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Phronesis in a Complex World: Normative Education and Climate Change Ethics

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ABSTRACT

Climate change is a complex and wicked problem, both its problem definition as its proposed solutions are controversial and relate to many different interlinked socio-political domains. However, this complexity should not lead to inertia, the crisis is urgent and we need to act. Educators are thus tasked with maintaining a challenging balance between teaching technical knowledge while also fostering a sense of ethical responsibility in students. They need to do this for a problem on which the ethical approaches are up for debate. This paper reflects critically on the notion of Phronesis (practical wisdom) as it is introduced as a pedagogical approach for ethics in higher education on the moral dilemmas of climate change. Phronesis is not in itself a theory on how to act, but rather it provides the domains necessary for moral development in students for the ethical reflection and practices regarding the complexities of the modern world. Education for responsible engineers should teach students to (1) recognize morally salient elements of the world; (2) recognize how these are integrated (3) integrate these in one's moral identity and lastly (4) be affectively invested in this moral identity. This paper argues that Phronesis can work as a didactical tool for systematically and purposefully engineering moral education, while also showing its limits compared to more classical approaches of rationalistic models of teaching ethics. In doing so, it tries to bridge a gap between the content and focus of moral education in climate change. (234 words)

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Introduction

Climate change is a problem emblematic of wicked problems in the Anthropocene: greatly urgent, complex and unprecedented (Tromp, 2018; Incropera, 2016). This dire nature of climate change requires innovate ways of knowledge production and transfer. In other words, higher education institutes (universities and colleges) play a fundamentally important part in the way we think about, and act on, climate change. Mitigation of, and adaptation to, climate change requires highly specific technical knowledge, but, as is inherent to wicked problems, also a knowledge of society, humanity and ethics. The transfer of technical knowledge is a strong element in engineering education, but there is a division of labor where normative reflection on novel technologies is not traditionally a central part part of engineering curricula (i.e. Chech, 2013). However, the integration of the normative with the technical is fundamental for tacking climate change issues. As Reimers (2021) puts it:

The motivation to invent more sustainable ways of life requires more than an understanding of the science of climate change, the capacity to design technological innovations, or an ethical framework that help us aspire to live in more inclusive and sustainable communities, it requires an understanding of social systems and the development of ethical reasoning that can help us integrate critical thinking about the current impact of climate change, our moral imagination, the personal motivation to act and our competency to act in effective ways. (p. 4).

However, currently there is no clear framework for integrating ethics into climate change curricula. There is not a clear conceptual framework for distinguishing the technical and the normative, or even if a demarcation between technical science and values is even tangible (Douglas, 2009).

Furthermore, ethics in engineering education might be superfluous when it is only a form of abstract theory, as the point of ethical reasoning is to make more responsible decisions (act differently) in the world. As Midgley (2000) puts it: “gaining knowledge is not just collecting and storing facts, but becoming trained in handling them” (p.54). So, on the one hand there is the theoretical dimension of understanding the normative dilemmas of climate change, but on the other hand the university needs to provide students personal tools for the internalization of normative reasoning.

This approach is also framed as a requirement for a combination of academic (technical) knowledge with Phronesis (Tassone et. al., 2016). So, there is a conceptual ethical goal of mapping out the normative topoi in climate change on the one hand, and the effective didactical and pedagogical approaches of integrating ethics in higher engineering education on the other.

This article aims to provide a theoretical background for the development and feasibility of Phronesis in climate change education. It aims to map the normative dimensions of climate change as a reference point for the meaning of Phronesis in the age of the Anthropocene. Specific pedagogical practices may be drawn from that, but the translation of climate change normativity to specific educational practices is a different level of analysis. Thus the main research question of this article is: what should be the normative and pedagogical focus of higher education curricula regarding climate change? This article will start with a conceptual description of Phronesis, secondly it will integrate this concept in the normative problems of climate change. Lastly, this will culminate in normative pedagogical guidelines that may ground pedagogical strategies.

Education and Phronesis

The concept of Phronesis is rooted strongly in virtue-ethical theory. Rather than focusing on deductive ethics, starting from a general ethical rule and applying that rule to a specific situation, the concept signifies an inner mental state of virtue regarding a practical context. To be more specific, Phronesis refers to a form of practical knowledge (Kakkori & Huttunen, 2007, p. 20). For Aristotle, the cultivation of Phronesis is a necessary condition for an effective praxis of other virtues. In this regard, Phronesis is qualitatively different from the other virtues, as a person might be virtuous in one sphere of life, and not so much in others, but without an attitude of Phronesis a virtuous life is unreachable (Dunne, 2005, p. 52). The virtue-ethicist character of practical knowledge does not necessarily lead to a meta-ethical stance of moral particularism. Phronesis is categorized by Aristotle as a form of intelligence, but is eccentric as it is a prerequisite for ethical life (or conversely, living an ethical life is a signifier for the mastering of Phronesis) (ibid.). As a form of intelligence, certain ethical principles may guide ones' attitude in moral contemplation regarding a specific situation. However, the meaning and implementation of those principles is dependent on the particularities of that given situation.

In this sense, practical knowledge or virtues rationality is the anti-thesis to the instrumental rationality that is dominant in neo-liberal discourse. Its focus on the affective, narrative, and contextual nature of the human condition and its focus on practice, rather than providing some ultimate ontological conceptualization of 'the good', makes it a rather descriptive concept of the psychological attributes and competences of a virtues person, which has a plurality of normative dimensions as its starting point (Duvenage, 2015, p. 80). This 'mediating character' (between abstract meta-ethical principles and practical behavior) makes it applicable for educational purposes, as the basis for a pedagogical theory of moral development. Furthermore, it is specifically relevant for engineering education, as implementing abstract ethical principles in concrete, hands-on technology is one of the main challenges in engineering (Floridi, 2019).

The way in which Phronesis might have pedagogical usefulness is that it is a possible bridge between moral theory and moral practice. The simple fact that a person holds moral belief A, or is familiar with an ethical theory prescribing A, does not automatically mean that their actions will align with this belief. On the contrary, there is even some evidence that moral behavior is not that strongly related to moral believe at all (i.e. Haidt, 2001). Simply learning about moral theory, therefore, might not be a very effective way of educating ethics. Moral theory runs the risk of becoming a tool for moral confabulation or rationalization, rather than a tool for moral decision-making (Floridi, 2019). Action A is justified by Moral Theory A, retroactively in this model. This is opposite of the goal of moral education where Moral Theory A grounds the motivation behind Action A.

The great benefit of a moral pedagogy of Phronesis, therefore, is that it opens up pedagogical room for the cultivation of moral identity and emotion. This line of reasoning is well explained by Darnell et al. (2019) who build on the Aristotelian notion of Phronesis and sub-divide it into four different cognitive and affective functions, here summarized as:

Table 1: four dimensions of Phronesis

Constitutive Function	An ability to perceive the morally salient elements of a given situation and what is necessary to respond appropriately.
Integrative Function	Integrating different components of the good life to act wisely when ethically salient values are in conflict.
Blueprint	An integration of a conception of the good in one's moral identity.
Emotional Regulation	To be affectively invested in, and in line with, one's ethical convictions (not to be confused with 'limiting one's emotions)

Although Darnell et al. relate their psychological model of moral decision-making to moral pedagogy, it is not their main concern. However, it is indictive of how theoretical insight from moral psychology might inform effective moral education. This approach of Phronesis has a strong focus on moral affect, which is in contrast with the influential classical Kohlbergian model of moral development, which is focused more strongly on the cognitive understanding of moral principles. A discussion on the stages of moral development in the Kohlbergian paradigm is beyond the focus of this paper. The point is that this influential paradigm takes a classical rationalist approach to moral theorizing, which is criticized widely to fall short when it comes to moral practices (i.e. Carpendale, 2000). However, as Darnell et al. (2019) note, neo-Kohlbergians put more emphasis on the role of affect and moral identity in moral pedagogy. They conclude that the neo-Kohlbergian paradigm is not fundamentally incommensurable with their Aristotelian four-component operationalization of Phronesis.

So, the concept of Phronesis is useful when it comes to the translation of moral convictions into practice. Teaching ethics is not a merely cognitive endeavor, students have to be emotionally engaged with the material, and learn ethical principles not as external to themselves (for instance as part of a given ethical theory). Rather, teaching ethics is, at least partly, like teaching a competence that is more than the ability to regurgitate abstract ethical theory. However, Phronesis as practical wisdom has only been discussed on the conceptual level. Especially if we accept that moral competency involves one's attitudes and actions towards their surroundings, the concept of Phronesis should be applied to a real-life normative context. The next section will therefore discuss the normative dimensions of climate change. This will not only provide a context for a discussion on Phronesis, but also provide a framework for the content of climate change ethics education.

Ethics in Climate Change

There is no one ethics of climate change, as climate change is not one thing. It is a set of processes that are interlinked and over-determined. Climate Change has no one single moral object or subject. The moral complexity of climate change goes even deeper than a multitude of moral subjects with conflicting interests: there is strong disagreement on what even the moral subjects are. Often, normative discourse on climate change discusses future generations, but as future generations do not exist, per definition, it is not clear why we should have moral obligations

towards them (Beyleveld, Düwell & Spahn, 2015). Climate Change drives horrendous extinction-rates, but species themselves are just biological categories, it is not clear why and if a collection of animals should be morally considered, especially when this conflicts with the interests of individual animals (Marris, 2020). All of this is not to say that future generations or species should not be morally considered, it is just to say that any discussion of climate change will sink into ethical and ontological quicksand when focused on one single aspect of its normative consequences.

Considering this complexity the discussion of the ethics of climate change will be extremely course-grained and, therefore, limited. It is not meant as an in-depth discussion of what humanities way forward in our geological predicament ought to be. The point of the discussion is to provide an overview of the basic moral approaches that arise in the face of the Anthropocene that can be the starting point of pedagogical approaches to climate change, especially when it comes to the cultivation of Phronesis as discussed above.

The starting point of the discussion is Miller and Eggleston's (2020) overview study *Moral Theory and Climate Change*. Instead of taking one aspect of climate change as a starting point, their study focuses on dominant ethical-theoretical frameworks and their applicability to climate change. This 'theory-first' approach fits the aim of this article well, as it provides a range of guiding principles, or normative foci, to consider the wide range of ethical dilemmas that arise on the warming planet. Studies that take a more 'bottom-up' approach are very suitable for fleshing out the moral conflicts within any given particular situation, but do not provide an overview of the different ethical principles that might guide our moral reasoning a-priori. Therefore, the top-down/theory-first approach fits better with the aim of providing the normative theoretical background in climate change ethics education.

The most salient distinction in the ethics of climate change on the theoretical level is the conceptual distinction between the personal and the systemic level. Almost all moral theories admit that the global and political/economic nature of climate change asks for a multi-leveled approach: combining both personal and political ethics. Following this multi-leveled approach, table 2 (appendix) will provide an overview of the different normative frameworks regarding climate change, this will be used to reflect on the meaning, feasibility and applicability of Phronesis in the teaching of climate change ethics.

Almost all scholars recognize the difficulty of applying ethics to a problem that has a) grave moral consequences and b) is outside the sphere of influence of any single actor. This does not mean that climate change is a classical collective action problem. I.e., climate change is different from providing a moral justification for paying for one's train ticket -even though deflecting from paying has no measurable effects on the world.

Gardinger (2006) explains well how climate change is different from a standard collective action problem. An extensive discussion on moral game theory is far beyond the scope of this paper, but the way in which climate change is a rather unique moral problem, or a "perfect moral storm" is in that is involves 1) a dispersion of causes and effects 2) a fragmentation of agency and 3) institutional inadequacy. In other words: to know what should be done, one should at least know what can be done, but the causal pathways driving climate change are very dispersed. Furthermore, as discussed, the moral scope is very opaque. And lastly, there are no institutional agents to restrict deflecting behavior adequately. This leaves a difficult

moral-theoretical lacune, as focusing on one single aspect of climate change can actually be a way of deflecting, as it can be a way of avoiding the more costly necessities of mitigating climate change. Behaving ethically can be a way to behave unethically in climate change.

Being a Phronemos in the Anthropocene

Following the focus on policy-changes (rather than individual ethics) dominant in the (meta-) ethical paradigms, the conceptualization of phronesis as presented in the first part of this paper might not seem the right approach to moral education at first-glance. Or, it might have limited applicability, for instance in education for students in politics, but not as a more engineering-oriented approach to teaching climate-change ethics. Following table 2, most ethical theories leave little room for individual agency in the context of climate change, apart from -unsurprisingly- the virtue-ethicist approach. The great downside of the virtue-ethicist approach, however, is that it provides no framework on which virtues are central to the moral problem of climate change, or what it actually means in practice to live these virtues.

However, following Gardingers concerns of moral theorizing in climate change, Phronesis as a didactical approach might still be rather useful. The moral lacune of climate change asks for a re-orientation between the different moral schema's that philosophical theory has generated. This might be analogous to Kuhn's ideas of paradigm shifts. After a period of 'normal ethics' focused on puzzle-solving (how does theory x apply to moral problem z), we slowly get in a phase of 'crisis ethics' (with the anomaly of climate change). This means that in developing new technologies, we might have to think differently about their function. More fundamentally, engineering education is also about re-considering the role of oneself as an engineer. Moving beyond notions of instrumental rationality as explained in the theoretical framework, towards a reflective agent following virtues of environmental sustainability (Jordan & Kristjánsson, 2013)

Constitutive function

Different ethical theories may provide normative foci for interpreting the problem of climate change, in other words, have a constitutive function (as defined in table 1), rather than being treated as ethical-epistemic starting points that are incommensurable with each other. In more educational terms, this means that on a cognitive level, inquiry-based learning might appropriate when it comes to climate change ethics. Of course, recognizing salient values is extremely difficult and prone to biases. Here, ethical theory can, again, serve as a scaffolding-method of guiding the inquiry, rather than as a starting point of moral education. It is important to note that 'passive-learning', that is just learning the main concepts of a certain ethical theory has little effectiveness in higher education, especially engineering education (Newberry, 2004). A more pedagogically sound approach to teaching ethical theory is case-based learning. That is, teaching ethical theory in the way they are relevant in applied cases (Haws, 2013). However, as both these authors note, case-study based learning is not in itself sufficient for engineering education, as it does not necessarily foster sense of emotional engagement with the content. In other words, and to illuminate more the link with climate change: theory focused pedagogy is a necessary but insufficient method for cultivating sustainable virtues in engineering education students.

Integrative function

Regarding the problem of fragmentation of agency, educational practices can focus specifically on the level of analysis and, in effect, short-comings of any particular moral theory or normative focus. The rationalistic focus of Kantianism, for example, might be critiqued for being very anthropocentric[2] and individualistic. Pedagogically, methods like participatory simulations can be a way to get students familiar with the conflicts of values between different theories, and the levels of analysis that they play out on (Jacobson & Wilensky, 2006). To stay with the example of Kantian anthropocentrism and methodological individualism: a participatory simulation can involve an institutional actor, forcing students to re-think state-responsibility and animal representation while also getting familiar with Kantian theory cognitively. This is thus a different pedagogical method than case-based learning, as presented above. This approach fits more with the pedagogical goal of intellectual engagement than emotional engagement (Newberry, 2004). However, it is important pedagogically for engineering students to understand that ethics is more than the application of rules (as might be the risk with case-based learning only). Doing ethical heuristics, as is the case with participatory simulation, fosters a sense of understanding of the plurality of ethical approaches. However, as Haws (2013) notes, it might leave the impression that ethics is mainly about argument rather than acting. Further, some ethical theories might be easier to implement this way than others.

Blueprint

On the more affect-side of moral education, integrating values in one's moral identity is an important part in teaching ethics on a general level (see also Newberry, 2014). However, when it comes to climate change ethics, it is not clear what a moral identity might constitute in everyday life. Here, the virtue-ethics perspective of table 2 is obviously very relevant (a blueprint of the good life might entail a concern for all sentient beings, for instance), but again, there is no clear framework for which values are central in climate change ethics, especially in the very constructivist virtue-ethicist tradition. However, following the constitutive and integration functions that treats moral theory as foci, role-modeling can be a starting point for the development of moral identity in higher education.

Concretely this means that students may identify role models based on the value constitution and integration functionalities. Coming back to table 2., this means that positive role-models might serve as an exemplar for moral identity, giving blueprint a different meaning. There is some evidence that role-modeling has positive effects on the development of a moral identity in pedagogical practices (see Sanderse, 2013 for an overview). However, the concept of role-modeling presupposes a very prescriptive teacher-student dynamic as it treats explicitly the teacher herself as a role model. This might conflict with an ideal of neutrality that is still widely regarded in education, especially when it comes to higher education issues (Hess, 2002). Plenary class discussions, which are an important aspect in ethics education in general (ibid.) might not always be the right approach in fostering affective engagement through pedagogy. There is some evidence that students get defensive, rather than open-minded, when discussing topics that are affectively important for them (de Clerck & Rutten, 2014). Pedagogical tools that focus more on empathy than argument such as rhetorical listening might overcome such shortcomings. However, climate change is a

[2] Obviously, there are prominent exceptions like Regan (1983), if you like replace "Kantianism" with "traditional Kantian ethics".

difficult case as much of its effects regard people that are far away spatially or temporarily.

Emotional regulation

Moral education specifically centers around emotion. The links between moral belief and moral action are, at least partly, regulated by affect. The specific functions of affect in shaping moral behavior are touched upon in the first section of this article, but largely beyond the scope of this paper. When it comes to climate change ethics, emotions are integral as well. Especially salient for emotional regulation in the context of Phronesis is the role emotions play in changing attitudes and behavior towards climate change. Empirical research shows that learning about climate change has affectional effects, leaning towards negative emotions, often clustered under the term ‘eco-anxiety’. However, this does not necessarily lead to a reduced sense of efficacy, it might even increase it (Maran & Begotti, 2021). The same study caveats that excessive exposure to information on climate change might also lead to ‘eco-paralysis. This means that pedagogically, these emotions should be mitigated constructively. There is some qualitative evidence that collective action has a positive effect on mitigating eco-paralysis. In pedagogical terms, this urges teachers to focus on empowerment (see for instance Tassone, 2017 for empowerment pedagogy in higher education).

In this sense, Phronesis is both conceptually and practically a useful lens for moral education. On the other hand, Phronesis is centered strongly around individual moral development, as argued in the second section of this paper this is a too limited focus when it comes to climate change, both ethically and emotionally. The important paper by Newberry (2004) shows that pedagogy on emotional engagement is limited by what he calls the ‘gravitational pull’ of engineering curriculum. Students respond to what is being deemed important institutionally, and if practical ethics is a minor part of this, students respond accordingly affectively. In other research (Loonstra & Tassone, 2024) I have mapped the learning domains of a technical university as they are reflected in the intended curriculum. Indeed, affect-oriented learning goals are least dominant. A true change towards emotional engagement with ethics follows probably from an institutional change in the goals of the university, more even than specific pedagogical approaches..

Conclusion

Climate change is one of the most urgent problems of modernity. It touches upon virtually every sphere of life and is characterized by great wickedness. The anthropogenic nature of climate change and its dire effects make it a difficult normative problem. Technical knowledge and values are deeply intertwined, or at least extremely difficult to separate. Universities, as knowledge-producing institutions, have an important role to play in providing students with the right tools to understand climate change, and respond to it ethically. This practice-oriented goal of ethical competency asks for an integration of moral theory and affect in pedagogical practices.

This article has provided a conceptual analysis of Phronesis, an Aristotelian notion of the framework of education focused on moral pedagogy specifically. Phronesis is the counter-part of Kohlbergian approaches that were long paradigmatic in moral education, but are criticized for being too rationalistic. Phronesis can be understood as a form of practical wisdom, stemming from the cultivation of values in one’s moral

identity. Following Phronesis, moral education should focus on the cultivation of a 1) constitutive function 2) integrative function 3) moral blueprint and 4) emotional regulation. To analyze the ethical and practical feasibility of Phronesis in moral education it was juxta-positioned with the most prominent ethical schools of thought (utilitarianism, deontology and virtue-ethics) and their response to the climate crisis.

Phronesis has a strong focus on individual moral development, and might therefore, following the focus of the most dominant ethical approaches to climate change ethics, not be very well-suited for moral education on systemic issues. However, this article proposes that, as the most paradigmatic approaches to climate change ethics come with great intra theory-shortcomings as well (analogous to a Kuhnian crisis-science), the concept of Phronesis might be very useful as a method of a pedagogical re-orientation of ethics as well. On the constitutive dimension, ethical theory might serve as lens to distinguish between values. This follows a logic of inquiry-learning where students perform their own normative analysis with moral theory as a scaffolding tool. Case based learning is an important pedagogical strategy. On the integrative dimension, the problem of reconciling conflicting values can be important regarding the multi-leveled and multi-faceted dimensions of climate change. Mirroring complex-problem pedagogy, participatory simulation can provide a practice-like setting for weighing the strengths and short-comings of normative foci. The blue-print dimension is where Phronesis falls short as an approach to moral education in climate change, as it is too individualized and has limited practical applicability in the context of climate change ethics. Role-model approaches of moral education might be an approach to deal with these shortcomings, but come with other normative problems. Other pedagogical approaches such as rhetorical listening, do not suffer from these weaknesses, but are little concrete. Lastly, the emotional-regulation dimension is very salient when it comes to climate change ethics, but has to be embedded in a broader theory of empowerment and social change to be morally effective and affectionally appropriate. This translate to the university where institutional changes regarding the intended curriculum are important in fostering attitudes.

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Appendix

Theory	Conception of ethics	Personal requirements in Climate Change	Systemic requirements in Climate Change
Act Utilitarianism	The ethical nature of an act is dependent on the maximalization of utility in its consequences.	The only real influence an individual can reasonably have on climate change is limiting procreation, as all other behaviors mitigating climate change are effectively meaningless compared to having fewer children.	Implement a temporal discount rate of 0 in financial models of mitigation efforts (as temporal closeness is morally irrelevant). Implement a supply-side Carbon Tax (as this is probably more effective than a Cap and Trade System). Finance adaption strategies for the least well-off by raising the highest marginal tax rates (following the principle of diminishing marginal returns).
Rule Utilitarian	The ethical nature of an act is dependent on its adherence to an ideal-theoretical moral rule.	All greenhouse gas (GHG) mitigating behaviors that do not reasonably conflict with other fundamental values, most prominently: limiting meat-consumption, fossil-fuel travel methods and	Implement a demand-side incentive system to promote alternatives to GHG-emitting activities via taxes. Implement a carbon-offsetting program (individual carbon-offsetting is logistically and societally too complex to be internalized as an ideal-theoretical rule).
Deontology	The ethical nature of an act is dependent on it being derived from that maxim through which you can at the same time will that it become a universal law. (conceptual principle of non-contradiction)	Problematic, as not-mitigating climate change is not conceptually contradictory. Possible solution: broader definition: do not act according to those maxims that are practically unsustainable.	Principle of right: Any action is right if it can coexist with everyone's freedom in accordance with a universal law, or if on its maxim the freedom of choice of each can coexist with everyone's freedom in accordance with a universal law. States ought to provide financial support for

		(prudence principle of non-contradiction) Duty to pressure government for systemic solutions.	mitigation and adaptation efforts to those countries that will be affected by climate change to the extent that the freedom of their citizens is severely limited. Or: implement an unconditional open-border policy rendering everyone free to escape the asymmetrical global effects of climate change.
Virtue ethics	The ethical nature of an act is necessarily dependent upon the virtuous nature of its actor.	Cultivate the right values for a virtues disposition towards nature (i.e. compassion for suffering, a will to justice for all parts of the environment, and a sense of reverence for and protectiveness towards the enchanted in nature) Or: Try to live *as if* in possession of those virtues, i.e. by mimicking a positive role-model (as climate change is a problem of great urgency, not well-suited for the time intensive practice of cultivating values).	The polis should be led responsibly: balancing the conflicting values.

(Based on Miller & Eggleston, 2020)