainty habitable: Ritual and professional formation in anatomical dissection

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ABSTRACT

Medical education has long been described as a “training for uncertainty,” yet how uncertainty is practically organised in professional formation remains underexplored. Drawing on a sociocultural approach to risk and on anthropological theories of ritual, this article conceptualises anatomical dissection as a ritualised infrastructure through which uncertainty is collectively managed. Based on seven months of participant observation and 32 interviews at the University of Bologna, we identify three interconnected ritual dimensions – technical, ethical and socio-emotional – that coordinate scientific knowledge, professional norms and embodied dispositions during the status passage into the medical profession. Ritualised practices stabilise action under conditions of epistemic incompleteness and moral exposure, rendering uncertainty inhabitable rather than eliminable. At the same time, their stabilising function is ambivalent: when detached from reflexive articulation, rituals may reinforce hierarchy, normalise exclusion or suppress critical reflection. The analysis positions ritual as a central yet contested mechanism in the production of professional authority.

1. Introduction

In most countries, doctors stand out as being among the most trusted professions (Inglehart et al., 2022), indicating their social significance and status. According to sociological classics, such as Parsons (1939), this is due to the central role of professions within society, which would provide “the institutional framework in which many of our most important social functions are carried out” (1939, p. 467). When doing so, as Abbott (1988, p. 59) pointed out, professions claim and defend jurisdictions–legitimate task domains–that grant them exclusive rights and autonomy to regulate their standards and education, and confer these to privileged social positions. This entails commitments to scientific standards of reliable performance and to a credible professional identity (Larson, 1977).

According to Abbott (1988), a defining feature that distinguishes professions from ordinary occupations is their institutionalised capacity to manage uncertainty in socially consequential domains. As Renée Fox argued (1957, p. 207), this is also true for doctors, as “medical education is in large measure a training for uncertainty”, a diagnosis that remains valid today despite significant medical advances (Fox, 1980, 2000). Professional education, such as for doctors, prepares for a practice where

outcomes “cannot be standardised or supervised in detail” (Freidson, 2001, p. 34), knowledge is incomplete, and decisions carry moral, social, or existential consequences. In this sense, “professional work involves inference, not routine” (Abbott, 1988, p. 35), and its social function is not to eliminate uncertainty, but to render it manageable in a legitimate and trustworthy way. Consequently, in medical education, “the student learns that uncertainty is an inevitable part of medical practice” (Fox, 1957, p. 208).

Drawing on Fox's classical work (1957, 1980), we understand uncertainty in medical and health settings as multidimensional. Medical uncertainty is not restricted to epistemic limits, such as incomplete knowledge or the difficulty of distinguishing personal ignorance from the limits of the field, but also entails emotional, moral and existential dimensions. More recent health sociology supports this broader perspective by conceptualising uncertainty as articulated, enacted and experienced (Mackintosh and Armstrong, 2020), and by foregrounding ethical uncertainty and implicit normativity in clinical practice (Cribb, 2020). Such a multidimensional perspective on uncertainty helps highlight the effectiveness of rituals, which address not only the epistemic but also the emotional, moral and existential dimensions.

While existing research has extensively analysed professional

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knowledge, uncertainty, and socialisation, we still lack a clear understanding of the practical and embodied mechanisms through which uncertainty is collectively organised and managed in professional training. A substantial body of scholarship in medical education has in fact examined how students and practitioners learn to navigate uncertainty, focusing on issues such as uncertainty tolerance, clinical judgement, reflective practice, and decision-making under conditions of ambiguity (Montgomery, 2006; Han et al., 2011; Simpkin and Schwartzstein, 2016). This literature has provided important insights into the cognitive, pedagogical, and professional dimensions of uncertainty management. However, less attention has been devoted to the practical and embodied mechanisms through which uncertainty is collectively organised and rendered manageable in everyday training settings. Our contribution addresses this latter dimension by examining the ritual practices through which future physicians learn to inhabit uncertainty within anatomical education.

Building on our multidimensional understanding of uncertainty, we draw on the sociology of risk and uncertainty to conceptualise rituals as a patterned mechanism through which risk and uncertainty are collectively navigated and stabilised (Douglas, 1966; Douglas and Wildavsky, 1982; Brown, 2022). In doing so, we move beyond approaches that see rituals primarily as symbolic devices (Moore and Burgess, 2011; Burgess and Horii, 2012) and foreground their practical role in organising action under conditions of indeterminacy. We specify how rituals operate, drawing on Zinn's modes of reasoning (2008; 2016; Zinn and Schulz, 2024), which distinguish between *rational* (scientific, utility-based), *non-rational* (imaginative, normative), and *in-between* (embodied-affective, experiential) forms of engagement with risk and uncertainty. Rituals are effective because they synchronise these modes of reasoning in practice, aligning formalised knowledge, professional imaginaries,¹ and embodied dispositions. We suggest that rituals make uncertainty *habitable* by synchronising different modes of reasoning through structured, repetitive practices. In this way, they enable medical students to learn not only how to apply scientific knowledge, but also how to inhabit the emotional and moral demands of professional practice.

Situated within this theoretical framework, our study mobilises anatomical dissection as an empirically grounded case study of ritualised learning in medical education. Focusing on the dissection practices at the Institute of Human Anatomy, University of Bologna, we examine how recurrent routines, ethical framings, and embodied engagements with donated bodies organise the transition from student to future physician. The analysis addresses three interrelated research questions: (1) how ritualised practices in anatomical education contribute to the production and legitimation of specific forms of medical knowledge, including assumptions about the body, expertise, and professional authority; (2) how cognitive, affective, and corporeal dimensions of learning are coordinated through ritual sequences in dissection and allied pedagogical practices; and (3) which tensions and frictions emerge within these rituals as students and educators navigate ethical obligations, emotional exposure, and organisational constraints in the dissection room.

The three ritual dimensions identified in the analysis should not be understood as corresponding one-to-one with particular modes of reasoning. Rather, each ritual dimension coordinates rational, imaginative, and embodied engagements in different ways. Technical rituality involves not only scientific knowledge but also professional imaginaries concerning competent medical practice and embodied skills. Ethical

rituality mobilises normative commitments while relying on embodied performances and practical judgment. Socio-emotional rituality similarly combines sensory experiences, professional aspirations, and practical techniques of emotional regulation. The analytical distinction therefore refers to dominant emphases rather than discrete domains.

2. The power of rituals

To develop this argument, we situated our approach within anthropological research on *rituals*. Anthropologists have widely documented that rituals are critical to the management of risk and uncertainty. For example, Bronisław Malinowski in his work on the Trobriand islanders (1925, p. 31) argued that in lagoon fishing, the islanders can, in a relatively safe environment, rely on their knowledge and skills, while in the more dangerous open sea fishing, they mobilise extensive magical rituals to secure safety and a good catch. Contemporary performance settings similarly display ritualised practices aimed at navigating uncertainty (Damisch et al., 2010, p. 1014).

Beyond their role in managing uncertainty, rituals have long been understood as central mechanisms through which social order is produced and maintained. Building on Durkheim's (1912/1995) insight that rituals generate collective solidarity and reinforce shared moral commitments through collective effervescence, Douglas (1966) demonstrated that rituals also stabilise classificatory systems and social boundaries. Rituals distinguish what is appropriate from inappropriate, pure from impure, and legitimate from illegitimate. In contexts characterised by uncertainty, they therefore do not merely reduce anxiety but provide collectively shared frameworks for interpreting and organising experience. As Collins (2004) emphasised, such effects are reproduced through embodied interaction, mutual focus of attention, and shared emotional engagement. Rituals are thus powerful because they protect socio-cultural frameworks not only through explicit moral instruction but through embodied and collectively enacted practices.

Rituals are crucial for the organisation of transitions between social statuses, as anthropologists have argued examining the *rite of passage* (van Gennep, 1960), such as from youth to adulthood. Such a status passage is a liminal and protected phase that not only characterises a biological transition but also requires the successful acquisition of skills and attitudes to prove the new status. In modern societies, there are numerous *status passages* (Heinz, 2002) through which people acquire the skills and rights to occupy specific social roles.

We argue that rituals are powerful in organising access to social positions through rules and regulations. In this way, they are part of *gatekeeping* processes (Heinz and Marshall, 2003), such as the stipulation that only the best students are allowed to study medicine. But they not only protect access to such positions and social privileges but also the body of knowledge and moral self-regulation, such as the *medical code of ethics*, including the duty to preserve life. In this way, they connect moral expectations with scientific knowledge.

Therefore, Fox's (1957) observation that medical training is centrally about the management of uncertain knowledge extends to broader mechanisms that address not only epistemic uncertainty but also moral ambiguities, with pathic practices embodying attitudes and skills in a pre-reflexive realm of habitualised, taken-for-granted action. Such a body of knowledge becomes the unquestioned background knowledge of professionals' life world (Schütz, 1972), partly routinised and pre-consciously applied, when conducting professional duties.

To grasp these complex mechanisms, we utilise the *modes of reasoning* and *knowledge* (Zinn, 2016; Zinn and Schulz, 2024) to conceptualise how professionals engage with risk and uncertainty. Rituals are effective because they synchronise these modes of reasoning in practice. They align scientific knowledge, normative expectations, and embodied dispositions within structured and repetitive sequences of action, thereby stabilising how professionals perceive, interpret, and respond to uncertain situations.

This directs attention not only to the coordination of abstract

¹ Following Taylor (2004) and Jasanoff and Kim (2015) we consider "imaginaries" being the broader belief systems, which are culturally embedded, institutionally stabilised and normatively charged, thereby not grounded in empirical evidence but imagined or desired social reality. Imaginaries include normative demands, ethical standards and desirable futures constituting a symbolic system of meaning (Castoriadis, 1987).

scientific knowledge and practical skill, but also to the broader social imaginaries that underpin professional authority. Rather than treating these processes as part of a diffuse “hidden curriculum” (Hafferty, 1988; Hafferty and Franks, 1994) or as the gradual sedimentation of a habitus (Bourdieu, 1977), we conceptualise anatomical education as a ritualised infrastructure, that is a patterned and institutionally sustained sequence of embodied practices, through which uncertainty is collectively organised. While hidden curriculum accounts illuminate the informal transmission of norms and habitus captures the durable embodiment of professional dispositions, ritual foregrounds the structured, repetitive, and symbolically dense sequences through which epistemic, moral, and affective orientations are synchronised in the dissection room. What hidden curriculum and habitus do not fully capture, we argue, is the structured and synchronising function of ritual practices in coordinating epistemic, moral, and embodied dimensions of professional formation. Here, rituals do not merely reproduce professional culture. They coordinate contradictory demands. These include detachment and respect as well as technical mastery and moral exposure, thus rendering uncertainty inhabitable and professional authority collectively recognisable.

3. Training future doctors: anatomical dissection as a case study on rituals

Anatomical dissection provides a particularly fertile case for examining how ritualised practices organise professional education under conditions of risk, uncertainty, and moral ambiguity. While post-mortem examination remains the most accurate and effective means for mastering anatomical structures throughout medical training (Chytas et al., 2020) and an irreplaceable cornerstone of medical education worldwide (Kumar and Rahman, 2017), its significance cannot be reduced to epistemic efficiency alone.

As argued in the preceding section, rituals are not merely symbolic supplements to rational practice but key mechanisms through which different modes of reasoning and knowledge are combined and stabilised. Anatomy teaching exemplifies this process. Contemporary curricula increasingly recognise dissection as a formative space that integrates scientific knowledge with professionalism, ethical responsibility, and clinical dispositions (Lachman and Pawlina, 2006). Research shows that anatomy teaching fosters empathy, respect for the human body (Sathvika et al., 2022), and patient-centred professionalism (Rathbone et al., 2019), highlighting its role in aligning biomedical reasoning with normative expectations and embodied sensibilities.

The encounter with the body constitutes a critical moment of affective and moral socialisation. As Hafferty (1988) noted, direct engagement with human bodies profoundly shapes emotional orientations and professional self-understandings. Historically, however, anatomy training often framed the body as a neutral pedagogical object, privileging emotional distancing and marginalising affective and embodied responses as unprofessional. More recent humanistic approaches (Štrkalj, 2016) have shifted toward recognising the moral, relational, and symbolic dimensions of dissection, reframing anatomy teaching as a ritualised passage in which students confront death, corporeal vulnerability, and uncertainty while rehearsing their future role as caregivers.

Similar developments can be observed in medical education more broadly. Scholars have increasingly emphasised the importance of affective engagement, narrative reflection, and collective sense-making in professional formation. Iedema et al. (2009), for example, show how storytelling about emotionally challenging clinical experiences enables healthcare professionals to transform affective responses into shared learning opportunities. In so doing, technical competence, ethical reflection, and professional identity are systematically connected. Such work suggests that becoming a doctor depends not only on acquiring scientific knowledge but on learning how to collectively interpret and manage emotionally and morally challenging situations.

Taken together, anatomy teaching functions as a socially networked

learning environment (Hafferty et al., 2013) in which shared ritual sequences coordinate scientific knowledge, embodied skills, affective regulation, and professional imaginaries. As such, anatomical dissection offers a particularly instructive case study for analysing how rituals help future doctors manage uncertainty, responsibility, and risk during the transition from student to professional (Laakkonen and Muukkonen, 2019). In this sense, anatomical dissection allows us to observe how ritualised practices synchronise different modes of reasoning in situ, coordinating formal knowledge, embodied experiences, and normative expectations in the face of uncertainty.

4. Methods

Fieldwork was conducted in Italy at the Institute of Human Anatomy, University of Bologna, a site selected for its strategic role as a national reference center for body donation. The Anatomy Center of the Alma Mater Studiorum, recently recognized as National Reference Center for the Preservation and Use of Gifted Bodies by the Italian Ministry of Health, has long consistently highlighted the importance of body donation as a cornerstone of anatomical education. This has been made possible by the Whole-Body Donation Program, launched in 2013 and subsequently reinforced by Law 10/2020, which established a clear regulatory foundation. This program supports medical education and clinical training by enabling traditional gross anatomy studies and higher training activities. This positioning afforded structured access to key stakeholders and a wide spectrum of professional practices relevant to body donation and anatomical education.

We adopted a qualitative, multi-method design combining participant observation and immersive interviews to capture both situated practice and reflective accounts. The approach emphasised depth, triangulation and reflexivity: observation documented the enactment of rituals in real time; interviews elicited participants’ interpretive frameworks and experiential narratives; analytic procedures integrated both sources through iterative coding and constant comparison.

Participant observation extended over seven months (October 2022–May 2023), with weekly dissections (typically 1–2 per week). Undertaking participant observation in such a distinctive and highly controlled environment required careful negotiation of field access. As noted in sociological studies of health and medicine (Fox, 2002; Atkinson, 1997), entering settings such as dissection rooms entails addressing a range of ethical and institutional considerations. In the present case, this process involved securing approval from ethics committees while also establishing trustful relationships with medical personnel and students whose cooperation was essential to the research. Observations covered the full pedagogical arc of each session, including introductory briefings with professors, ethical orientations regarding body donation, the presentation and handling of donor bodies, and hands-on dissection activities. We also documented the technological ecology of sessions – from conventional instruments to digital anatomical models and specialized tables – as these tools modulated the sensory and cognitive textures of learning.

To preserve the granularity of practice, we produced thick, multi-modal fieldnotes (descriptive accounts; short verbatim fragments of dialogue; reflective and emotional memos; quick sketches; and, where permitted, photographic annotations). The research stance evolved with access and trust: we alternated between detached observation, engaged outsider roles, and, at selected times, complete immersive observation, always under the direction of teaching staff and within institutional protocols (Atkinson, 1997). The team composition varied between one and two researchers, facilitating inter-observer discussion and immediate debriefs.

For what concerns the second technique, we conducted 32 immersive interviews with two analytically complementary groups.

1. Medical tutors (n = 14), balanced by academic seniority (7 = 4th-year and 7 = 5th-year students) and gender (9 = women; 5 = men).

In the first group, we focused on tutors, a unique feature of the Bologna anatomy program that was one of the key reasons for selecting this case study. Tutors are students who, after completing the anatomy course, choose to continue their involvement by assisting younger peers. This role allows them to further their own learning while also acting as mentors to less experienced students. The tutorship selection process is rigorous, based on the applicants' motivation and academic background (*curriculum vitae*), ensuring that only the most committed and capable individuals are chosen.

2. Healthcare professionals ($n = 18$) from multiple specialties (e.g., neurology, ENT, orthopaedics, haematology, urology, endocrinology, general medicine), including clinicians, researchers, anatomy professors, a medical officer, and a septic-room technician. Several had trained in Bologna or maintained longstanding ties to its medical institutions, allowing us to situate student rituals within longer professional trajectories.

Interviews were audio-recorded with consent and transcribed verbatim. The interview guide was informed by international literature on human anatomy, dissection pedagogy, and medical ethics, supplemented by exploratory conversations with national experts, given the limited Italian-language empirical base.

4.1. Data analysis

Fieldnotes and transcripts were organised in NVivo 12 and analysed using template analysis. An initial coding template, informed by the theoretical framework and research questions, included domains such as ritualisation of practice, ethical framing, sensorial apprenticeship, role coordination, technological mediation, and emotional and identity work. This template was iteratively refined through constant comparison, allowing for the emergence of *emic* distinctions while retaining theoretical sensitivity.

Reflexivity was an integral part of the analytical process. The research team consisted of three sociologists, two of whom conducted the fieldwork. None of the researchers had medical training or prior experience of anatomical dissection, positioning them as outsiders to the professional world under study. This outsider position heightened sensitivity to the affective, sensory, and moral dimensions of the dissection room, while also making the emotional demands of the setting particularly salient. At the same time, the development of trustful relationships with medical staff, tutors, and students was crucial in facilitating access, contextualising observations, and supporting the interpretation of practices that might otherwise have remained opaque to non-medical researchers. Reflexive discussions and analytic memos were used throughout the project to examine how researchers' positionality shaped data collection and interpretation.

4.2. Ethics

The research protocol was submitted to the Bioethical Committee at the University of Bologna, which determined that the study met the criteria for exempt research in accordance with the policies of the University involved and applicable regulations. Participation was voluntary, and all participants received clear information about the aims of the study and the conditions of their involvement. For interviews, informed consent was obtained in advance; completion of the interview was taken as consent to participate. All data were anonymised, and identifying details were removed from transcripts and fieldnotes.

Given the sensitivity of the field site, particular attention was paid to the ethical management of the research context. Access to the dissection facilities was continuously negotiated, and researchers strictly adhered to institutional protocols regulating conduct, movement, and interaction. Observation was conducted in a non-intrusive manner and suspended whenever presence was considered inappropriate. Respect for the dignity of body donors was maintained by adhering to the

behavioural and professional norms governing the dissection room, by treating donated bodies as individuals who had made a valuable contribution to medical education rather than as objects of research, and by avoiding unnecessary descriptions or representations of human remains in fieldnotes and publications.

5. Results

Analysis identified three interlocking ritual dimensions – technical, ethical and socio-emotional – through which uncertainty is practically organised in anatomical education.

5.1. Technical rituality: knowing how to do anatomy

According to some of our participants and to the fieldwork notes, the environment, hierarchies, setting, bodies, gestures and instruments are the primary site for the acquisition and embodiment of medical technical knowledge and skills. These include hands-on training, repeated clinical procedures, and the observation and imitation of more experienced professionals. Through repetition, theoretical knowledge becomes practical competence.

“Peer-education with the bodies always offers a confrontation, an exchange, but it also requires being very well prepared. There is a double track that becomes a path for us to continue to gain experience on the one hand and on the other hand to return our knowledge balanced on this tightrope, which is always an advantage in both directions” (Interview 3).

Medical students must adhere to a series of structured rituals before entering the dissecting room. These rituals serve to maintain the sterile environment and to prepare participants for the encounter with the donated bodies, an experience charged with multiple significance.

“We take preparatory courses: how to move safely, the clean and dirty pathways, how to use surgical instruments” (Interview 16).

In fact,

“Dissection is the beginning of their medical journey: they start to feel the responsibility of what they are about to become” (Interview 19).

The septic room at the Institute of Human Anatomy is the place where a future doctor learns how to technically do anatomy by delving into the different practices, dynamics, perspectives stimulated by the donation programme. Before entering the septic room, a whole dressing-up ritual must be followed all together:

“The meeting point is at classroom D to leave coats, backpacks and get dressed. There is a table where the useful medical equipment is located. Medical students gather, start chatting while they put on their light blue gowns, which have cloth sleeves tightened at the wrist, then they closed it each other by making a bow at the neck and back. And finally, the light blue “shoe protectors”, latex gloves, and the FFP2 mask. And when ready they take the corridor, walking down it all to enter in the antechamber of the septic room” (Notes from the fieldwork).

The students immediately realise that they cannot be merely observers. The initial ritual of dressing is a practical and visual way to immerse themselves in the medical role, to feel it on them. Progressively, then, the routinisation of this “pre-field” practice makes the students, more and more, active.

“It’s an important experience: it strengthens the group – we change clothes together; we enter and exit together” (Interview 16).

The dressing procedures and collective movement toward the septic room function as a ritual of coordinated transition into professional space. Students do not enter the dissection room as isolated learners but

as a temporarily synchronised collective whose bodies, gestures and movements are aligned through repetitive sequences. The ritual does not merely prepare students technically through hygienic protocols; it also organizes anticipation, responsibility and belonging. Rational concerns with sterility and procedural correctness are therefore inseparable from embodied sensations of exposure and from normative expectations concerning professionalism and conduct. Through this collective choreography, the ritual synchronises different modes of reasoning before the encounter with the body even begins.

Beyond practical preparation, this collective dressing ritual creates a temporary moral community. Through bodily synchronisation and shared participation, students are symbolically separated from everyday life and incorporated into the professional world of medicine. In Durkheimian terms, the ritual reinforces collective belonging, while Collins's notion of interaction rituals helps explain how emotional energy and group solidarity emerge through co-presence and shared attention. Simultaneously, the ritual establishes boundaries between professional and non-professional conduct, echoing Douglas's argument that rituals stabilise social classifications through embodied practice.

In this way, the ritual combines technical preparation, embodied participation, and anticipatory orientations towards becoming a doctor, illustrating how professional identities are collectively enacted and reinforced within a single ritual sequence. The antechamber is the place where students prepare their entrance into lab training lessons.

"The septic room is an operating room with table suction systems, environmental suction, designated rooms, a clean entrance, and a dirty exit ... it fully follows the logic of a surgical theatre" (Interview 1).

But just before the entrance, the medical professor responsible for the lesson gathers and prepares the students by reminding they are about to encounter a specific environment, hierarchies, setting, donated bodies, gestures, and instruments.

"The Professor explains to the medical students what they will find inside and - being the first time - not to worry if they do not feel like doing things rather to go out if they do not feel good. Once finished, he makes them go through a special side entrance. There are, in fact, two entrance corridors: one « clean » which is where the students will enter and one « dirty » from which they will exit" (Notes from the fieldwork).

These preparatory briefings were particularly significant because, for many students, and especially first and second year students, the anatomy lab represented their first direct encounter with a human body within a professionalised medical context. Before developing relationships with living patients in clinical settings, students were introduced to the moral and emotional responsibilities of medical practice through interaction with the donor body. Preparation therefore beyond technical instruction and risk management. Professors and tutors actively framed the encounter as an ethically meaningful transition into professional medicine, encouraging students to approach the donor not merely as an anatomical object but as a person whose bodily donation enabled their professional formation. In this sense, ritual preparation contributed to shaping early understandings of patient-centred care, respect, and professional responsibility.

"It's not just a machine. It's also a performance [...] you need a director, a script [...] you have to recreate the whole environment like a real operating theatre" (Interview 4).

Inside the septic room, the technical rituality takes place.

"When students enter in the septic room are sorted to the three mortuary slabs by groups by one of the technical managers. Each group is assigned to one or more Tutors, fourth- or fifth-year medical students who-under the supervision of the teacher in charge-do teaching activities. At each slab there is both a senior and a junior

tutor so that a junior can have an assistant or otherwise someone to guide with the preparations" (Notes from the fieldwork).

However, after approximately 20 min:

"The tutor rings a bell-the same as those placed on the counter in a hotel lobby-and immediately the students switch slabs" (Notes from the fieldwork).

And so, throughout the class-hour. The bell rings 1 or 2 times and each group of students moves on to another slab. The bell is functional but has a meaning conventionally shared among insiders. A meaning that must be understood and learnt:

"We are already in the twentieth minute and the bell rings to signal the change of dissection station. The tutors finish their explanation and conclude by covering the anatomical area with the sheet and putting away the instruments used. Meanwhile, the groups of medical students immediately change the dissection station. It is a sort of « dance » between them" (Notes from fieldwork).

The bell operates as a ritual device that structures collective pacing and synchronisation within the dissecting room. Much like liturgical or ceremonial signals, it regulates transitions between phases of activity and reinforces awareness of shared temporal order. Although primarily organised to facilitate learning, the bell ritual does more than coordinate movement between stations. It synchronises attention, bodily action, and shared expectations across the group. Students collectively learn not only anatomical knowledge but also the rhythms, hierarchies, and forms of coordination associated with professional practice. Through repeated slab rotations, uncertainty is gradually transformed into routinised movement, embedding technical reasoning within embodied and socially coordinated action. Rational instruction, embodied participation, and collective orientation towards competent performance are thus combined within a single ritual act through which students learn to act as members of a coordinated professional community.

5.2. Ethical rituality: practicing with respect and reflexivity

Beyond the technical training practices, the body elicits for medical students a set of values and norms that guide behaviours both towards the future profession and in relation to it.

"I always like to compare the surgeon to a military pilot because they are very similar professions – they both require essential physical fitness: you must be healthy, because if you're not, you can't do it. And you must have certain traits – you can't afford to lose parts of your vehicle, even in an emergency" (Interview 7).

This comparison is particularly significant as it reflects an underlying normative ideal of the medical professional that privileges bodily endurance, physical fitness, and sustained performance under pressure. Rather than being a neutral analogy, it points to how professional identity is imagined through embodied standards that resemble those associated with elite, high-performance occupations. Within this framing, the anatomy lab contributes to the early socialisation of students into these expectations through prolonged standing, sensory exposure, and emotional regulation. In this sense, ritualised training may implicitly privilege bodies that conform to these normative ideals while rendering other forms of bodily vulnerability less compatible with dominant understandings of professional suitability.

This dimension is developed also by shaping the dress code (under the lab scrub) and the rules of behavioral conduct.

"Respect for the bodies in the room is fundamental: we can't enter if we are wearing shorts, miniskirts, tank tops, we don't let them enter, we must enter the dissection room as if we were going to a mortuary. There is a Decalogue to say, if I see someone mumbling chewing gum, I tell them that they must spit it out because it is a place where you must be silent and respectful" (Interview 3).

The dissection of anatomical bodies has the potential to cultivate greater empathy and ethical awareness in future healthcare professionals.

"In the dissection room you find a patient. So begins this relationship made up not only of technique but also of feelings of respect and gratitude towards these people who have made such a high and generous gesture for their education" (Interview, 22).

Ethical conduct in the dissection room is not transmitted solely through formal instruction but collectively enacted through ritual repetition. Shared silence, dress regulation, behavioural correction, bodily positioning around the body, and repeated verbal reminders create a morally ordered environment in which students collectively rehearse appropriate professional conduct. Respect is therefore ritualised rather than simply prescribed. Through these repetitive and collectively monitored practices, biomedical rationality becomes intertwined with broader professional imaginaries concerning dignity, responsibility and care, while embodied-affective reactions such as discomfort or restraint are simultaneously regulated.

"We used to suture the body as if it were the body of a living person ... So even those who taught conveyed to the operating surgeon the utmost and total respect for those who donate their body" (Interview 4).

"Teamwork is essential, and not only in scientific terms [...] it's not just about technical skills but also respect, ethics, and morality" (Interview 11).

It becomes clear that ethical rituality is not reducible to abstract moral principles. Respect is learned through bodily practices such as dress codes, handling procedures, and interactions with donated bodies. Ethical commitments therefore emerge through the interplay of normative expectations, embodied performances, and practical knowledge concerning appropriate professional conduct.

5.3. Socio-emotional rituality: imagine oneself in the profession

The antechamber and the septic room are threshold space where students ready themselves for different types of sensorial interactions with the medical work. During their training, medical students must confront personal challenges, such as the physical and sensory management associated with their profession. The connection between medical training and the senses is the first key point:

"You feel very small, and you realize you are part of something much larger than yourself. Preparing them is important. Consider that we operate on the skull and the face – so there is also the emotional impact of not just seeing an abdomen, a limb, or a joint, but the face of a person in front of you" (Interview 7).

"We have to learn how to be in the dissecting room ... it's a step-by-step thing also because everyone has their own sensitivities" (Interview 8).

The gradual exposure to the dissecting room also reveals the selective and disciplinary dimensions of ritual participation. Students differ in their sensory tolerance, emotional responsiveness, and willingness to physically engage with the body. While hesitation is formally legitimised, ritual participation nonetheless establishes implicit expectations concerning emotional composure and bodily control. Learning *how to be* in the dissecting room therefore involves not only acquiring technical competence but also adapting oneself to collectively recognized standards of professional comportment.

The management of the senses is stimulated during the training sessions. Entering a dissection room brings the students to deal with sight, smell, and touch:

"We always made sure to cover the face and genital areas of our anatomical specimens. It was something we did by default - partly because, as in surgery, creating a kind of operating field helps you concentrate better without distractions, and partly because it's an unspoken form of respect – avoiding the exposure of inevitably very personal areas" (Interview, 11).

"There is a strong smell by approaching "preserved" bodies. Incense or oils, indeed, are used to preserve bodies during the training period" (Notes from the fieldwork).

The strong smell of preservation fluids initially confronts students with the material reality of death and bodily decay. Yet this sensory experience is immediately embedded within a broader ritual framework. Technical explanations concerning preservation methods transform sensory discomfort into scientific understanding, while collective participation and repeated exposure reframe initial aversion as part of becoming a competent physician. The experience therefore combines embodied sensation, scientific interpretation, and professional imaginaries concerning the future self as doctor.

Being impressionable or easily impressed may limit some training experiences, but it nonetheless underlines the frontline involvement of the medical student also with his/her own borders.

"When I explain I try to be quite careful to involve my fellow first-year students. To say touch if you like, to encourage those who want to, and at the same time to include those who prefer just eye contact or just talking ..." (Interview 21).

However, the training could help to find a way to loosen impressionability.

"It's not just a rite of passage - it highlights the importance and delicacy of the physician's professional role" (Interview 16).

It is a matter of rediscovering an idea of the social linked to the existence of a common rationality that goes beyond individual and cultural particularisms.

Furthermore, the rituals that emerged in the dissection room also encourage work on the language used and the different ways of communicating, fostering greater attention to interpersonal relationships and teamwork.

"It is a way of learning to get closer to a potential patient, so you learn to get closer to the other" (Interview 3).

"Organise and manage communication skills, use different languages depending on the context and circumstance" (Interview 21).

Moreover, many of the medical students involved in the research highlighted that, through the dissection practice, they developed inclinations, passions, and interests towards specific anatomical regions that they wish to explore further in their specialisation. At the same time, they observed colleagues who realised they were not suited for certain specialisations that involve close and intense contact with the human body. These students often struggled with the sensory and emotional demands associated with close contact with human bodies, including smell, touch, and sustained visual exposure. These trajectories also reveal how professional socialisation processes may reproduce implicit ableist expectations regarding what constitutes a "suitable" medical body. Students' reflections on physical endurance, sensory tolerance, and emotional resilience suggest that certain embodied capacities are tacitly constructed as indicators of professional legitimacy, particularly in relation to surgical careers. While not always explicitly articulated, these expectations contribute to subtle processes of differentiation, whereby some students come to see themselves as more aligned with specific professional pathways than others.

Such experiences reveal the ambivalent character of ritual participation within anatomical education. While ritualised dissection practices foster collective integration and professional identification, they

also establish implicit thresholds concerning emotional composure, sensory tolerance, and bodily control. Participation is formally open to all students, yet the ritual environment subtly privileges those capable of adapting to dominant expectations regarding professional comportment and affective regulation.

6. Discussion

This study examined anatomical dissection as a ritualised site of professional formation, situating medical education within a sociological understanding of rituals as mechanisms for managing risk, uncertainty, and moral ambiguity (Jiga et al., 2022; Kumar and Rahman, 2017; Chytas et al., 2020). Building on the sociology of professions, anthropological theories of ritual, and the sociology of risk and uncertainty, the findings show that uncertainty is not simply cognitively processed but practically organised through embodied, ethical, and socio-emotional forms of ritualisation.

Fox's seminal observation (1957) that medical education constitutes a "training for uncertainty" remains highly relevant. Yet our findings indicate that such training operates less through the accumulation of knowledge than through the ritual organisation of embodied, ethical and socio-emotional practices. In this sense, uncertainty is not navigated by reducing it, but by structuring how it is encountered and responded to in practice.

Technical, ethical and socio-emotional rituality emerged as three interlocking dimensions through which uncertainty is collectively organised in anatomical education. Importantly, these ritual dimensions do not correspond directly to distinct modes of reasoning. Rather than representing separate domains, they describe different points of entry through which rational, imaginative, and embodied forms of engagement become coordinated in practice. Their analytical value lies precisely in showing how these dimensions are brought together rather than kept apart. Technical rituality anchors biomedical reasoning in repeated bodily practice, yet it also involves professional aspirations and embodied skills alongside scientific knowledge. Ethical rituality translates professional norms such as dignity, respect and responsibility into routinised forms of conduct, echoing Douglas's argument (1966) that rituals stabilise moral orders through embodied symbolic practices. At the same time, ethical rituals depend upon practical judgment and bodily performances in addition to normative commitments. Socio-emotional rituality, in turn, legitimises affect, intuition, and vulnerability while simultaneously regulating them within professional boundaries (Goss et al., 2019; Ong et al., 2023; Lempp, 2005). Taken together, these dimensions coordinate modes of calculating (rational), imagining (non-rational) and experiencing (in-between) in practice. Through this coordination, rituals prevent both an overreliance on detached rationality and an uncontained emotional engagement (De Stefano et al., 2023), supporting the idea that navigating risk and uncertainty requires the interplay rather than the separation of multiple modes of reasoning (Zinn and Schulz, 2026). They also limit the risk of unconditional application of ethical norms by embedding them in situated practice, where principles are enacted through discretion and adapted to specific contexts.

Interpreted through the lens of *rites of passage* and *status passages*, anatomical dissection emerges as a liminal and transformative phase in medical education (Hafferty, 1988). The dissection room constitutes a space in which students are progressively separated from lay understandings of the body and incorporated into the professional world of medicine through ritualised sequences, hierarchies, and embodied practices. At the same time, these rituals perform a gatekeeping function by tacitly assessing students' capacities to cope with technical demands, ethical responsibility, and emotional exposure. Importantly, such assessments do not operate solely on cognitive criteria but also on sensorial and affective thresholds, shaping professional trajectories in ways that remain largely implicit. This highlights that professional formation involves aligning embodied experiences with the acquisition of reflexive

knowledge. This raises sociological questions about inclusion, exclusion, and the normalisation of particular embodied dispositions within the medical profession (Boeckers et al., 2010; Houwink et al., 2004).

Building on this, the findings suggest that these processes of normalisation may also be understood in relation to implicit ableist assumptions embedded within medical training (Kaundinya and Schroth, 2022; Jain, 2025). Professional competence is often associated with forms of bodily endurance, sensory tolerance, and emotional control that align with dominant ideals of physical and affective resilience as a medical "capability imperative" (Stergiopoulos and Jain, 2026). Within this framework, ritualised medical education does not merely transmit technical knowledge or professional norms, but also contributes to the shaping of expectations regarding which kinds of bodies are considered appropriate for specific medical roles (Kaundinya and Schroth, 2022). This includes subtle processes of differentiation that may disadvantage students whose bodily experiences or capacities diverge from these normative standards.

Since such thresholds are unlikely to be neutral the findings also highlight the fundamental ambivalence of rituals. They may privilege particular embodied dispositions while marginalising others, thereby subtly shaping who can inhabit the role of the competent professional. In doing so, rituals tend to stabilise an imagined ideal of the professional, which can sit uneasily with the indeterminacy and messiness of practice, where uncertainty often exceeds what such models can accommodate. While rituals play a crucial protective role in stabilising professional authority, collective identity, and moral boundaries, this stabilising capacity is inseparable from their potential to normalise and constrain. In particular, they reinforce an idealised model of professional conduct that can downplay the uncertainty, imperfection, and possibility of error in clinical practice. Empirically, this risk becomes visible where ritual repetition suppresses critical reflection, marginalises discomfort, or frames hesitation as unprofessional. In such cases, rituals may cease to facilitate the balanced coordination of modes of reasoning and instead reinforce conformity or narrow rationalism. This underscores that rituals themselves entail risks, particularly when they obscure ethical tensions or silence alternative forms of experience.

Crucially, the analysis does not suggest that rituals should be replaced by reflexive practices, but rather that the two must be institutionally balanced. Our findings extend scholarship by showing that ritualisation operates simultaneously as a stabilising infrastructure and a mechanism of normalisation. While previous research has demonstrated that dissection contributes to technical competence and professional identity (Bhattacharjee and Ghosh, 2023; Ong et al., 2023; Lempp, 2005), we show more specifically how ritualised practices navigate uncertainty by coordinating different modes of reasoning in situ. Rituals do not simply reduce uncertainty; they shape the boundaries of legitimate affect, appropriate detachment and recognisable professionalism. In doing so, they are generative but also potentially constraining.

In the dissection room, uncertainty is organised across three interlocking ritual dimensions – technical, ethical and socio-emotional – which coordinate rational, in-between and embodied modes of reasoning. Technical rituality anchors biomedical rationality in disciplined sequencing and choreographed movement. Ethical rituality translates normative expectations – such as respect, dignity, and responsibility into non-reflexive routines, echoing Douglas's argument (1966) that rituals protect moral orders through embodied symbolic practices rather than discursive justification. In this sense, rituals stabilise the classificatory boundaries that define legitimate professional conduct, while simultaneously reproducing the collective moral commitments that Durkheim regarded as essential for social solidarity.

Socio-emotional rituality regulates affect through graded exposure and collective pacing. Through repetition, these practices sediment into pre-reflexive dispositions that allow competent action under epistemic and moral indeterminacy.

This interpretation resonates with what Burr and Russell-Sewell (2024) define as the account of the social production of the dead

body, where detachment, dissociation and reconciliation normalise the transgressive act of dissection. From their perspective, the body is continually reconfigured within networks of scientific knowledge, pedagogical intention and gratitude, stabilising what would otherwise remain morally disruptive. Similarly, our data show how ritual sequences – unveiling, bell-signalling, slab rotation – reorder the donor body from ethically unsettling presence to epistemically manageable object. Ritual thus performs an ontological choreography that makes uncertainty inhabitable in practice, holding together personhood and objecthood without fully resolving their tension.

Yet the very capacity of ritual to enable reconciliation underpins its ambivalence. Evidence can be observed from Qatanani et al.'s systematic review (2023), which reinforces this double effect. Graded exposure – prosecution, structured orientation, peer guidance – appears to facilitate emotional integration, whereas lecture-based or symbolic interventions produce inconsistent outcomes. Ritual efficacy depends not on its presence but on its calibration. Without reflexive scaffolding, ritual may produce either desensitisation or emotional overload. Similarly, Oloya and colleagues (2025) demonstrate that attitudes, subjective norms and structural conditions mediate students' engagement. Ritual operates within material constraints: poorly preserved cadavers, overcrowded labs or weak mentorship can destabilise ritual coherence and foster disengagement. Ritual's stabilising function is therefore contingent rather than intrinsic.

We therefore argue that rituals legitimate authority and stabilise meaning, yet they may also entrench hierarchy or inhibit change. In the dissection room, dress codes, silence and role allocation protect dignity and order but can subtly enforce conformity. When hesitation or moral questioning is tacitly coded as unprofessional, ritual becomes disciplinary. Rather than coordinating rational and embodied reasoning, it polices affect and narrows the range of legitimate responses, contributing to the erosion of the normative ideal it seeks to uphold, which risks becoming detached from practice and therefore hollow.

In line with Zinn's modes of reasoning (2016), we affirm that formalised knowledge, generalised belief systems, and embodied forms of knowledge are mobilised in practice, but only where space exists for interpretation and adjustment. In the absence of such space, ritual risks privileging detached rationality and marginalising moral or affective insight.

Anatomical dissection thus exemplifies how professional authority is produced through embodied, collective practices that manage uncertainty and stabilise meaning (Lalit et al., 2018; Getachew, 2020). Ritual is indispensable to this process. Yet its stabilising power is inseparable from its potential to normalise, exclude or silence. Sustaining professional responsibility in medicine therefore requires not the abandonment of ritual, but its continuous re-articulation within reflexive pedagogical frameworks. Only under these conditions can rituals organise uncertainty without collapsing into conformity or ethical inertia.

From this perspective, professional formation in medicine involves not only the coordination of multiple modes of reasoning in conditions of uncertainty, but also the gradual internalisation of embodied norms that define who is perceived as professionally legitimate. Ritual practices thus play a dual role: they stabilise professional identity while simultaneously contributing to the subtle reproduction of normative expectations regarding bodily and affective “fitness” for medical work.

7. Conclusions

This article has argued that anatomical dissection should be understood not merely as a pedagogical technique but as a ritualised infrastructure of professional formation that organizes how uncertainty is navigated in practice. Situated within the sociology of professions and the sociology of risk and uncertainty, the study has shown that medical education manages uncertainty not primarily through the accumulation of knowledge, but through the institutionalisation of embodied, ethical and socio-emotional rituality.

By distinguishing between technical, ethical and socio-emotional rituality, the analysis has demonstrated how rituals coordinate different modes of reasoning – rational, imaginative and embodied – in ways that stabilise action under conditions of epistemic incompleteness and moral exposure. Rather than reducing uncertainty, rituals render it inhabitable by aligning knowledge, emotions and normative expectations within structured and repetitive practices.

The findings suggest that sustaining professional responsibility in contexts characterised by high stakes and moral complexity requires not the abandonment of ritual, but its continuous reflexive articulation, understood as an ongoing openness to question, adapt, and pragmatically recalibrate ritual practices when they no longer align with the contingencies of everyday clinical work. Ritualised practices must be institutionally accompanied by spaces for interpretation, discussion and adjustment if they are to avoid becoming hollowed-out routines. Such spaces are crucial both for enabling discretionary use of rituals in practice and for fostering critical reflection on rituals themselves, even when this proves more difficult to sustain. Where such reflexive embedding is present, rituals can foster ethical sensitivity rather than mechanical compliance and integrate rather than silence embodied forms of knowledge. Professional responsibility in medicine depends not on the elimination of uncertainty, but on the ritualised capacity to inhabit it through the coordination of multiple modes of reasoning.

Future research might extend this analysis comparatively across medical schools, specialties or national contexts to examine how different ritual configurations shape professional subjectivities in distinct ways. More broadly, this points to the need for a sociological understanding of professional competence that foregrounds the ritualised coordination of formal knowledge, imagined ideal models of professional conduct and experienced emotional-embodied reality in the face of risk and uncertainty.

CRedit authorship contribution statement

Veronica Moretti: Formal analysis, Investigation, Methodology, Writing – original draft. **Annalisa Plava:** Investigation, Methodology, Writing – original draft. **Jens O. Zinn:** Conceptualization, Supervision, Writing – original draft.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

No data was used for the research described in the article.

References

- Abbott, A., 1988. *The System of Professions: an Essay on the Division of Expert Labor*. University of Chicago Press, Chicago, IL.
- Atkinson, P., 1997. Narrative turn or blind alley? *Qual. Health Res.* 7 (3), 325–344.
- Bhattacharjee, S., Ghosh, S.K., 2023. The sun also rises: tracing the evolution of humanistic values in anatomy pedagogy and research, including cadaveric acquisition practices. *J. Anat.* 243 (6), 1031–1051.
- Boeckers, A., Brinkmann, A., Jerg-Bretzke, L., Lamp, C., Traue, H.C., Boeckers, T.M., 2010. How can we deal with mental distress in the dissection room?—An evaluation

- of the need for psychological support. *Annals of Anatomy-Anatomischer Anzeiger* 192 (6), 366–372.
- Bourdieu, P., 1977. *Outline of a Theory of Practice*. Cambridge University Press, Cambridge.
- Brown, P., 2022. *On Vulnerability. A Critical Introduction*. Routledge, Milton Park, Abingdon, Oxon; New York.
- Burgess, A., Horii, M., 2012. Risk, ritual and health responsabilisation: Japan's 'safety blanket' of surgical face mask-wearing. *Sociol. Health Illness* 34 (8), 1184–1198.
- Burr, J., Russell-Sewell, N., 2024. The social production of the dead human body in the practice of teaching anatomy through cadaveric dissection. *Sociol. Res. Online* 29 (2), 370–385.
- Chytas, D., Piagkou, M., Salmas, M., Johnson, E.O., 2020. Is cadaveric dissection the “Gold Standard” for neuroanatomy education? *Anat. Sci. Educ.* 13 (6), 804–805. <https://doi.org/10.1002/ase.1957>.
- Collins, R., 2004. *Interaction Ritual Chains*. Princeton University Press, Princeton, NJ.
- Cribb, A., 2020. Managing ethical uncertainty: implicit normativity and the sociology of ethics. *Sociol. Health Illness* 42 (S1), 21–34.
- Damisch, L., Stoberock, B., Mussweiler, T., 2010. Keep your fingers crossed! how superstition improves performance. *Psychol. Sci.* 21 (7), 1014–1020. <https://doi.org/10.1177/0956797610368065>.
- De Stefano, A., Rusciano, I., Moretti, V., Scavarda, A., Green, M.J., Wall, S., Ratti, S., 2023. Graphic medicine meets human anatomy: the potential role of comics in raising whole body donation awareness in Italy and beyond. A pilot study. *Anat. Sci. Educ.* 16 (2), 209–223.
- Douglas, M., 1966. *Purity and Danger: an Analysis of Concepts of Pollution and Taboo*. Routledge & Kegan Paul.
- Douglas, M., Wildavsky, A., 1982. How can we know the risks we face? Why risk selection is a social process 1. *Risk Anal.* 2 (2), 49–58.
- Durkheim, É., 1995. *The Elementary Forms of Religious Life*. Free Press, New York, NY (orig. pub. 1912).
- Fox, R.C., 1957. Training for uncertainty. In: Merton, R.K., Reader, G.G., Kendall, P.L. (Eds.), *The student-physician: Introductory Studies in the Sociology of Medical Education*. Harvard University Press, pp. 207–241.
- Fox, R.C., 1980. The evolution of medical uncertainty: The milbank memorial fund quarterly. *Health and Society* 58 (1), 1–49.
- Fox, R.C., 2000. Medical uncertainty revisited. In: Albrecht, G., Fitzpatrick, R., Scrimshaw, S. (Eds.), *The Handbook of Social Studies in Health and Medicine*. Sage, pp. 409–425.
- Fox, R.C., 2002. Medical uncertainty revisited. In: Bendelow, G., Carpenter, M., Vautier, C., Williams, S. (Eds.), *Gender, Health and Healing: The Public/Private Divide*. Routledge, London, pp. 236–253.
- Freidson, E., 2001. *Professionalism: the Third Logic*. University of Chicago Press, Chicago, IL.
- Getachew, D., 2020. Reaction of medical students to experiences in dissection room. *Ethiop J Health Sci.* 24 (4), 337–342.
- Goss, A.L., Viswanathan, V.B., DeLisser, H.M., 2019. Not just a specimen: a qualitative study of emotion, morality, and professionalism in one medical school gross anatomy laboratory. *Anat. Sci. Educ.* 12 (4), 349–359.
- Hafferty, F.W., 1988. Cadaver stories and the emotional socialization of medical students. *J. Health Soc. Behav.* 29 (4), 344–356.
- Hafferty, F.W., Castellani, B., Hafferty, P.K., Pawlina, W., 2013. Anatomy and histology as socially networked learning environments: some preliminary findings. *Acad. Med.* 88 (9), 1315–1323.
- Hafferty, F.W., Franks, R., 1994. The hidden curriculum, ethics teaching, and the structure of medical education. *Acad. Med.* 69 (11), 861–871.
- Han, P.K., Klein, W.M., Arora, N.K., 2011. Varieties of uncertainty in health care: a conceptual taxonomy. *Med. Decis. Mak.* 31 (6), 828–838. <https://doi.org/10.1177/0272989x11393976>.
- Heinz, W.R., 2002. Transition discontinuities and the biographical shaping of early work careers. In: Heinz, W.R., Krüger, H. (Eds.), *Status Passages and the Life Course*. Juventa, Weinheim, pp. 3–25.
- Heinz, W.R., Marshall, V.W. (Eds.), 2003. *Social Dynamics of the Life Course: Transitions, Institutions, and Interrelations*. Aldine de Gruyter.
- Houwink, A.P., Kurup, A.N., Kollars, J.P., Kral Kollars, C.A., Carmichael, S.W., Pawlina, W., 2004. Help of third-year medical students decreases first-year medical students' negative psychological reactions on the first day of gross anatomy dissection. *Clin. Anat.: The Official Journal of the American Association of Clinical Anatomists and the British Association of Clinical Anatomists* 17 (4), 328–333.
- Iedema, R., Jorm, C., Lum, M., 2009. Affect is central to patient safety: The horror stories of young anaesthetists. *Soc. Sci. Med.* 69 (12), 1750–1756. <https://doi.org/10.1016/j.socscimed.2009.09.043>.
- Inglehart, R., et al., 2022. *World Values Survey: round Seven – Country-Pooled Datafile*. JD Systems Institute & WVSA, Madrid & Vienna.
- Jain, N.R., 2025. Haunted by ableism: ghosts of the past, present, and future in medical education. *Soc. Sci. Med.* 382, 118321. <https://doi.org/10.1016/j.socscimed.2025.118321>.
- Jasanoff, S., Kim, S.-H., 2015. *Dreamscapes of modernity: sociotechnical imaginaries and the fabrication of power*. University of Chicago Press, Chicago.
- Jiga, L.P., Campisi, C.C., Jandali, Z., Ryan, M., Maruccia, M., Santecchia, L., et al., 2022. Role of the cadaver lab in lymphatic microsurgery education: validation of a new training model. *J. Invest. Surg.* 35 (4), 758–767.
- Kaundinya, T., Schroth, S., 2022. Dismantle ableism, accept disability: making the case for anti-ableism in medical education. *J. Med. Educ. Curric. Dev.* 9, 1–5. <https://doi.org/10.1177/23821205221076660>.
- Kumar, N., Rahman, E., 2017. Effectiveness of teaching facial anatomy through cadaver dissection on aesthetic physicians' knowledge. *Adv. Med. Educ. Pract.* 8, 475–480. <https://doi.org/10.2147/amep.s139893>. (Accessed July 2017).
- Laakkonen, J., Muukkonen, H., 2019. Fostering students' collaborative learning competencies and professional conduct in the context of two gross anatomy courses in veterinary medicine. *Anat. Sci. Educ.* 12 (2), 154–163. <https://doi.org/10.1002/ase.1811>.
- Lachman, N., Pawlina, W., 2006. Integrating professionalism in early medical education: the theory and application of reflective practice in the anatomy curriculum. *Clin. Anat.* 19 (5), 456–460. <https://doi.org/10.1002/ca.20344>.
- Lalit, M., Piplani, S., Mahajan, A., Arora, A.K., 2018. Attitude and response of first-year medical students toward cadaver, dissection, and subject of anatomy: a qualitative study. *AMEI's Curr Trends Diagnosis Treatment* 2 (2), 121–129. <https://doi.org/10.5005/jp-journals-10055-0053>.
- Larson, M.S., 1977. *The Rise of Professionalism: Monopolies of Competence and Sheltered Markets*. University of California Press. Transaction Publishers (Reprinted 2013).
- Lempp, H.K., 2005. Perceptions of dissection by students in one medical school: beyond learning about anatomy. A qualitative study. *Medical education* 39 (3), 318–325.
- Mackintosh, N., Armstrong, N., 2020. Understanding and managing uncertainty in health care: revisiting and advancing sociological contributions. *Sociol. Health Illness* 42 (S1), 1–20. <https://doi.org/10.1111/1467-9566.13160>.
- Malinowski, B., 1925. Magic, science and religion. In: Malinowski, B. (Ed.), *Magic, Science and Religion and Other Essays*. Routledge & Kegan Paul, pp. 17–92.
- Montgomery, K., 2006. *How Doctors Think: Clinical Judgment and the Practice of Medicine*. Oxford University Press, New York.
- Moore, S.E.H., Burgess, A., 2011. Risk rituals? *J. Risk Res.* 14 (1), 111–124.
- Oloya, J.N., Okello, M., Munabi, I.G., 2025. Social norms and medical students' engagement with cadaveric dissection: a qualitative study and integrated model of cadaveric engagement (IMCE model). *Journal of medical education and curricular development* 12, 23821205251378866.
- Ong, C.X., Foo, Y.Y., Compton, S., 2023. The impact of human cadaveric dissection on professional identity formation in medical students. *BMC Med. Educ.* 23 (1), 970. <https://doi.org/10.2307/2570695>.
- Parsons, T., 1939. The professions and social structure. *Soc. Forces* 17 (4), 457–467. <https://doi.org/10.2307/2570695>.
- Qatanani, A.M., Fishman, O., Khamar, D., Rosenzweig, S., 2023. Personal preparation of medical students for the human dissection experience: a systematic review. *Medical science educator* 33 (5), 1271–1281.
- Rathbone, A., Nazar, H., Harburn, J., Todd, A., Husband, A.K., 2019. Exploring undergraduate pharmacy student experiences of learning human anatomy using cadaveric specimens. *Am. J. Pharmaceut. Educ.* 83 (8), 7103.
- Sathvika, S.V., Francis, Y.M., Karunakaran, B., Raghunath, G., Kumaresan, M., Begum, Z., Subramanian, R., 2022. Donor oath: respect to the mortal teacher to learn ethics and humanitarian values of anatomy. *Cureus* 14 (3).
- Schütz, A., 1972. *The Phenomenology of the Social World*. Heinemann Educational, London.
- Simpkin, A.L., Schwartzstein, R.M., 2016. Tolerating uncertainty - the next medical revolution? *N. Engl. J. Med.* 375 (18), 1713–1715. <https://doi.org/10.1056/NEJMp1606402>.
- Stergiopoulos, E., Jain, N.R., 2026. Affects of ableism in medical education: happiness, resignation, and the disabled killjoy. *Adv. Health Sci. Educ.* 1–24. <https://doi.org/10.1007/s10459-025-10499-4>.
- Štrkalj, G., 2016. *Humanistic Anatomy: a New Program for an Old Discipline*. Taylor, C., 2004. *Modern Social Imaginaries*. Duke University Press, Durham, NC.
- Van Gennep, A., 1960. *The Rites of Passage* (M. B. Vizedom, G. L. Caffee, Trans.). University of Chicago Press (Original work published 1909; Les rites de passage. Émile Nourry).
- Zinn, J.O., 2008. Heading into the unknown: everyday strategies for managing risk and uncertainty. *Health Risk Soc.* 10 (5), 439–450.
- Zinn, J.O., 2016. 'In-between' and other reasonable ways to deal with risk and uncertainty: a review article. *Health Risk Soc.* 18 (7–8), 348–366.
- Zinn, J.O., Schulz, M., 2024. Rationalization, enchantment, and subjectivation – lessons for risk communication from a new phenomenology of everyday reasoning. *J. Risk Res.* 27 (2), 295–312.
- Zinn, J.O., Schulz, M., 2026. *A New Phenomenology of Risk and Uncertainty*. Palgrave Macmillan.