Employing the intellectual virtues to better understand argumentation interventions in education

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Abstract

Argumentation-based classroom interventions are a growing alternative for stimulating conceptual learning, thinking, and communicative skills. However, not all classroom argumentation is desired, nor does every argumentation design lead students to develop their abilities and understanding. In the educational literature, productive argumentation has been associated particularly with deliberation due to the design properties that deliberative practices demand from students, such as collaborating towards a goal, revising one's own opinion, listening to others, and changing their minds when it is necessary to arrive at a collective decision or problem resolution. We contend that what makes deliberation productive is not argumentation in itself, but how a certain type of design scaffolds students into virtuous-like behavior, which can be the enabling condition for productive argumentation in classroom activities. Through the exploration of three cases of classroom argumentation and discussion experiences, we hypothesize that virtuous-like behavior may serve as an enabling condition for each intervention. In particular, intellectually humble behaviors could be scaffolded within these interventions because all three create the proper environment for students to revise their own positions, listen carefully to others, and change their minds in light of appropriate reasoning or new evidence. Employing an intellectual virtues framework, advances our understanding of how to design classroom environments for productive argumentation. This paper thus presents a novel and pioneering approach to understanding argumentation in the classroom by incorporating the concept of intellectual virtues, bridging the gap between virtues and traditional research, and offering fresh perspectives on the field.

Keywords: Argumentation; Intellectual Virtues; Intellectual Humility; Educational Design

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1. Introduction

Argumentation practices are growing as an alternative for promoting better epistemic subjects (that is, subjects whose epistemic performance is ameliorated) through enabling a better understanding of different (and divergent) concepts or opinions (Ryu & Sandoval, 2012), using evidence to support ideas (Kuhn & Modrek, 2022), a better calibration of one's own opinions (Leitão, 2000), and better dispositions towards dialogue with others in general (Crowell & Kuhn, 2014). We aim to discuss the implications of the relationship between this literature and contemporary work on intellectual virtues, understood as the study of the dispositions necessary for the flourishing of good epistemic subjects.[1] Argumentation interventions in education aim to understand and foster the impacts that these classroom activities have on skills like argument identification, production, and assessment, widely known as argumentative competences. Improving argumentative competencies is important because they are often associated with improved overall knowledge construction and cognitive development (Kuhn & Udell, 2003), and most often in terms of the degree of subject-matter learning and argument structure internalization (Jonassen & Kim, 2010). These interventions are also seen as key to developing interactional and social skills in students (Mercer, 2009), such as dealing with opposing views, successfully participating in group work, and improving efforts at rational persuasion.

Importing insights from work on the intellectual virtues, understood as acquired cognitive habits that avoid related deficits and excesses, could be key to informing and improving argumentation in education interventions. Intellectual virtues are a good candidate to help us understand and evaluate the cognitive habits that are often said to be by-products of argumentative interaction, namely: intellectual humility, open-mindedness, curiosity, fair-mindedness, and autonomy (to name a few). Porter et al., (2020; 2022), for example, show that under proper classroom conditions intellectual humility might be fostered by changing teachers' instructional patterns, especially when it aims at enabling the mastery of achievement goals (understanding more of a topic) rather than performance goals (being recognized for knowing more or being rewarded for it). One key point in her studies is that intellectual humility growth was predictive of next year achievements for students, showing that changes in classroom design might be key to developing intellectually virtuous students.

There is, however, ongoing discussion regarding the directional relationship between the cultivation of intellectual virtues and argumentative practice. This discussion has been taking place at least since Siegel distinguished between the "reasons conception" of critical thinking, which highlights critical thinking and argumentation skills, and what he calls "the critical spirit", or, "certain attitudes, dispositions, habits of mind, and character traits" (Siegel 1988 p. 39) that amount to a willingness to be a better critical thinker rather than merely having the ability to do so. More recently, the debate has been addressed in terms of whether we should "argue to learn" or "learn to argue" (Fortes et al., 2022). On one view, if we learn to argue, then our aim is the creation of these intellectual virtues, such as open-mindedness and humility. If we argue to learn, then these traits are prerequisites, not byproducts.[2] In our view, virtues are too often expected to emerge in students as a natural byproduct of the acquisition of critical thinking skills with a deprioritization (or removal of) habituation in the 'critical spirit', but when students are only taught argumentative skills such as 'spot the fallacy' (Blair 2023), there is little reason to believe that the virtues needed for arguing well will emerge.

In what follows, we a make the case that rather than focus on intellectual virtues as outcomes of argumentation in education interventions (or hope for them to emerge from interventions), we should instead help develop intellectual virtues as early as possible because they are often unrecognized, though crucially important contributors to the rise of productive argumentation. In other words, we understand cultivating intellectual virtues as a theoretical pre-condition for enabling productive argumentation (as discussed further below) in the classroom[3].

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[1] A *virtue* is here understood as consisting of subject-held attitudes and dispositions that "perfect" a natural human faculty, or correct for proneness to dysfunction and error in certain situations (Roberts & Wood, 2007, p.59). An *intellectual* virtue consists, roughly, of attitudes and dispositions for good and productive thinking (Ritchhart, 2002, pp.18-31). Intellectual virtues are typically acquired, although the virtuous subject needn't be responsible for possessing them (Battaly, 2019).

[2] Thank you to an anonymous reviewer for pressing this point.

[3] The exploration of intra-personal variables within the realm of collaborative or dialogic learning has its roots in several significant works. For example, Wegerif (2010) delved into the effects of a dialogic space on children, emphasizing the need for them to momentarily set aside their judgments when confronted with others' opinions. Similarly, Rapanta introduced the concept of Aporia (2019), suggesting that argumentation becomes productive

Although a broad notion of the term pre-condition (also taken as enabling conditions), we use it here as it is used in the psychological and behavioral literature where it refers to creating the adequate environment for an intervention to have the desired effect(s). In this sense, we show that a confounding variable in argumentation in education interventions is that productive interventions are those considered as promoting intellectual virtues without addressing them explicitly; in other words, argumentation designs that scaffold students to behave in a virtuous-like manner seem to have a greater chance of success (even if this is not the single predictive factor of productive classroom discourse).

We thus argue that most of what is commonly seen as a by-product of high-quality argumentation in education interventions could instead be seen as a prerequisite for arguing well. In this way, our discussion somewhat preempts the "argue to learn" or "learn to argue" debate in that we encourage the cultivation of intellectual virtues prior to engaging either of these approaches in earnest. As Cohen (2007) puts it "a good argument is one that has been conducted virtuously" (p. 1), which implies the acquisition of these virtues before the argument(ation) occurs. We will make our argument in three steps: 1) we introduce what the intellectual virtues are and focus on intellectual humility in particular; 2) we advance our case that some intellectual virtues, such as intellectual humility, are pre-conditions for productive argumentation; and 3) we discuss how this idea could help us reinterpret and advance the research agenda for argumentation in education.

2. How intellectual virtues are related to argumentation

The intellectual virtues have a long history in philosophical inquiry (Fowers, et al., 2021). We are interested in the dispositions that Hookway (2003, cited in Lepock, 2011) identifies as the "higher level" intellectual virtues,[4] which are described as "inquiry-regulating traits of intellectual character", such as conscientiousness, perseverance, and open-mindedness. Despite a long history of philosophical investigation, the development of empirical virtue epistemology research within or outside educational contexts has emerged only recently (Baehr, 2013). One important insight from this research is that at least some intellectual virtues participate in the regulation of the confidence we have in our epistemic capacities and the epistemic openness of one toward others. For example, the development of a sense of virtuous intellectual humility and the ability to critically evaluate others' opinions are considered essential for effective participation in argumentative spaces because they are engaged and critical modes of involvement with this activity. Moreover, Cohen (2007) points out that the pursuit of high-quality argumentation leads to outcomes such as understanding, truth-seeking, and a love of learning, thereby initiating the discussion of virtue theories in argumentation studies. Importantly, Aberdein (2010; 2016) establishes a taxonomy of intellectual virtues and vices related to argumentation. In his view, virtuous arguers must show a willingness to engage critically and respectfully with other arguers and maintain good intentions to solve a dispute over a topic or decision. Of interest to education research on argumentation, however, is the extent to which applying virtue epistemology to argumentation studies in education might help us advance our understanding of the best conditions for argumentation in schools. Among other benefits, doing so will help educators prepare their students for life outside the classroom.

Researchers in education believe that argumentation (and especially deliberation) promotes the type of discourse that sustains the practices required for political participation in a globalized world and that allow for managing democratic societies' challenges (Rapanta et al., 2020). This includes learning to properly gauge the level of confidence in your own knowledge, weigh the different evidence against a topic of interest, and have an open mind so as to allow yourself to build knowledge through exposure to conflicting ideas. These dimensions can all be captured by intellectual virtues (Kidd, 2015). In particular, intellectual humility has recently attracted

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when it evokes feelings of bewilderment or surprise. While both Wegerif and Rapanta have explored the conditions necessary for creating a productive interactional space for discussion, the concept of intellectual virtues adds another layer to this discourse. For instance, Intellectual Humility is distinct from the "ego-suspension" discussed in previous works. Intellectual humility signifies an active ego measuring itself and others, not a passive or suspended one. This means that students should not only be aware of their positions but also critically evaluate both their own and others' stances from the outset.

[4] As opposed to 'low level' knowledge generating faculties, such as perception, memory, or deduction. See also Roberts & Wood, 2007.

the interest of some empirical research (Fowers et al., 2021), especially in education (Baehr, 2013) and in student argumentation (Godfrey & Erduran, 2021).

2.1 Shared characteristics necessary to argumentation and virtuous cognitive habits

While many philosophical accounts of intellectual virtue emphasize how intellectually virtuous motivations drive people toward truth-seeking and knowledge (Rothenfluch, 2015), we focus on the shared cognitive processes of virtuous argumentation and cognitive habits conducive to good epistemic outcomes. These processes are taken to be indissociable from argumentative interaction (Leitão, 2000) and would lead to knowledge gains and skill development for the participants in a discussion (Kuhn & Halpern, 2022). We argue that this is only ideally the case, occurring only when cognitive and discursive processes in argumentative interaction are shared with cognitive and discursive processes of intellectually virtuous-like habits. Shared, here, means that the socio-cognitive processes necessary for productive argumentation are closely related to what an intellectually virtuous person would exhibit in a discussion, such as metacognitive awareness, perspective taking, and understanding.

In the psychological and educational literature, metacognition is seen as the core cognitive process related to argumentation discourse because, while arguing, students are asked to revise their understanding of the topic under discussion, assess the quality of their justification, and position themselves using the argumentative products of this cognitive process (Leitão, 2000; Kuhn & Halpern, 2022). In argumentative interaction, participants must assess their knowledge when using it to justify a position, challenge the others' standpoint(s), and revise the grounds on which they warrant their positions. However, metacognition in argumentation also seems to be central in stimulating student engagement in discussion (Kuhn & Modrek, 2021) rather than only as a competence for argument production. Perspective-taking is another cognitive process central to argumentation, which points to two distinct but related mental operations: considering different epistemic standpoints and recognizing others as epistemic subjects. The former refers to the content of argumentative discussions, the latter to the people engaged in discussion. The content delivered in elementary educational settings is seldom presented as controversial or open to debate even though more than one perspective must be at play for an argumentative interaction to take place (Baumtrog, 2018; Casey, 2020, cf. Larrauri Pertierra, 2022). This is a key transformation involved in creating argumentative classrooms: asking students to recognize the existence of different and divergent positions over the same topic, which in turn improves the epistemic quality of the classroom environment (Schwarz et al., 2011; Fancout, 2022). As Cohen (2019) argues, virtuous argumentation must be composed by both the expression of sound arguments (the most traditional account of argumentation in education) but also by arguers as good listeners, in the sense of listening to arguments both critically and charitably.

Moreover, improved argumentation in education interventions would be conducive to a greater understanding of the topics being discussed in any given classroom. Ryu and Sadoval (2012) show that the children they observed during argumentation interventions improved their capacity to understand different scientific topics because they became more aware of how (and why) pieces of evidence supported scientific conclusions. In contrast, children that only repeated what teachers said as true knowledge did not improve their understanding. Kuhn and Modrek (2022) point out that not only is thinking of the evidence needed to support a conclusion a complex mental operation that requires the coordination of differing pieces of information, but that it also shows the nuanced understanding children have of a topic, especially when contextualized evidence is being discussed. It should be noted, however, that all the above-mentioned studies refer to prompted or guided argumentation models. Thus, it seems essential that for argumentation in education to be productive it must be framed in a certain way. Although this framing may not itself constitute "virtuous argumentation," it at least supports the notion that when people behave as if (or are guided to) virtuous argumentation, some improvement is observed. Moreover, this is compatible with contemporary psychological and pedagogical notions of scaffolding developmental skills, such as the notions of a "zone of proximal development" and "internalization" in the socio-cultural tradition (for the discussion of critical thinking skills scaffolding, see Wass et al., 2011).

Most of what we have discussed thus far broadly relates to intellectual virtues. The characteristics of productive argumentation we have pointed to are: acknowledging the limits of one's and others' knowledge, revising one's perspective (in the sense of maintaining flexibility and changing positions), and generally, being open to a diversity of opinions. Taken together, these three characteristics seem very similar to intellectual humility (Ballantyne, 2021; De Brasi, 2020), which leads us to ask, is intellectual humility a pre-condition for productive argumentation?

2.2 Intellectual humility as central to productive argumentation

According to Sally Jackson (2015), social practices of reasonableness have been moving forward through argumentation design since their invention (in the sense of innovations of intentional designs). Jackson's reflections on argumentation design outline how reasoning, rhetoric, and dialogue are integral components of the construction of norms and values, taken as part of innovation enabled through design changes in argumentation settings, rules, or goals. Argumentation design provides a framework for understanding how culturally shared situations guide people to create arguments, identify and respond to challenges, and reach agreement.

In educational contexts, productive argumentation design (Andriessen & Schwarz, 2009) is a broad term used to refer to 1) when students express and challenge each other's points of view through arguments, 2) participants of argumentative interaction show improved knowledge or skills throughout an argumentative intervention, 3) participants constructively collaborate to achieve a common goal through reasoned procedures, and 4) everyone has the chance to contribute to a discussion. Moreover, productive argumentation is the result of careful design where a debatable topic is raised and students are motivated to present (and challenge) a given position through strong reasoning (de Macedo et al., 2019). In this sense, productive argumentation design occurs when students are motivated to express their opinion, listen to challenges, and then through reasoned argumentation come to a fair conclusion on a given topic. Through this type of interaction, students develop thinking skills and a better understanding of the topic itself (Leitão, 2000; Asterhan, 2013). Productive argumentation is also sometimes called deliberative argumentation and thought of as a subtype of argumentative interaction used in the classroom that relies much more on cooperation than competition (Felton, et al., 2022), which hase been proven to be much more productive in engaging students in democratic practices such as partisanship division reduction (McAvoy & McAvoy, 2021) and conceptual learning (Asterhan, 2018). The exact extent to which cooperative models should be prioritized over competitive models in education is, however, still a debatable topic as competitive and adversarial argumentation seems to maintain an important place in society, and so schools should also enable students to navigate these modes of social reasoning.

We aim to provide a general account of virtue epistemology in argumentation design, while focusing on a particular case in close proximity to argumentation in education, namely, intellectual humility. We understand intellectual humility as having a self-directed component, which is concerned primarily with the regulation of confidence we have in our own epistemic goods and capacities, and an other-directed component, which is concerned primarily with one's epistemic openness to others so as to improve one's own epistemic situation (Krumrei-Mancuso & Rouse, 2016; Leary, 2018; Porter & Schumann, 2018; Tangney 2000).[5]

Accordingly, a key element of intellectual humility concerns the accurate assessment of one's epistemic self (a component captured in many philosophical accounts of intellectual humility; e.g., Kidd, 2015; Whitcomb et al., 2017). The intellectually humble person neither over- nor under-estimates herself. In particular, intellectual humility reduces intellectual arrogance (without creating an underappreciation of oneself) by promoting a doubting attitude owing to the recognition of our fallibility (due to, say, biases and prejudices) and our limitations (due to, say, our finite cognitive power and time). Having said that, intellectual humility also entails an other-directed component, which includes a disposition to change and make up one's mind by taking others' opinions into account. Moreover, owning one's limitations certainly entails recognizing one's positional disadvantages (in time and space) in relation to others (others, located otherwise, can have knowledge about past events and regarding other places that I cannot have; see Toole (2021) for a recent overview). Similarly, given that we live in societies with hyper-specialized knowledge, which distribute the acquisition of knowledge differently among different people, recognizing one's own limitations entails recognizing others' strengths. More generally, recognizing one's own limitations goes hand in hand with the recognition of our inevitable epistemic dependability on others. As Maura Priest puts it, "Intellectually humble agents recognize that epistemic excellence is rarely (if ever) acquired on one's own" (2017, p.476). So, this dimension of humility makes clear how it can help one depend epistemically

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[5] Moreover, both the self- and other-directed components are present in folk theories of intellectual humility, particularly in that they view intellectually humble people as open-minded (Samuelson et al., 2015). Further, Porter and Schumann (2018), investigating the respect and openness of intellectually humble people to opposing views, re-ran their analyses to examine whether the self-directed or the other-directed component was driving the effects, and the general pattern of results remained the same when using one or the other. That being said, although many researchers agree that humility involves both components, there is more agreement with regard to the exact nature of the self-directed one (i.e., involving an accurate view of the self) than the other-directed one (Davis & Hook, 2014; Reis et al., 2018).

on others in certain circumstances. As Vrinda Dalmiya puts it, intellectual humility "consists in such 'other regard', in spite of, and, in fact because of, a realistic 'self-regard'" (2016, p.119).

It is within this second other-directed component that open-mindedness plays a crucial role in intellectual humility (cf. Wright et al. 2018), since it minimally involves the capacity to detect and the disposition to make sense of and take seriously the merits of distinct cognitive standpoints (cf. Baehr, 2011; Kwong, 2016; Riggs, 2016). Thus, open-mindedness is here understood as an essential element of this other-directed component of intellectual humility.[6] Moreover, given that the open-minded person is disposed to give new ideas serious consideration, it is crucial that they listen widely and carefully (cf. Dewey, 1986, p.136).[7] That is to say, they must pay attention (and not merely remain silent when someone speaks) to those who have from slightly to drastically different viewpoints; or, as we put it, they must listen widely.[8] And, to be fair to others' viewpoints, they must put their cognitive effort toward appropriately grasping others' perspectives, even if they do not initially seem to make much sense; or, as we put it, they must listen carefully.

3. Intellectual virtues are pre-conditions for a productive argumentative interaction

Within empirical educational research, productive classroom discourse is characterized by collaborative decision making, collective goal setting, collective consensus, and diversity of participation, rather than competitive, individual, and homogenous argumentation (Asterhan, 2018; Felton et al., 2022). This type of productive argumentation has been called deliberation or collaborative argumentation (Felton & Crowell, 2022). Although this use of the term is much looser than what argumentation theorists have been proposing as deliberation, this is an important starting point; classroom argumentation can be productive or not depending on the way it is framed. Deliberation can lead to epistemically good outcomes (see, e.g., Mendelberg, 2002), but whether it does so depends partly on certain structural and personal conditions holding (De Brasi, 2021). In fact, if we want to avoid certain deliberative distortions, such as domination (the overall group opinion aligning toward the views of the socially privileged members; Sanders, 1997), we need the deliberators to instantiate certain intellectual virtues such as humility. In particular, for deliberation to involve a back-and-forth of reasons that can allow the better (less error-prone) reasons to prevail, it must be set within an interactional communicative exchange. Importantly, this process of giving and taking reasons includes responding to the reasons others have for their views and against one's own. In this sense, deliberation is a reciprocal process, where reasons are not only introduced by the different parties but also responded to. For this to be the case, it is not only important to give voice to different viewpoints but also to listen to them.

Therefore, as much research concerning the dynamics of groups has shown, the question of how to produce deliberative spaces that avoid the effects of domination and other deliberative distortions and produce positive effects on arguers, is still an open problem. In this sense, it is important in education to deal with communication and information as central axes of argumentation interventions. Moreover, this seems to indicate that providing a proper space for creating the adequate disposition to argue is an unspoken pre-condition of productive argumentation. If not all argumentation leads to good epistemic outcomes, when argumentation's goals change, it is not necessarily that argumentation changes from competitive or collaborative, but that the collective disposition to engage in arguing as a means of achieving something emerges. In this sense, we argue that the predictive factor leading to productive argumentation is its pre-conditions, and one key factor is framing argumentation in a way such that students must behave in a virtuous-like way (that is, they must display the conduct

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[6] Understanding open-mindedness as a component of intellectual humility easily explains why people often display the two together. As has been shown, intellectual humility is predictive of open-mindedness (e.g., Krumrei-Mancuso & Rouse, 2016; Porter & Schumann, 2018; see also Davis et al., 2016), which provides evidence that it is intellectual humility, as opposed to general humility, that is predictive of open-mindedness. This is not to suggest, however, that there is no other way of explaining such an association (see, e.g., Spiegel, 2012).

[7] There are other forms of communicative receptivity aside from this aural one, but for the sake of simplicity we here focus on listening.

[8] Virtuous open-mindedness does not require *every* novel idea to be given serious consideration, since one can have adequate reasons against the competence and/or sincerity of the other. As Dewey (1986, p.136) says: "While it is hospitality to new themes, facts, ideas, questions, it is not the kind of hospitality that would be indicated by hanging out a sign: 'Come right in; there is nobody at home.'" See also Baumtrog (2016).

a virtuous person would), even if they don't actually possess the stable disposition to do so and even if it doesn't necessarily lead to being virtuous after all.

3.1 Vices in argumentative design for classroom activities

As stated before, Aberdein (2007; 2010; 2016) has proposed a taxonomy of different classes of argumentative virtues and vices. He argues that having the right disposition is key for a high-quality argumentative interaction (to improve the products and processes of argumentation). Most research has centered on understanding the cognitive and discursive dimensions of argumentation in the classroom (Kuhn & Halpern, 2022). However, some research points out that classroom dispositions toward argumentation are related to goal setting (Asterhan, 2018), where students with mastery goals (achieving more understanding, for example) relate to productive argumentation, in contrast to performance goals (such as, seeking recognition as a strong arguer). In our experience with teacher training in argumentation theory and argumentation pedagogy (Fortes et al., 2021) teachers tell us that they think argumentation is difficult because students are uncooperative, unmotivated, and are too focused on the "teacher's right answer" rather than on coming to a solution together. We can assume that schools are actually oriented toward vice education, especially through practices oriented towards obedience, passivity, and indifference.

Our interpretation of what teachers are saying is that students are much more used to vicious argumentative interactions where they are not invited to think freely and autonomously, where they feel tricked into giving answers that they think teachers expect, where servility is rewarded, and inquisitiveness is punished. Although we haven't systematically gathered this data, a common reaction observed in our experience after a teacher tries to design and enact argumentative activities in the classroom is awe and surprise (Memis et al., 2022). When teachers adapt tasks to be engaging, topics to be stimulating, and interactions to be meaningful in an argumentative manner (especially in deliberative settings) they see unexpected changes, such as a change in students' dispositions towards knowledge construction, not only "better argument production". We interpret this change not just as a development of thinking skills, but designing proper interaction enables (or sets the pre-conditions) for students to present themselves as virtuous-like arguers, and more often than not they demonstrate their capacity for virtuous argumentation. In this sense, we do not think we are facing a problem of a "lack of" skills or competence, but rather a problem regarding communicating what is really expected from students in these situations and how to frame it.

4. Three educational interventions where intellectual virtues are pre-conditions to a productive argumentative setting

As non-exhaustive examples of intellectual virtues being used as, in our view, pre-conditions for argumentation interventions in school contexts, we will present three well-known (and highly cited) cases that have been key to establishing argumentation as a productive mode of discourse for learning subject-matter concepts and developing thinking skills. These examples are not based on an exhaustive literature review, but on the fact that they are all very well-known interventions that prompt argumentation (or dialogue, or discussion) in classrooms with the aim of fostering learning and development in different domains. The first and second both have a shared theoretical background: the first is centered on dialogue and student interaction, while the second emphasizes argumentation and teacher development. The third, on the other hand, concentrates on argumentation design and the format of higher education debates. Another reason for these specific selections is that none refers directly to intellectual virtues or people's dispositions.

First, is the notorious Exploratory Talk exercise (Mercer & Dawes, 2008). Although not traditionally considered argumentative discourse, exploratory talk, in contrast to cumulative and disputative talk (Mercer, 2008), is the type of discourse where people engage critically and respectfully with each other. In this sense, exploratory talk is the type of interaction between peers in which they reflect upon each other's contribution(s) before taking a stance on the matter being discussed. On the other hand, cumulative talk asks students only to accept and agree with each other without much reasoning or discussion, and disputative talk occurs when students disagree too much but each mind their own business without cooperating or reviewing one's own position. Through this description it already looks like we are talking about a continuum of dispositions for talk (and knowledge construction discussions) with two bad extremes and a middle ground that makes it productive.

Moreover, we think the Exploratory Talk exercise functions as a good case of framing the discussion between students because for the talk to be exploratory some conditions must be controlled. For example, one key element for achieving exploratory talk (and internalizing it as an "intra-mental" process) is the establishment of an obedience to ground rules. These rules are a set of guidelines that students must follow if the conditions for good dialogue are to be met. Such rules include "listen actively", "ask questions", "share relevant information", "challenge ideas", "give reasons for challenges", "build on previous contributions", "encourage everyone to talk", "ideas and opinions are to be respected", "construct an atmosphere of trust", "embrace shared purpose", and "the group should seek agreement" — among others. From an intellectual virtue standpoint, we can hypothesize students are behaving virtuously due to how the interaction is being designed beforehand, such as being led to understand the limits of their own knowledge (revise and listen) and to be open-minded (consider both sides), all included in intellectual humility, as well as other virtues such as displaying courage (defy and defend) and respecting each other at all times. This is an example (of several) places where we can argue that intellectual virtue (and intellectual humility in particular) is a precondition for successful argumentation interventions that helps us better understand how the design of these cognitive habits (how to cultivate them) could be developed and internalized throughout educational interventions.

Second, epiSTEMe, a successful project founded in England (Ruthven, et al., 2011) that designs classroom activities for promoting learning in physical science and mathematics. This project has impacted many researchers' projects both within and outside the country where it was developed (Ruthven et al., 2017). The intervention is based on changing the discursive setting in STEM classrooms so that students engage more critically with the subject-matter and with each other. The epiSTEMe model is based on many ideas, such as the exploratory talk method mentioned above, but also on whole-class discussion studies, and particularly in effective teaching practices studies. Ruthven and colleagues propose a three-phase intervention: exploration, codification, and consolidation. The first, exploration, is aimed at fostering the inquiry and examination of different perspectives regarding how to understand (and solve) a task in discussion. The second, codification, refers to a more normative take on mathematical-scientific concepts that students must understand to solve a problem. The third, consolidation, refers to a step where students become more autonomous while engaging with the related learning task.

These authors (Ruthven, et al., 2011; 2017) often emphasize that each phase requires teachers to play a different role, and that their ability to do so is central for the project to be productive. At first, teachers are working to foster imagination, perspective taking, and the understanding of a given problem. In this sense, we argue that teachers are instructed to guide students to engage with each other (and with the subject-matter) with open-mindedness as well as intellectual curiosity and inquisitiveness in a productive way. We assume that this means regulating the deficits and excess of each intellectual virtue while the exploration phase is happening. For example, preventing students from passively accepting every idea (excess of open-mindedness) or encouraging them to look at the subject matter in new, but not redundant ways, rather than giving up early or dragging on unnecessarily long (finding the mean of curiosity). In the second stage, codification, teachers are asked to guide students to the correct concepts in physics and mathematics. We could identify this as truth-seeking and, importantly, true understanding of a subject-matter before proceeding to problem-solving. In the third phase, consolidation, teachers are asked to give space for students to more independently engage with the task at hand, in this case, providing space for intellectual autonomy (thinking for oneself). To us, these are all pre-conditions (not consequences) of the intervention, and it seems that teachers are being instructed to guide students (and themselves) in between excesses and deficits in each step of the intervention.

Last, and perhaps most directly argumentative, is the classroom adaptation of the Critical Debate Model (Fuentes, 2011) created by Selma Leitão (Leitão, De Chiaro & Ortiz, 2016). Although the previous examples were discourse and dialogue-based interventions, both focused on individual student gains. We thus also wanted to present the case of an intervention where collective organization (and collective gains), such as teamwork, strategic thinking, and competitive discourse (something rather disputed in the learning sciences community), were central to it. The original version of the Critical Debate Model refers to the pragma-dialectically inspired inter-school debate tournament held in Chile. The inter-school debate version already attempted to address issues now considered vices of argumentation, such as an unwillingness to listen to others and an unwillingness to change one's own mind, both common in traditional debate models such as the parliamentary model used in tournaments (Fuentes, 2011). In the critical debate model, the pragma-dialectical phases of a critical discussion were proposed as a method to regulate each step of the debate, allowing for teams to change their minds in light of new evidence, and to respect each step of the discussion as part of a procedure of good thinking. In Leitão's version for

classrooms, she centers the role of in-group and out-group argumentation as key to fostering the skills of appreciating the limits of one's own knowledge, providing strong arguments for both sides in a discussion, and intensively experiencing perspective taking throughout a semester (all central to intellectual humility). We argue that these changes refer to changes in the disposition to engage in argumentative interaction, not just changes in argument construction (identification, production, and evaluation). Most of the results so far point to the fact that students show a greater "willingness to see the other side" and "willingness to revise one's own opinion" than change or construct more complex argumentation schemes (Ramírez, Souza & Leitão, 2013; de Macedo, Ramírez & Leitão, 2019). In this sense, we think both interventions regulate the levels of engagement with content and with other points of view, making students more willing to concede a group-position, revise their strategies based on group agreements (not always on argument quality), and develop a "love to argue" kind of feeling. Although this last possibility has not been scientifically investigated, it is a common refrain that those who work with this model hear as feedback.

We thus think the aforementioned interventions help make the case that designed virtue-like behavior leads to productive argumentation because it scaffolds students to the correct disposition for engaging in collective reasoning. These interventions all share idea that through changes in students' discourse we can promote the development of thinking skills and content learning because of a special properties argumentation has, such as, metacognitive engagement (Kuhn 2022), knowledge revision (De Chiaro & Leitão, 2005), and the necessity for producing rebuttals (Leitão, 2000). In our view, and in concordance with current literature, not all argumentation can promote these types of gains, especially because the argumentation is not being properly designed and mediated in classroom contexts (Andriessen & Schwarz, 2009). Most research points to the fact that deliberative (rather than competitive) argumentation is more productive for the classroom (Felton et al., 2022) because it establishes common goals, requires participation from the most diverse array of people possible, and consensus-seeking — even if suboptimal— provides a good frame for deciding a possible solution (if the best solution is not feasible). Again, but only when properly designed and mediated and when these conditions are met, we propose teachers use the lens of intellectual virtues to become informed of some of the central traits and dispositions required for productive argumentation. This is something already beginning to rise in goal achievement in argumentation (Asterhan, 2018) and intellectual humility (Godfrey & Erduran, 2021) research.

4.1 Argumentation pedagogies as a step towards human flourishing

So far, argumentation-driven pedagogies have centered their research agendas and interventions on changing the discursive settings of classrooms without paying much attention to students' dispositions for productive argumentation. Consequently, it seems that classroom practices and curriculum materials have been too focused on content and skill development at the expense of investigating children as developing virtuous epistemic subjects (especially considering them as epistemic subjects outside the classroom context). Without explicitly addressing the formation of virtuous habits, argumentation in education interventions will remain stagnant on specific curricular content learning or specific classroom interactions. Moreover, teacher training should be addressing how to help students understand and think about the role of their dispositions in their learning trajectories. Although the three classroom experiences discussed above stimulate different types of virtuous-like behavior, they all aim at creating an environment for the revision of one's own opinion, listening to others' points of view, and changing their mind in light of good evidence or reasoning. On our reading, this means that intellectual humility plays a central role in making these classroom experiences productive for learning conceptual knowledge, and developing thinking and communication skills.

As Joshi (2016) argues, argumentation pedagogies have the chance to model values for the next generations. In this sense, argumentation settings can provide students with truth-seeking methods, democratic values of collective problem solving, and demonstrations regarding how students can live among a diversity of opinions. However, the research agenda on argumentative-driven education has yet to reach it.

5. Conclusion

Recognizing the limits of self-knowledge (and of one's social group's knowledge), understanding the same problem from multiple sides, and integrating knowledge that comes in different forms are widely accepted as intellectual virtues (Baehr, 2013). In addition, Rorty (1996) claims that the application of these principles to deliberative contexts should be called dialogic virtue, in that it does not refer to the individual principle of personal

cultivation, but to the cultivation of a social practice that promotes a collective social good only possible through virtuous encounters in dialogue. In this paper, it is crucial to highlight that our work is fundamentally a theoretical exploration. We concentrate on presenting a hypothesis concerning potential confounding variables, with an emphasis on virtue-like behavior instantiated in argumentation and dialogue-driven classroom setting. Though we've taken steps to address and discuss the limitations of our paper, we acknowledge the necessity of more extensive empirical investigation. A deeper understanding of individual and group-level dispositions towards argumentation is essential. It is our belief that such investigations could pave the way for a more effective promotion of epistemic goods within classroom settings.

Incorporating intellectual virtues is an important way of approaching argumentation. The social cultivation of these cognitive and interactional habits promote the search for truth and better knowledge construction, among other goals. Cohen (2007) says that "there is more to our cognitive lives than knowing" (p.4), and this is also true for our educational system. There is more to education than knowledge accumulation. Employing the intellectual virtues framework might help educators go beyond focusing on what is learned through argumentation (and how much) and to a better understanding of the types of arguers we are helping to flourish in our classrooms.

As we have argued, intellectual virtues, and especially intellectual humility, play a central role in enabling the appropriate dispositions toward "productive argumentation" in the sense that they/it guides students to engage with each other by having them give their best justification for a position, but also to being open to revising and changing their point of view in light of strong challenges, with an emphasis on conceding when overpowering reasons are present, but nothing more or less. As Baumtrog (2016) argues, it is to enable the willingness to be rationally persuaded.

If we can think of argumentation interventions in these terms, this could lead to a renewal in educational studies where intellectual virtues are taught as a pre-condition for the development of argumentation skills in general. Democratic citizenship in the 21st century may well depend on using school spaces to cultivate the habit of deliberation as a decision-making process that is transferred to participation in social and civic life (Mendelberg, 2002). Bringing intellectual virtues to the forefront of the discussion is important because it provides a way to initiate new generations into argumentation and deliberation more seriously (Somin, 2010) and effectively. It should therefore be considered an important educational objective, but it requires effort and depends on certain conditions for its achievement.

Keypoints

- Classroom argumentation is a growing alternative for promoting conceptual learning, thinking, and communicative skills.
- Not all argumentation in the classroom is productive and depends on the design of the argumentation.
- Virtuous-like behavior is an enabling condition for productive argumentation in the classroom.
- An intellectual virtues framework is employed to advance our understanding of how to design classrooms for productive argumentation.
- Incorporating the concept of intellectual virtues offers fresh perspectives on the field of productive classroom discourse.

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