

REVIEW

The philosophy and ethics of anatomy teaching

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SUMMARY

Philosophical and ethical considerations in anatomical education involve a variety of issues. This chapter tries to address some of these. Anatomical education must be valid and relevant in terms of general educational objectives. In order to go beyond the rote memorization of facts, anatomical education must include functional and clinical relevance. Furthermore, anatomical education should provide not only knowledge, but also skills and attitudes. These attitudes can be fostered by the involvement of anatomy in medical humanities. Furthermore, there are three main items to be dwelled upon: sex/gender, population/ethnicity, and age. Finally, anatomical education should address also cadaver-related ethics, comprising sociological issues including the nature of donation, and dealing with death amongst students and staff.

Key words: Basic educational philosophy – Ethics of anatomy – Gender – Ethnicity – Age – Sociology – Donation – Skills and attitudes – Medical humanities

INTRODUCTORY REMARKS

This paper is part of a project of the Trans-European Pedagogic Anatomical Research Group (TEPARG) on the Teaching of the Anatomical Sciences (Sañudo, 2014). As this group comprises anatomists from the (human or dental) medical context, we will confine ourselves mainly to medi-

cal education. As a matter of fact, we recognize that several issues raised would be common to any anatomy course taught as part of a professional program of study. Therefore, several mentions of (undergraduate) medical education can easily be replaced with appropriate terms of a related curriculum including anatomy teaching.

BASIC EDUCATIONAL PHILOSOPHY OF TEACHING ANATOMY

“[...] *The domain of education is vast, the issues it raises are almost overwhelmingly numerous and are of great complexity, and the social significance of the field is second to none.*” (Phillips and Siegel, 2013). According to these authors, this is due to several facts. First of all, many philosophers of education wanted to contribute not to philosophy itself but to educational policy and practice. Secondly, the field lacks intellectual cohesion. Finally, the number of subjects to be addressed within the philosophy of education is legion. Developing from a rather simple, if not simplistic, ordinary language analysis, philosophy of education later also addressed the interrelated fields of social, political and moral philosophy.

As a matter of fact, we can't and don't want to address all possible issues of the enormous scope of the field, which can be distilled for instance from Randall Curren's *A Companion to the Philosophy of Education* (2008) and Siegel's *The Oxford Handbook of Philosophy of Education* (2009). Therefore we will confine ourselves to considerations that need to be part of the design of an anatomy course that lie outside those narrow limits of content and delivery mode.

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The development of a curriculum has a number of difficult decisions need to be made. The more or less technical questions of proper ordering or sequencing of topics in the chosen subject, the time to be allocated to each topic, the lab work or excursions or projects that are appropriate for particular topics will not be addressed here. What will be addressed are overall issues of justification for particular items of curriculum content.

Teaching of anatomy must be embedded within (human or dental) medicine. This means that the content must be relevant in terms of the targeted outcome of (undergraduate) medical education. This targeted outcome may differ by medical schools or universities, but a majority will agree that graduates of a basic medical curriculum are no specialists. They will eventually get further postgraduate medical education as interns/registrars/residents. There are differences between countries whether graduates get their medical licence immediately after or even concomitantly with their graduation from medical school (as it is the case for instance in Germany and in Portugal), or after their internship (as it is the case for instance in Austria).

Moxham and Moxham (2007) suggest that anatomy ought to be a "stand-alone" component in a medical curriculum; due to anatomy's perceived clinical importance, the preference for practical teaching and learning, and because both professional anatomists and medical students do not believe that anatomy necessarily contributes greatly to other basic sciences. Consequently, integrative biomedical science courses are potentially disadvantageous to clinical training if the teaching of anatomy merely forms background or introductory information or if taught not by subject specialists who are able to develop proper, and full, understanding of the discipline.

Thus, anatomical education must be valid and relevant in terms of the general educational objectives of the medical school. This implies that anatomical education should be accomplished (mainly) by medical school graduates. Based on their own medical education, they will be able to appraise validity and especially relevance somewhat better than other non-medical professionals, such as biologists. We are well aware that this opinion will be a target of criticism, as others might hold different views.

Anatomical education is relevant when its intermediate educational objectives are within the framework of the general educational objectives. Relevance in medical education is a function of two main factors: prevalence and severity. For example, teaching the anatomical basics of several rare diseases will go beyond the general educational objectives in most cases. It is the duty of anatomical teachers to check their educational objectives against the general educational objectives. Therefore, they should be in close contact not only with the curriculum developers but also

with their colleagues working as physicians or specialists since this will help them to teach clinically relevant anatomy.

Teaching mere morphology will miss an important issue of anatomy: the function. There is one paradigm, which should lead teaching in anatomy: "form follows function". This may be especially true for the locomotor apparatus, but it also applies to all other organs or systems. For example, students will not appreciate the differences in the mucosal lining of the digestive system without understanding the differences in function. Here, anatomical education suffers from the historical separation of physiology as the initial functional part of anatomy.

Teaching anatomy without functional and clinical relevance reduces anatomy's academic value to an accumulation of rote memorization of mere facts. In order to accomplish this objective of functional and clinical relevance several approaches might be applied. First of all, curricula may integrate anatomy in modules together with physiology, physics, biomechanics, etc. In this case, a harmonization of the contents between the different disciplines is strongly advised. Secondly, especially for clinical relevance, clinicians such as radiologists, surgeons, neurologists, psychiatrists and so on, can be incorporated into one's own anatomical courses. This is particularly suitable for any kind of dissection or prosection courses. Finally, adding personal clinical experiences from one's own (under- and) postgraduate education will make anatomical teaching less monotonous and will help the students listening to integrate anatomical facts to their own growing conception of medicine.

Anatomical education should address three fundamental objectives: (1) anatomy must prepare students for clinical examination, and this practical knowledge of morphological anatomy in living beings should be encouraged, (2) anatomy must provide the basis for medical imagery, and (3) anatomy must help to develop manual skills when the student himself performs the actions, achieving something personally and discovering on his own (Kénési, 1984).

TEACHING OF KNOWLEDGE, SKILLS AND ATTITUDES

Anatomy is often seen from outside to be a discipline filling students with an enormous amount of factual knowledge. Factual knowledge in part contributes to the cognitive domain of educational objectives. According to Bloom's taxonomy of educational objectives, these may be derived from at least three different domains: (a) the cognitive domain, (b) the psychomotor domain, and (c) the affective domain. Marzano and Kendall suggest in their *New Taxonomy of Educational Objectives* three domains of knowledge: information, mental procedures, and psychomotor procedures; and six

levels of processing: retrieval, comprehension, analysis, knowledge utilization, metacognition, and self-system thinking (2006). There are high similarities between their domain of information and Bloom's cognitive domain as well as their domain of psychomotor procedures and Bloom's psychomotor domain, but there is a strong difference concerning their domain of mental procedures and the affective domain as elaborated by Krathwohl et al. (1964). We will therefore rely on Bloom's taxonomy.

The cognitive domain, described extensively by Bloom (Bloom et al., 1956; Blumberg, 2009), comprises educational objectives dealing with several aspects of knowledge, such as factual, conceptual, procedural, and meta-cognitive knowledge, which build the content dimension. The several levels, which can or should be achieved, ranging from mere remembering up to creating 'new' knowledge, build the progress dimension (Anderson et al., 2001; Carignan, 1991). Thus, a two-dimensional array can be created.

A similar array can be created for the psychomotor domain (Harrow, 1972). Its content dimension covers several skills or competencies such as manual skills, perceptive skills, and psychosocial (or communicative) skills. The progress dimension ranges from 'imitation' to 'control' to 'automatism' (Guilbert, 1998).

The third array is built for the affective domain (Krathwohl et al., 1964). Its content dimension comprises personal attitudes, beliefs, and behaviours, whereas the progress dimension ranges from 'receptivity' to 'response' to 'internalization' (Guilbert, 1998).

A fourth domain, which is gaining more and more attention, is the domain of professionalism (Ludmerer, 1999; Swick et al., 1999). Much has been written, but definitions are few. A now generally accepted – and widely published – definition was given by the AIBM Foundation, the ACP-ASIM Foundation, and the EFIM (AIBM Foundation et al., 2002). According to this source, professionalism is defined by a commitment to professional competence, honesty with patients, patient confidentiality, maintaining appropriate relations with the patients, improving the quality of care, improving the access to care, just distribution of financial resources, scientific knowledge, maintaining trust by managing conflicts of interest, and professional responsibilities. According to our previous taxonomy, these issues constitute the content dimension of this domain. For the process dimension, which hasn't been addressed in the literature by now, we define at least the levels 'unprofessional', 'semi-professional', and 'professional'. Nevertheless, several issues of the content dimension can be mapped to other domains: for instance 'professional competence' can be mapped into the psycho-motor domain; 'honesty with patients', 'patient confidentiality' and 'appropriate relations

with the patients' can be mapped into the affective domain, etc.

Anatomical educational objectives must not be limited to the cognitive domain but should also address the psychomotor and the affective domain, the latter especially in the field of ethics.

It is obvious that several educational objectives with higher grades of progress, such as synthesis or evaluation for the cognitive domain, go beyond the scope of traditional and current anatomical education, but not medical education, especially when seen in a discipline-based curriculum. These educational objectives are traditionally addressed by the different clinical disciplines. Thus anatomical education is often limited or restricted to the clinicians' demand that anatomy must provide the "basis for ...". However, this clinicians' demand is not supported properly by filling the variable "... with appropriate terms but clinicians often answer only: "my specialty"; for instance, the cardiologist doesn't supply the anatomist with appropriate information, what he would like the anatomist to teach. Thus, anatomists are left alone when educational objectives for anatomy should be established. There have been several attempts to define educational objectives for anatomical education with the most comprehensive one presented as AMEE guide No. 41 "The Place of Anatomy in Medical Education" (Louw et al., 2009). Even this document restrict the goals of an anatomical curriculum by stating that these "*goals do not include (a) the knowledge of a large quantity of the information contained in a detailed study of anatomy, [and] (b) the anatomical knowledge and skills required for the successful practice of specialties.*" This problem of blending clinical educational objectives with anatomical educational objectives, or segregation of anatomical educational objectives by clinical educational objectives, may be solved by means of the self-conception of anatomy as a fundamental medical discipline, and not a mere basic science.

EDUCATIONAL DESIGN

Whereas the "Designing Courses in Anatomy" will be the topic of a forthcoming chapter (Moxham and McHanwell, 2014), we want to integrate some general remarks on educational design also within this chapter.

The educational design of anatomy – with all its overlaps with clinical specialties – is composed of three dimensions (Kennedy et al., 2001; Louw et al., 2009). While this model was developed for a multimedia program (Kennedy et al., 2001), it can be used in general for anatomical education itself. The first perspective is the regional – or topographic – dimension (head, neck, back, thorax, abdomen, pelvis, upper limb, and lower limb). The second perspective is the systematic dimension (integumental, haematopoietic, cardiovascular and

lymphatic, nervous and endocrine, genitourinary and reproductive, digestive, respiratory, and musculoskeletal systems). These two perspectives or dimensions are well known, and comprise the basic structures for current anatomical curricula. Traditional curricula and also textbooks are often arranged along one of these dimensions, described as “systematic approach” or “regional approach”. If possible, especially in terms of time and resources, most benefit would of course be derived from both a regional and a systemic approach altogether (Pais and Moxham, 2013).

The third perspective is the perceptive dimension, i.e. by which type of deconstruction of the intact body a certain item can be appreciated by the students. It ranges from the “visual pole” with images achieved by for instance endoscopy, ultrasound, CT, MR, and (conventional) x-Rays, but also more or less schematic drawings, towards the “manual pole” with physical examination, clinical procedures, post-mortem examinations, and anatomical dissections. Especially this perceptive dimension can be used for the clinical transition of anatomical contents.

INVOLVEMENT OF ANATOMY TEACHING IN MEDICAL HUMANITIES

Medical humanities can be defined as an interdisciplinary, and increasingly international endeavour that draws on the creative and intellectual strengths of diverse disciplines, including literature, art, creative writing, drama, film, music, philosophy, ethical decision making, anthropology, and history, in pursuit of medical educational goals (Kirklin, 2003). On the other hand, the concept of ‘medical humanities’ seems utterly exhausted, attenuated by decades of trying to encompass all that the invincible biomedical model of medicine actively ignores; it even risks sounding petty and adversarial, as if medicine were unremittingly inhumane (Campo, 2005).

Medical humanities provide insight into the human condition, suffering, personhood, our responsibility to each other, and offer a historical perspective on medical practice. Attention to medical humanities helps to develop and nurture skills of observation, analysis, empathy, and self-reflection, skills that are essential for humane medical care (Aull, 2013). The visual arts can help physicians in training to increase their observational and interpretive skills (Boisabuin and Winkler, 2000). The social sciences help to understand how medicine takes place within cultural and social contexts and how culture interacts with the individual experience of illness and the way medicine is practiced (Aull, 2013). That is, medical humanities have the goal to re-conceptualize health care by influencing students and practitioners to query their own attitudes and behaviours while offering a nuanced and integrated perspective on the fundamental aspects of

illness, suffering, and healing (Shapiro et al., 2009). It is unarguable that the doctor’s role is both to be technically competent as well as humane in his approach (Oyebode, 2010). Being humane involves connecting and engaging with the patient’s concerns and worries, the patient’s understandings as well as misunderstandings, and drawing from the same pool of cultural motifs as the patient so as to grasp the patient’s apprehensions (Oyebode, 2010). Present doctors are accused to lack of empathy and compassion for their patient (Gupta et al., 2011), which may be partly attributed to the growing socio-economic burden but also to the fact that many medical curricula do not include modules related to the conduct of the health care providers. Medical humanities might, for instance, help in ‘humanizing’ the student-cadaver encounter by bearing witness to the ‘cadaver experience’ for anatomists of the past, but also offering forgotten alternatives for placing present-day reactions in perspective (Terry, 1985).

The good news is that many anatomical departments or even medical schools have already implemented the one or other course or program to cope with the demands of medical humanities (Ousager and Johannessen, 2010). These courses or programs comprise many different activities such as lectures and group discussions exploring humanistic issues, complete longitudinal curricula on death and dying, and even faculty development. Thereby, the anatomy faculty can act as the students’ first role models for compassion within their professional duties (Rizzolo, 2002). For example, at the College of medicine at the University of California, Irvine, a “drawing-with-the-right-side-of-the-brain” workshop to supplement the gross anatomy course was developed (Shapiro and Rucker, 2003). Medical students at Mayo Clinic, College of Medicine, researched the history of anatomical specimen procurement, reviewing topic-related film, academic literature, and novels, to write, direct, and perform a dramatization based on Robert Louis Stevenson’s *The Body-Snatcher* (Hammer et al., 2010). Sad to say, such courses and programs get more and more into dire straits and are in need of defense (Belling, 2010; Halperin, 2010).

SEX/GENDER SPECIFIC AND SEX/GENDER RELATED ANATOMY

‘Sex’ is defined as ‘the classification... as male or female according to reproductive organs and functions assigned by the chromosomal complement’, whereas ‘gender’ is considered to be ‘a person’s self-representation as male or female, or how that person is responded to by social institutions on the basis of the individual’s gender presentation’ (Morgan et al., 2014). Anatomy is one of the key sites for the production and maintenance of sex and gender as embodied dualities (Moore and

Clarke, 1995). Teaching anatomy has to cover the biological sex, both female and male anatomy. This comprises not only the obvious biological differences in the reproductive system but should also cover sex differences in organs and systems beyond the reproductive system. Nowadays, there are two major obstacles. The first is the disproportional representation of female anatomy in educational resources, especially books (Morgan et al., 2014). Several studies found that the male body is used as a "standard". Males were shown in more than 60% of the illustrations of nonsexual anatomy, whereas females were shown in only 11% with the rest being "neutral" (Giacomini et al., 1986). This is also true for the vocabulary and syntax in these textbooks (Lawrence and Bendixen, 1992). "Equality of representation" was only achieved in the chapters and sections on genitourinary anatomy. Another *"analysis of textual descriptions and graphic illustrations revealed that the male body has been the stable norm or standard against which the female body has been compared and implicitly judged as underdeveloped, weak or faulty"* (Petersen, 1998). An examination of the use of medical simulators showed that the simulators present the male body as 'male including female' rather than 'male, not female' (Johnson, 2005).

The second obstacle derives from the first one: the male body is perceived as the "standard" with the female body seen as a "deviation" from the standard. Anatomy often depicts the male anatomy as the norm or standard against which female structures are compared. Modern texts thus continue long-standing historical conventions in which male anatomy provides the basic model for 'the' human body (Lawrence and Bendixen, 1992). This convention is starting to be overthrown: in 1981, a group of women called the Federation of Feminist Women's Health Centers published a book titled "A New View of a Woman's Body", which offers a new feminist sexual anatomy and very elaborate hand-drawn visual representations (Moore and Clarke, 1995), and the Journal "Clinical Anatomy" just recently published a complete issue addressed to the female anatomy (Tubbs and Wellons, 2013). Furthermore, students' perceptions and attitudes to sexism within anatomy are quite complex (Morgan et al., 2014), related both to their socio-cultural background and their own sex.

This results in three tasks for (anatomical) educators (Morgan et al., 2014): (1) they have to raise awareness of sex/gender issues, especially in their teaching materials, (2) identify gender-specific health concerns, and (3) pay attention to the hidden curriculum.

POPULATION/ETHNICITY SPECIFIC ANATOMY

Of course, anatomical education must address the specific issues of relevant population(s) and ethnicities, which will be the targeted patients of

the future physicians. This means that it will not be appropriate to use anatomical materials, books, models, and also cadavers, from ethnicities not being the targeted patients. Ethnicity-specific anatomy is by sure a very delicate topic and still suffers from world atrocities of the "Aryan race" or under apartheid where black and white anatomy is debated (i.e. in front of the law, as in South Africa). Thus addressing ethnicities in anatomical teaching must be completely free of any valuation. Due to several facts, *"the physical and documentary evidence demonstrates the disproportionate use of the bodies of the poor, the Black, and the marginalized in furthering the medical education of white elites"* (Halperin, 2007). This author also concludes *"When those in power clearly see that anatomic dissection is in their self-interest, they support it. When they don't, the bodies of others are 'good enough'."* Even Henry Gray and Henry Vandyke Carter did their imaging work for the first edition of *Gray's Anatomy* on the bodies of the poor taken from the morgue of their own hospital, and from the mortuaries of the Poor Law workhouses of Victorian London, unable to afford a funeral or other means of disposal and so taken, effectively, without adequate consent (Richardson, 2008).

This is also true for the "new media", the "cyberanatomy". Cyberanatomies are local products influenced by local attributes (gender, race, culture and other), distributed globally, and finally consumed and interpreted locally (Moore and Clarke, 2001). The (local) sites of production and consumption (and interpretation) are in most cases not identical; thus production and consumption are influenced by different local attributes. This might result in different, and from the view of the producers not intended, bodily representations.

AGE-RELATED AND AGE-SPECIFIC ANATOMY

Teaching of anatomy has also to cover the whole lifespan. Organs change their morphology and function from the beginning to the end of life, some to a higher extent than others. Very often, anatomical teaching covers just the end of life and the very beginning, the embryological period, but age-related modifications are fainting out of education as early as in the foetal period. Developmental changes of the skeleton are often addressed up to the closure of the epiphyseal plates, whereas most of the other organs are taught and learned in the mere late-adult form. There is a lack of anatomy of the child, and the adolescent, and differentiation of the adulthood. There are few or even no resources for the anatomy of the toddler, the teenagers, and the different phases of adulthood (tweens, thirtysomething, fortysomething, quinqagerians, etc.). By sure, it would be inappropriate to introduce real fetuses or neonates into anatomy teaching; therefore other approaches such as real or virtual models or cyberanatomies would be appropriate.

Anatomical education and especially anatomical dissection is accused of teaching the anatomy at the end of life, due to the cadavers used (Lippert, 2012). Thus, anatomical teaching has also to cover the anatomy of the younger ones. This can obviously not be done by dissection, but by several imaging modalities (ultrasound, CT, MR, etc.).

When dealing with the whole lifespan, anatomy must also address the boundaries. These boundaries are filled with ethical overtones and constitute so much of what anatomy is and deals with (Jones, 1998). Within the embryonic realm, concepts like those of the pre-embryo and brain birth are of intense interest and relevance to anatomists. At the other end of the spectrum, anatomy has an important part to play in elucidating the well-known concept of brain death.

CADAVER-RELATED ETHICS, COMPRISING SOCIOLOGICAL ISSUES INCLUDING THE NATURE OF DONATION, DEALING WITH DEATH AMONGST STUDENTS AND STAFF

Whereas the area of cadaver-related ethics is addressed in – up to now – two consecutive TE-PARG-papers (M^oHanwell et al., 2008; Riederer et al., 2012), the other ones have to be addressed here.

The experience of most anatomy educators is that all efforts should be endeavoured to stress the respect that is due to donors, the surviving family members and friends of the deceased and to the human bodies or body parts at all times, with no exceptions. This respect is demanded by all the parties involved with cadavers in Medical Schools, employees of funeral homes, school's staff, teachers or students.

A donation program, like the physician-patient relationship, is based on trust. When this trust is broken, as a result of a disrespectful action, either involving the donors, the surviving dear ones or the cadavers, the whole donation program may be jeopardized. This should be a matter of utmost priority and efforts should not be spared to assure that all people involved are aware of its importance and periodically reminded of it.

Both authors of this paper are the donation officers of their institutions. As a standard, they meet regularly with the respective funeral home employees, the staff of their department and of the Body Donation Office to go through all appropriate procedures dealing with the interaction with donors and surviving family members and with the transportation, embalming, storage and manipulation of cadavers and body parts.

These actions are especially important in relation to the main beneficiaries of the donation programs: the students. Cadaver dissection is not only essential to develop knowledge and skills, at the cognitive and psychomotor levels of anatomical learning, but is also especially important in modelling

attitudes as well as humanistic and ethical values, indispensable for their adequate future professional practice of Medicine.

The human cadaver is very often the student's first contact with death and is also referred to as being the student's "first patient" (Coulehan et al., 1995), whereas students prefer the "body as teacher" (Bohl et al., 2011). The contact with the cadaver is, independently from the approach as first patient or teacher, a very special and unforgettable moment in medical student's academic life and may be the first chance to develop the required ethical respect for his/her future patients. Recent results indicate that students believe the "body as teacher" concept is more effective in engendering respect and empathy towards the body and towards future patients, and in facilitating students' emotional development (Bohl et al., 2011). Conceptualising the cadaver as a teacher avoids this problem as the cadaver is closer to a respected non-medical person than to a medical object (Winkelmann and Guldner, 2004). The concept of the donated body being the students' "teacher" is extensively elaborated in Thailand, where body donors are honoured with the special status of "ajarn yar" ("great teacher"; Winkelmann and Guldner, 2004). Every year, Thai schools and universities regard and respect the body donors in a ceremony called "wai khru" ("honour the teacher"). By such ceremonies, either in the Thai form as described above or more Western memorial services, students may develop a richer understanding of the last days of life that the donors experienced, and their recognition and expression of gratitude for the sacrifices of donors and their families can enhance an emerging sense of professional responsibility (Pawlina et al., 2011). Prakash et al. (2007) opine that this concept of the body as teacher will help in dealing with human cadavers including their ethical aspects.

At this point we must stress that the student body of a Medical School is an ever-changing community. This is the reason why the authors recommend to all institutions and is current practice at the authors' institutions as many others, that the first year medical students are given a talk by a donation officer, every year at the very beginning of their academic life, addressing the various aspects of body donation as well as the ethical issues of dealing with human cadavers in the Medical School.

CONCLUSION

By all means it was a difficult endeavour to compile an overview on the philosophy and ethics of anatomical teaching. We are convinced that almost each reader will be able to contribute substantially to one or the other aspect we raised. Teaching anatomy is not just the delivery of various facts but demands also a personal involvement with the nature of man in its sexual duality

from birth to death embedded in a certain population and socialisation.

We do hope that this chapter on the teaching of the anatomical sciences will help to stimulate further and deeper discussions and elaborations of the topic as a whole or several aspects.

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