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Chapter # 8

PROMOTING EPISTEMIC VIRTUES ACROSS THE CURRICULUM TO EDUCATE 21ST CENTURY CITIZENS

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ABSTRACT
In our Knowledge Society, the ease of access to information due to advanced and user-friendly technologies often gives us the illusion to know more than we do. This "epistemic disease" is a danger to both democracy and public health. The educational system must therefore encourage good epistemic habits consistent with responsible citizenship. From a didactic perspective, this requires updating the curriculum in light of the educational challenge of the 21st century: training students to be virtuous epistemic agents by fostering their epistemic cognition. In this article, I intend to provide teachers with some useful operational guidance to achieve this goal. To this end, the epistemological concept of the virtuous epistemic agent is converted into a didactically fertile construct in two steps: first, observable knowledge-friendly behaviors are identified that can be regarded as clues to the habitus of the virtuous epistemic agent; then some procedural principles are formulated to help teachers design instructional activities that foster students' commitment to enacting those kinds of behaviors.

Keywords: epistemic cognition, procedural principles, curriculum design, didactic transposition, epistemic practices, epistemic virtues.

1. THE NEED FOR EPISTEMIC RESPONSIBILITY IN AN ICT-BASED SOCIETY

Living in complex information ecosystems, where we are constantly exposed to information overload, makes issues of *who* and *what* to believe and *how* to integrate multiple sources of information into coherent and useful knowledge primary challenges for those tasked with selecting what is worth teaching and how to do it. Easy access to information – at least in some countries – enabled by increasingly advanced and user-friendly technological devices, has greatly influenced our intellectual lives, particularly the way we acquire information, form beliefs, and search for reasons to support them. However, the more powerful Information and Communication Technology, the greater the need for epistemic responsibility, i.e., the moral responsibility to behave in epistemically virtuous ways (McHugh & Davidson, 2020). Indeed, information overload contributes to instilling in us the reassuring but dangerous belief that we master authentic knowledge, even though this is not the case. In short, we often suffer from knowledge illusion, namely, we think we know more than we do (Sloman & Fernbach, 2017). This *epistemic disease*, fueled by increasing digitization, may hinder the development of 21st century citizenship skills, as well as the achievement of the Sustainable Development Goals set by the United Nations 2030 Agenda. Evidence of this is the Covid-19 infodemic, which clearly shows how the presumption of knowledge combined with "information disorder" can undermine people's ability to make decisions.

The World Health Organization labeled as "infodemic" the overabundance of information "including false or misleading information in digital and physical environments during a disease outbreak" (WHO, 2022) that makes it difficult to find one's way around a given topic because of the difficulty of identifying reliable sources. The damage to public health that this information pathology can cause by prompting people to distrust scientific experts and health authorities can be further amplified by the filter bubble effect. This expression was coined by the American scholar Eli Pariser (2011) to refer to personalized information ecosystems generated by algorithms, such as, for example, Google's personalized search and Facebook's personalized news. These algorithms, based on the preferences previously granted by the user, tend to propose content similar to what the user likes. As a result, naïve epistemic subjects, being excluded from information that contradicts their standpoint, end up being isolated in their epistemic bubble or echo chamber (Nguyen, 2020). The knowledge illusion generated by the consensus of one's group makes them more polarized and prone to conflict (Sunstein, 2009). In other words, interacting with a homogeneous network of like-minded friends makes people more likely to radicalize their positions, regardless of whether they have well-founded reasons to support them.

This natural tendency of the human mind is further reinforced by the many types of cognitive bias that influence our judgment and decision-making (Piattelli-Palmarini, 1994; Kahneman, 2011). Especially relevant to the problem at hand is the confirmation bias, i.e., our spontaneous inclination to search for, accept and interpret evidence in a way that supports what we are already convinced of. Confirmation bias hampers public evaluation of opinions and arguments, promotes social conformity, devaluation of expert views, and polarization and manipulation of opinions. Although philosophers of science, following Karl Popper (2014), suggest challenging a hypothesis by trying to disprove it, we are always looking for data that are consistent with our current beliefs (Kahneman, 2011). Thus, complying with the rules of scientific rationality requires a great cognitive effort from people as they need to get used to inhibiting their spontaneous intuitions.

In this context, whether information sharing can be the key resource of our society compared to those of the past also depends on the extent to which citizens are likely to enact knowledge-friendly behaviors while seeking new information and taking decisions. The education system needs, therefore, to encourage good epistemic habits consistent with responsible citizenship, by providing students with the conceptual, critical, and epistemic tools to effectively select, evaluate, integrate and make sense of different sources of information. From a didactic perspective, this goal can be pursued by updating the school curriculum (Martini, 2019) to meet the educational challenge of the 21st century: training students to be virtuous epistemic agents by fostering their epistemic cognition, i.e., the ability to produce, evaluate, justify and use knowledge in formal and informal contexts (Greene, Sandoval, & Bråten, 2016; Greene, & Yu, 2016). The questions addressed in this article are: Q1) What does it mean in practice to be a virtuous epistemic agent (VEA)? Q2) How can the school educate students to be virtuous epistemic agents?

In the following section, the construct of VEA is conceptually clarified by integrating the virtue epistemology perspective with proposals from scholars interested in the contribution of philosophy to educational research on epistemic cognition.

2. TOWARDS A DEFINITION OF A VIRTUOUS EPISTEMIC AGENT

Virtue epistemology is a collection of theories that share two commitments: First, epistemology is a normative discipline. Second, intellectual agents and communities are the primary focus of epistemic evaluation insofar as they embody and express intellectual virtues and vices (Turri, Alfano, & Greco, 2021). This particular approach within the field of epistemology has developed since the 1980s in the wake of established virtue ethics (Hursthouse & Pettigrove, 2018). The latter, which can be traced back to Aristotle and other ancient Greek and Roman thinkers, shifts the focus from general questions about what is good or bad, right or wrong, to more specific questions concerning individual behavior, such as "what am I supposed to do to be an ethical person?". The same holds for virtue epistemology, whose purpose is no longer to reflect on knowledge from a "point of view from nowhere" (Pigliucci, 2020), but rather to focus on how the epistemic/intellectual virtues of individuals and communities (epistemic agents) affect their epistemic actions. In broad terms, intellectual virtues are understood as characteristics that promote intellectual flourishing, or which make for an excellent cognizer. Going into detail, virtue epistemologists are divided into reliabilists and responsibilists, depending on their views on the nature of epistemic virtues. Both refer to the Aristotelian conception of virtues, but they value different aspects of it, as the synoptical table below shows.

Table 1.
"Reliabilist" perspective and "responsibilist" perspective on epistemic virtues.

		Reliabilist perspective	Responsibilist perspective
Types of Epistemic Virtues		acute perception, introspection, sound reasoning, reliable memory, etc.	open-mindedness, accuracy, curiosity, objectivity, intellectual courage, intellectual perseverance, intellectual humility, intellectual responsibility, intellectual autonomy, etc.
Features of Epistemic Virtues		natural, hard-wired	acquirable through education
		reliably truth-conducive	not straightforwardly truth-conducive
		morally neutral	morally valuable
		passive (virtues, as natural faculties, are independent of any intentional action performed by the epistemic subject)	intentional, active (the subject is responsible for his/her epistemic actions)

Virtue reliabilists (e.g., Sosa, 2007) advocate a conception of intellectual virtues as innate reliable faculties – i.e., acute perception, introspection, sound reasoning, reliable memory – that enables us to form true beliefs. Insofar as these types of faculty-virtues are part of the individual's natural endowment, for whose functioning he/she is not directly responsible, they are morally neutral, passive qualities.

Virtue responsibilists (e.g., Zagzebski, 1997), on the contrary, draw on Aristotle's model of ethical virtues and maintain that intellectual virtues are excellent character traits such as, by way of example, open-mindedness, objectivity, intellectual perseverance, intellectual autonomy, intellectual humility, intellectual responsibility. These traits are not hard-wired but need to be acquired through education.

However, this distinction is criticized by some scholars (e.g., Baehr, 2006) as insensitive to the fact that different types of knowledge require the exercise of different epistemic virtues. As Jason Baehr (2006) points out, if by knowledge we mean ordinary and mundane truths, then it may be enough that our cognitive faculties are in good working order to reach them. Not so if we are interested in other valuable domains of human knowledge. For instance, acquiring disciplinary knowledge also requires us to exercise many intellectual character virtues supporting our cognitive faculties, such as intellectual carefulness, thoroughness, accuracy, intellectual honesty, and so on.

As is easy to see, this approach may offer interesting insights for educational research and thus deserves future study. However, for the sake of this article, I simply highlight another issue closely related to the debate on the two types of virtues, namely, how the intellectual character virtues can account for "higher degree" epistemic achievements such as wisdom and understanding (Greco, 2002). The topicality of considering other epistemic goals in addition to knowledge (e.g., Kvanvig, 2003) has also been brought to attention by some scholars interested in the implications of epistemic cognition for education.

According to Chinn and Rinehart (2016), educational researchers present too narrow a view of epistemology, neglecting the variety of epistemic aims and products focused by modern epistemological traditions, including arguments, theories, explanations, wisdom, understanding, and evidence. To fill this gap, Chinn and colleagues developed the AIR model of Epistemic Cognition (Chinn, Buckland, & Samarapungavan, 2011; Chinn &, Rinehart, 2016) based on three components – Aims and values, epistemic Ideals, Reliable epistemic processes – whose relevance is warranted by philosophical scholarship and endorsed by other educational researchers (e.g., Duschl, 2008; Sandoval, 2016).

In this framework, intellectual virtues (vices) are conceived as habits of mind (Chinn &, Rinehart, 2016, p. 463), i.e., "learned, stable disposition" (Chinn et al., 2011, p. 156), that may foster (undermine) the achievement of valuable epistemic goals. This way of understanding epistemic virtues is of particular interest to the present contribution. Indeed, the concept of *habit*, introduced by Aristotle and made central by Dewey, has been extensively explored in the educational literature, which can therefore provide us with useful insights into how intellectual virtues can be acquired. However, before addressing Q2 I attempt to sketch out an initial response to Q1:

A VEA is an individual who exercises epistemic virtues and strives to avoid epistemic vices. By virtues (vices) we mean those habits of mind that promote (undermine) the achievement of valuable epistemic goals.

This provisional and partly tautological definition is clarified in the next section while trying to answer Q2.

3. TEACHING EPISTEMIC VIRTUES ACROSS THE CURRICULUM

Before explaining the learning of epistemic virtues in terms of acquiring mental habits, it is necessary to briefly clarify our position concerning reliabilists and responsibilists. Drawing from both perspectives, I label as epistemic virtues both character traits and cognitive faculties when employed to achieve worthy epistemic goals. Although perception, memory, reasoning ability, etc., are part of our natural endowment, their intentional use to perform goal-directed actions is our responsibility and can be improved through education. With this in mind, virtue lies not in the possession of an excellent cognitive faculty, but in the excellent epistemic use of this faculty. Since, as Dewey (1933)

argues, "education is concerned with the proper direction of natural powers" (p. 29), I claim that even reliabilist virtues – as intended above – can be conceived of as mental habits, that is, as collateral learnings (Dewey, 1953, p. 49) affecting the way we tend to think and cope with a variety of situations.

> The principle of habit so understood obviously goes deeper than the ordinary conception of a habit as a more or less fixed way of doing things, although it includes the latter as one of its special cases. It covers the formation of attitudes, attitudes that are emotional and intellectual; it covers our basic sensitivities and ways of meeting and responding to all the conditions which we meet in living (Dewey, 1953, p. 27).

Insofar as we agree that one of the main office of education is to supply conditions that make for the cultivation of these enduring attitudes (Baldacci, 2012), curriculum updating should not be reduced to a mere quantitative increase in the knowledge to be taught. On the contrary, this revision should address, on a qualitative level, how the selected disciplinary content is didactically transposed (Schubauer-Leoni, 2008; Martini, 2018). To explain what I mean, I introduce the distinction between first- and second-level curriculum proposed by Baldacci (2006), which is related to Bateson's (2000) hierarchical theory of learning.

According to Bateson (2000), learning is a complex process articulated on several levels; it follows that talking about it in generic terms is always a source of misunderstanding. Similarly, Baldacci acknowledges some conceptual confusion when discussing the construct of curriculum without being aware of the different logical levels of its objectives. In this regard, he argues that the curriculum structure can be organized on two levels, which correspond to the first two distinct logical types of learning identified by Bateson.

The first-level curriculum aims to promote proto-learning, i.e., the acquisition of disciplinary knowledge and skills. On the other hand, the second-level curriculum is concerned with deutero-learning, that is the development of habits of thought and actions, personal attitudes and interests, *formae mentis*, and particular ways of seeing and thinking, including those of disciplinary experts. Proto-learning is direct, explicit, and gives results in the short-to-medium term. Deutero-learning, on the other hand, is collateral as it only takes place in parallel and in connection with proto-learning, mostly implicit, and gives results in the medium-to-long term.

In light of this distinction, I argue that developing students' epistemic virtues is a second-level curricular goal, involving long-term complex learning that can only occur collaterally to individual proto-learnings necessary to achieve worthy epistemic goals. Therefore, cultivating the *habitus* (e.g., Bourdieu, 1977; Baldacci, 2012) of the virtuous epistemic agent involves acquiring a set of knowledge, skills, and stable epistemic dispositions – epistemic virtues – to properly use and apply this knowledge and skills in a variety of contexts where epistemic goals are at stake.

From the perspective of educational practice, this higher-order learning requires students to undergo extensive cross-cutting training. This means that all school disciplines, or at least many of them, should provide students with meaningful learning activities that prompt them both to exercise epistemic virtues, while avoiding epistemic vices, and to reflect explicitly on what behaviors, depending on the circumstances, are to be held epistemically responsible.

In this regard, I intend to formulate some procedural principles, conceived as pragmatic patterns of behavior (Stenhouse, 1977), to help teachers design epistemic-oriented instructional activities. These activities must be varied and redundant to enable students to develop collateral learning in the form of habits of thought and action related to a variety of settings or typical situations. In other words, procedural principles are meant to suggest teaching situations eliciting the exercise of certain epistemic virtues. Thus, virtues are not taught in the abstract but are acquired in relation to types of contexts that encourage behaviors exemplifying them. This also allows teachers to draw students' attention to the context-sensitivity of epistemic virtues and to help them discriminate under what circumstances a given behavior may count as virtuous or vicious (Chinn et al. 2011, pp. 156-157). The principles are constructed in three steps, which are described in the next section.

4. DEFINING SOME INSTRUCTIONAL PROCEDURAL PRINCIPLES FOR DESIGNING EPISTEMIC-ORIENTED ACTIVITIES

Assuming that a VEA holds specific knowledge, skills, and stable epistemic dispositions, the *first step* toward constructing procedural principles was to interpret such knowledge and skills as occurrences of abstract epistemological categories that pinpoint the *structural epistemic components* of the VEA habitus.

These categories were selected based on a review of the philosophical and educational literature (e.g., Goldman, 1999; Chinn & Rinehart, 2016; Kelly, 2008; Sandoval, 2005) and match the components of Chinn's model of Epistemic Cognition: epistemic goals directed at epistemic products, reliable epistemic practices, epistemic standards/criteria. This allowed me to take a step toward operationalizing the construct of VEA, by replacing the provisional definition proposed in Section 2 with the following:

A VEA is an individual who is both capable – has necessary knowledge and skills or can acquire them – and disposed – expresses commitment to epistemic virtues – to pursue valued epistemic goals by engaging in reliable epistemic practices, and to use sound epistemic standards to evaluate epistemic products and practices as well as to justify these evaluations.

However, since these categories are very broad and independent of a specific knowledge domain, they fail to provide precise guidance to teachers, most of whom are not accustomed to fostering students' epistemic cognition during the didactic transposition of their disciplines. Therefore, I sharpened these general categories by identifying, for each of them, *operationalized subcategories* in the form of epistemically virtuous behaviors to be related to the procedural principles aimed at their development (*second step*). My working hypothesis is that by equipping teachers with cross-cutting procedural principles to adapt to their disciplines, they will be more likely to design epistemically oriented activities that encourage students to perform behaviors to be regarded as indicative of the VEA habitus.

The operationalization of the identified epistemological categories was carried out by exploiting the literature on epistemology (including social epistemology and virtue epistemology), education, and epistemic cognition, and by analyzing the set of media and information competencies outlined by UNESCO (Grizzle et al., 2021). The following are some instances of operationalized subcategories.

Concerning *epistemic goals directed at epistemic products*, some examples are provided by the following intellectually virtuous behaviors: seeking objective knowledge, understanding the ethical issues surrounding the access and use of information, creating meaning from information, gathering reliable information, collecting sound evidence, forming true belief within a discipline, constructing good explanations, providing sound epistemic justification of a knowledge claim and so on.

Under the category of *reliable epistemic practices* (e.g., Kelly, 2008; Sandoval, 2016; Chinn &, Rinehart, 2016; Tombolato, 2020) fall the variety of practices, including all forms of reasoning – inductive, deductive, abductive, analogical, probabilistic, counterfactual, by falsification, etc. – that enable us to achieve worthy epistemic goals with the help of, or in the face of, others. These practices relate to how knowledge is acquired, constructed, validated, verified, evaluated, justified, communicated, and used effectively to solve problems and make decisions within an epistemic community. Epistemic practices encompass both the expert practices shared by the members of the scientific communities – disciplinary epistemic practices – and the practices that people ordinarily engage in to acquire, disseminate and communicate information.

Finally, *epistemic standards* cover the specific criteria used to evaluate and justify products and practices. They are, for instance, criteria for checking the soundness of an argument, identifying trustworthy sources of information, separating evidence from opinions, checking the adequacy of an epistemic representation, evaluating the credibility of an expert's opinion, identifying biased procedures and reasoning, distinguishing good from bad explanations, distinguishing fruitful analogies from false or misleading ones, searching and verifying online information and so on.

Once the subcategories were identified and operationalized in the form of epistemic virtuous behaviors, the *third step* was to construct some procedural principles that can guide teachers' professional actions. As Table 2 shows, each operationalized subcategory can correspond to numerous procedural principles, which translate these subcategories into actions that the teacher must perform to promote in learners those behaviors considered indicative of the VEA habitus (knowledge, skills, and epistemic dispositions).

Table 2.
Some examples of procedural principles referred to each general epistemological category characterizing the habitus of the virtuous epistemic agent.

General epistemological categories	Operationalized subcategories (Epistemically virtuous behaviors)	Procedural Principles
Epistemic goals directed at epistemic products	*Providing sound epistemic justification of a knowledge claim*	*Learners are more likely to develop the habitus of the virtuous epistemic agent if they are engaged in activities a) that require them to consistently justify their knowledge claims; b) that allow them to recognize if others' knowledge claims are justified or not c) that allow them to distinguish epistemic from non-epistemic (e.g., pragmatic) justifications; d) that allow them to become acquainted with different types of epistemic justifications, both reliable and unreliable and so on.*

	Forming true belief within a discipline	*Learners are more likely to develop the habitus of the virtuous epistemic agent if they are engaged in activities a) that allow them to distinguish beliefs formed through reliable disciplinary practices from naïve beliefs; b) that prompt them to prove the truth of a knowledge claim within a discipline by referring to disciplinary modes of inquiry and knowledge-finding tools; c) that elicit them to reflect on how each discipline constructs, critiques, revises knowledge and proves the truth of its statements; d) that allow them to compare different disciplinary conception of what counts as evidence/proof, etc.*
	Constructing good explanations	*Learners are more likely to develop the habitus of the virtuous epistemic agent if they are engaged in activities a) that allow them to distinguish an explanation from a description within distinct disciplines; b) that require them to provide disciplinary explanations about a fact, a phenomenon, a mathematical formula; c) that expose them to different types of explanations (e.g., nomological-deductive, inductive-probabilistic, simulation-based) in relation to different disciplines and so on.*
Epistemic practices	*Constructing disciplinary forms of knowledge*	*Learners are more likely to develop the habitus of the virtuous epistemic agent if they are engaged in activities that allow them a) to become acquainted with disciplinary rules and constraints that bound scientific community members when constructing knowledge; b) to compare different forms of reasoning in relation to the achievement of disciplinary epistemic goals; c) to choose which epistemic practices (formal, empirical, experimental, etc.) are to be employed to address a given disciplinary or interdisciplinary problem and so on.*
	Surfing the net to get reliable information	*Learners are more likely to develop the habitus of the virtuous epistemic agent if they are engaged in activities that allow them a) to compare trustworthy websites with misleading ones, identifying some distinguishing features; b) to recognize when an authentic material is used in the wrong context; c) to compare articles providing facts from various viewpoints with biased articles; d) to try to create historical, scientific, etc. fake news to better understand how to debunk them; e) to check whether the article cites substantial and relevant evidence to support what is claimed and so on.*
	Justifying knowledge, epistemic practices, forms of reasoning	*Learners are more likely to develop the habitus of the virtuous epistemic agent if they are engaged in activities that allow them a) to become acquainted with how experts evaluate and justify the practices enacted to construct knowledge in their domain of expertise; b) to compare disciplinary and forms of reasoning and so on.*

Epistemic standards	Distinguishing good from bad explanations	Learners are more likely to develop the habitus of the virtuous epistemic agent if they are engaged in activities that elicit them to compare good and bad explanations based on the following criteria: fit the facts to be explained, be falsifiable, not conflict with other facts, rely on valid inferences, avoid inferring causal relations from statistical correlations, distinguish relevant from irrelevant variables/facts, allow for new predictions (at least in some disciplines) and so on.
	Checking the soundness of epistemic justification	Learners are more likely to develop the habitus of the virtuous epistemic agent if they are engaged in activities that require them to evaluate a justification based on good epistemic criteria such as: coming from expert testimony, logical consistency (no contradiction), soundness of evidence, coherence with previous data (no counterevidence) and so on.
	Identifying biased procedures and reasoning	Learners are more likely to develop the habitus of the virtuous epistemic agent if they are engaged in activities that prompt them a) to evaluate the soundness of an inductive generalization by ascertaining whether there is a sufficient number of cases to draw a conclusion, whether the breadth of the conclusion is supported by the evidence, whether the forecast is expressed in probabilistic terms, etc..; b) to evaluate the reliability of an argument by checking whether it includes logical fallacies, whether its premises are tendentious or self-contradictory, whether it contains semantic ambiguities and so on.

It is worth noting that epistemological categories and, consequently, procedural principles have been conceptually isolated, but it does not mean that they can be actually isolated. Insofar as they are closely interconnected, almost every teaching activity exemplifies many of them. Indeed, the epistemic goal aimed at an epistemic product presupposes both an epistemic practice of which that product is the result and epistemic criteria on which to rely to evaluate practices and products.

5. FUTURE RESEARCH DIRECTIONS

Within this framework, a future goal of the current research is to formulate additional cross-cutting procedural principles. However, a possible limitation of my working hypothesis concerns the fact that most teachers are not very comfortable with relating their discipline to epistemological issues affecting students' learning. I am not only referring to preschool and primary teachers, but also to many secondary school and university teachers. As a partial remedy to this obstacle, discipline-specific procedural principles can be formulated by carrying out a fine-grained operationalization of general epistemological categories. This further research goal requires in-depth theoretical and empirical investigation of the practice of disciplinary experts. Indeed, as some scholars (e.g., Knorr Cetina, 1999; Sandoval, 2016; Schwab, 1968) pointed out, different epistemic communities enact different epistemic practices, have different perspectives on objectivity and use different standards/criteria to justify their discipline knowledge claims, or to establish what counts as evidence. Moreover, pilot experiences will be undertaken in which teachers and

researchers will co-design instructional activities based on the procedural principles. The goals of this collaboration are a) to enable the teachers involved to understand in practice how to use the principles to transpose their disciplines; b) to provide other teachers with concrete examples of the application of these principles; c) gather feedback on how to further refine these principles to better suit different school levels, and on how to effectively monitor students' learning progress.

Disciplinary procedural principles can facilitate teachers to the extent that they make explicit the syntax of the disciplines, that is, "the variety of modes of inquiry, of patterns of discovery and verification" (Schwab, 1968, p. 301). However, some epistemological awareness on the part of teachers is recommended to ensure that these principles can be used as effective instructional tools to meet the educational needs of 21st century students. This suggests that epistemology should be integrated into teacher professional development programs. However, we need to think carefully about *how to integrate* it so that it can truly influence teachers' instructional practices.

6. CONCLUSION

In this chapter, I have tried to provide an operational solution to the problem of training students to act epistemically responsible within the information ecosystems in which we live. This implies that learners develop the VEA habitus, characterized by praiseworthy dispositions such as epistemic virtues. Since these dispositions are second-level learning, teachers are provided with procedural principles to design instructional activities that enable students to develop epistemic virtues as collateral learning. This approach has a twofold advantage. On the one hand, it allows us to cope with the contextual specificity of epistemic virtues (vices). On the other, the sustained and conscious practice of virtuous behaviors helps students develop stable, long-lasting dispositions to act epistemically responsible when dealing with personal and professional issues and when exercising their citizenship rights.

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KEY TERMS & DEFINITIONS

Information overload: the result of exposing individuals to an amount of information that exceeds their ability to process it, with consequences for attention, comprehension, and decision-making ability.

Cognitive biases: systematic errors in judgment or decision-making that occur predictably under particular circumstances.

School curriculum: a theoretical and methodological device that allows knowledge, practices, and skills to be articulated coherently.

Epistemic bubble: a social epistemic structure in which other relevant voices have been left out, perhaps accidentally. An example is the network of one's Facebook contacts.

Echo chamber: a social epistemic structure from which other relevant voices have been actively excluded and discredited. Members of echo chambers, unlike members of epistemic bubbles, have been brought to systematically distrust all outside sources.

Didactic transposition: the process of transformation and adaptation that scholarly and expert knowledge undergoes to become suitable to be taught and learned. This process involves conscious choices about what to teach, how to teach it, and why to teach it.

Habitus: a set of stable, long-lasting dispositions to think and act in a certain way under certain conditions.

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