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What should schools do to promote wonder?

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ABSTRACT
Wonder-full education recognises experiences of wonder as lying at the heart of learning and education. If we accept the premise that wonder is important for/in education, what should characterise wonder-full education? This paper clarifies what it is like to wonder, how the aims of wonder-full education are best described, and it discusses three dimensions of wonder-full education: the educators, the curriculum, and the ethos of the classroom and school. It is argued that the success of a wonder-full curriculum hinges on the capacities of the teacher, both her pedagogical tact and her ability to wonder herself.

KEYWORDS
Wonder; wonder-full education; perspective development; pedagogical tact

Introduction

At the university where we teach bachelor students in Educational Sciences, we often notice in class that the students try to guess the 'right' answer, instead of really engaging with the subject and thinking for themselves. Students in our classes seem to have 'learned to learn' in a specific way, a way that foregrounds giving 'right' answers, and does not prioritise a way of thinking and engaging with knowledge that aims to question the existing frameworks, uses imagination to think of possible alternative answers, and encourages to doubt whether one really knows what one thinks one knows, and to realise that there is so much one does not and cannot know. The latter is what we regard as an ideal way of engaging with (new) knowledge, as well as, for example, Burgh and Thornton (2016, p. 166) who write that 'genuine doubt' is the proper starting point for all inquiry (thereby citing Peirce, 1899, p. 48).

That characteristics of the educational system common in Western Europe (as well as many other 'developed' countries in the world) might be part of the explanation for students' focus on 'right' answers, and that this system discourages doubt, wonder, and the use of the imagination, has been noted by several authors. Trotman (2014, p. 31), for instance, has observed the deleterious consequences of international comparisons (as in PISA): 'those aspects of the curriculum that are least amenable to routine testing, by default, come to occupy the least privileged positions in the curriculum. Despite some cursory gestures towards "awe and wonder" (Ofsted, 2004) and aspects of creative and affective development, ministerial interest in primary school performance rests squarely on test scores of pupil literacy and numeracy'. 'Performance' and 'accountability' are key terms in all levels of education in the neoliberal paradigm, a paradigm which is

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inhospitable to the interruptions of wonder and doubt and the unpredictability they would bring to education (D'Agnese, 2020). The focus on performance indicators such as test scores or how fast students complete their studies puts pressure on the activity of studying, leaving little time to wonder, or to stop and think. There is too much at stake, there is no time to lose. At a systemic level (though fortunately not equally in every school, let alone every classroom) Western education – not being separable from the capitalist societies in which it takes place – is currently governed by the logic of accumulation (*acquiring* more and more knowledge and skills), rather than transformation.

Some contemporary philosophers of education and educational researchers (Yannis Hadzigeorgiou, Kieran Egan, Anders Schinkel, among others) specifically draw attention to the importance of stimulating experiences of 'wonder' in education, and the importance of the capacity to wonder *for* education. Wonder can be understood as a mode of consciousness in which we experience what we perceive or are contemplating as strange, beyond our powers of comprehension, yet worthy of our attention for its own sake (Schinkel, 2018, p. 34). 'Yet the experience of a sense of wonder cannot be reduced to the experience of any one of the aforementioned elements' (adds Hadzigeorgiou, 2014, p. 44).

Hadzigeorgiou writes that the value of wonder has been defended, 'of course', 'by philosophers and scientists alike', although its attention for it in education 'has been totally overlooked' (Hadzigeorgiou, 2016, pp. 143–144). It is our intuition that arguing for the importance of wonder in education is (partly) being done to offer counterpoise to the educational culture sketched above. We agree with Hadzigeorgiou (2016, p. 144) who argues that one of the reasons why wonder has not received the attention it deserves is because 'it is not only difficult for both pupils and science teachers to completely abandon empiricist and logical positivist philosophies of science (…), but also because one can adopt a constructivist approach to the teaching and learning of science without even bothering about the issue of wonder' (see also Hadzigeorgiou, 2005).[1] Although Hadzigeorgiou's focus is on science education, we think that this is a broader point applicable to all education, because a conception of education as best based on scientific evidence of 'what works' ('evidence-based' education), which reflects a positivist conception of science, appears to be gaining dominance.

The central purpose of this paper is to take this one step further and explore what, if we accept the premise that wonder is important for/in education, schools can and should do to promote wonder, and why.

To be able to answer this question we will first give a concise conceptualisation of the concept of wonder, with particular attention to its connections to education, and provide a short summary of the arguments given elsewhere as to why wonder is important in education. Second, we will clarify how the aims of education that values wonder can be best described, and in what sense such education would stimulate what our students seem so unused to. Then, thirdly, we can explore what schools can and should do to promote wonder. We will distinguish between three dimensions of education, (a) the educators; (b) the curriculum; and (c) the overarching norms and values (ethos) of the classroom, to discuss what their particular roles are with regard to promoting wonder.

This paper can only aim to offer a broad outline of the role of schools with regard to wonder. The paper aims to be practice-oriented but does not provide a detailed

description. Such an endeavour lies outside the scope of this article, and should be undertaken in particular schools, with consideration for their particular principles and challenges.

A concise conceptualisation of wonder in relation to education[2]

As virtually all authors on wonder have recognised, we can distinguish between 'wonder at' and 'wonder(ing) about', 'passive' and 'active' wonder, 'deep' or 'contemplative' wonder and 'inquisitive' wonder (see, for instance, Parsons, 1969, p. 88; Hove, 1996, pp. 442–443; Goodwin, 2001; Sinclair & Watson, 2001; Profitt, 1998, p. 105; Hadzigeorgiou, 2014, p. 45; Zazkis & Zazkis, 2014, p. 67; Schinkel, 2017, 2020). Whereas 'wonder at' is the type of wonder we are 'struck' by and that leaves us lost for words, 'wonder about' is inquisitive, explanation-seeking, and in that sense closer to curiosity (though still distinct from it; see Opdal, 2001; Hadzigeorgiou, 2014; Schinkel, 2017 and 2020 for discussions of the distinction). It would be hasty to place too much emphasis on this distinction, however (Schinkel, 2020, also warns against its reification), and we must especially take care not to identify 'wonder about' with the everyday sense of wondering as in 'I wonder what's for dinner'. As Hove (1996, p. 443) notes, 'wonder' and 'wondering' can be intimately connected. And when we conceive of wonder(ing) as the opposite of seeking the right answer and asking no further questions in this article (or as the opposite of 'thoughtlessness'; see Di Paolantonio, 2019) we are thinking of the type of wondering (about) that is intimately connected with wonder (at). Therefore, unless otherwise indicated, we use the term 'wonder' to cover both inquisitive and contemplative wonder. They are variants of the aforementioned mode of consciousness.

Prinz distinguishes three dimensions of wonder: (i) a cognitive dimension, which refers to being in a state of 'not-(yet)-knowing', and includes feelings of curiosity but also confusion; (ii) a sensory dimension, which refers to the agent's full (both with mind and body) attention to the object of wonder; and (iii) a spiritual dimension, which refers to the mystical and, for example, to the emotions of awe and amazement (Gess, 2019, p. 24).[3] This is in line with Schinkel who argues that wonder 'engages us on all levels – emotionally, intellectually, aesthetically, and strongly existentially' (Schinkel, 2017, p. 552).

For Prinz, who studies wonder in relation to art/aesthetics, the definition of good art is that it addresses these three dimensions, and, most importantly, that it is able to evoke these dimensions durably or in any case time and again (i.e. that it is not a single moment of shock or surprise) (see Gess, 2019, p. 25). This aspect of durability is also an important element of wonder, and it distinguishes wonder from, for example, sensation (see Gess, 2019, p. 25) or curiosity alone (see for example, Opdal, 2001, p. 342). If someone is curious about how rainbows can appear in the sky, for example, when a correct explanation is given, her curiosity is satisfied and 'gone'. Wonder about and wonder at a rainbow on the other hand, or the power of waves, or the ingenuity of your new iPhone, for that matter, can arise time and again, irrespective of known facts such as the cause-and-effect of the refraction of light by water. Wonder *at* is struck by the mystery or beauty of its object; wonder *about* the rainbow, also receptive to such qualities, is not satisfied with the explanations at hand, seeking as it does a deeper understanding, beyond the current framework of understanding.

Likewise, if we experience something sensational, as in a thrill, this is some kind of shock-effect, which wears off once we are used to the image or discover the trick that has caused the effect. But, as Gess points out by giving the example of special effects in a film, wonder *can* also consist of the seemingly paradoxical combination of being aware of the science or technology behind the experience, and at the same time being fully immersed in the experience that is evoked by this technology (2019, p. 15). People 'forget' everything once immersed in an experience of wonder, yet at some level, we remain reflexively aware at the same time of what causes this experience, and moreover, this form of 'knowing' actually contributes to our sense of wonder (as opposed to resolving it, as is the case with sensation or curiosity only) (see Gess, 2019, chapter 1).

Wonder and emotions

Conceptualisations differ concerning to what extent 'wonder' is taken to be an emotion in itself, but most authors agree that it is an experience which engages us emotionally (e.g. Egan et al., 2014; Hadzigeorgiou, 2014; Hepburn, 1980; Hove, 1996; Piersol, 2014; Schinkel, 2017; Vasalou, 2015). As we can also see in Prinz' three dimensions, emotions that are connected to experiencing wonder are, amongst others, puzzlement, curiosity, surprise, amazement, awe, perplexity, excitement, but also confusion, alienation, and even fear. And as Gess writes, emphasising emotions relating to the cognitive dimension of wonder, wonder is best considered 'a spectrum ranging from fascination to radical doubt' (2019, p. 29). That the involved emotions can be both positive and negative is connected to the centrality of puzzlement in wonder: the wonderer cannot (immediately) get her head around the experience (e.g. Moore, 2006). One can, for example, wonder about the existence of stars and end up being completely struck by the fact that the world exists in the way that it exists, or that it exists at all (e.g. Hepburn, 1980; but see also Egan, 1992, who contends that 'awe' is a more appropriate term for the latter experience). Note that puzzlement of some kind – thus an epistemic element – is central to *all* experiences of wonder, whether inquisitive or contemplative. Part of the experience of wonder is the sense of an unanswered question – even if it is an *unanswerable* question (Schinkel, 2017, pp. 546–547).

Wonder in young children vs. wonder in adults

Experiencing wonder is often compared to looking at the world like a child (e.g. Vasalou, 2015, p. 24; Piersol, 2014, p. 10). Naturally, because for young children many things are new, and thus not (yet) familiar, they are much less bothered by preconceptions and existing expectations about how the world works and the place of things in it. Therefore, it seems an accurate comparison. However, to compare wonder with a young child's lookout to the world does not necessarily imply that children in fact experience wonder (all the time). Opdal argues on the basis of examples of what kinds of questions children ask and how they 'philosophize' about possible answers that it is clear that children 'not only experience wonder, but (…) are able to question the frames behind, and sometimes even figure out other and better solutions, i.e. that they function as philosophers' (2001, p. 334). We are however inclined to argue, even though we too know many philosopher-children, that for young children, because they do not *explicate* (i.e. are aware of)

experiences of wonder in the same way older children and adults do, in the end, all we do is describe what these children do as wonder. And this is tricky, because the fact that wonder (in adults) looks similar to children's 'natural' perception of, or way of being in, the world, does not establish that children experience wonder, and/or that they experience wonder in the same way as adults.

The distinctive element is what Schinkel calls a 'self-reflexive' aspect' of wonder, that 'belongs to the quality of the experience' (2020, p. 23; and see also; Hepburn, 1980; Nussbaum, 2001), and that we have described above with Gess' example of special-effects in film. There is a certain awareness (for example, in the form of the feeling of looking at oneself from a distance) of the 'I' as an observer of something unexpected, be it that this doesn't necessarily have to lead to explicitly thinking – in that moment – that 'I' am wondering about or at something. We suggest that the development of a mature or adult form of wonder can be determined by the presence of a reflexive element. But, this does not mean that primary education cannot stimulate the natural, unconscious child-like wonder with a view to developing (reflexive) wonder.

Why wonder is important in and for education

As said we can distinguish between deep or *contemplative* wonder (wonder *at*) and inquisitive wonder (wonder*ing about*). Inquisitive wonder seems 'naturally allied' to education, in the sense that it denotes an 'eagerness to inquire, a desire to understand, and also (…) a willingness to suspend judgment and bracket existing – potentially limiting – ways of thinking, seeing, and categorizing' (Schinkel, 2017, p. 539). For contemplative wonder, the connection is not so direct, but that does not mean that it isn't there. Schinkel argues that contemplative wonder has particular educational importance, and therefore should have a place in education. What making the distinction between inquisitive and contemplative wonder helps us to see is that wonder is not just educationally important as a motivation to learn (however important that is), but that wonder (of both kinds) is important for education also because (a) wonder is part and parcel of learning to understand the difference between 'what you don't know, what you only think you know, and what you (as a human being) cannot know or understand'; (b) the previous can lead to a more refined not-knowing with regard to those things we cannot know or understand; (c) wonder keeps our interest in the world alive (or revives it) (2017, p. 550); and above that (d) wonder makes us aware of the contingency of the existing ways to understand or do things, stimulates our imagination and helps us to see alternative possibilities (Hepburn, 1980; Hove, 1996; Lloyd, 2018; Schinkel, 2020).

The first two aspects, i.e. the students' (or human beings') relation to not-knowing, have our special interest here. Opdal argues that whereas curiosity can be 'seen as a motive to do exploration within definite and generally accepted frames', when a person is wondering 'doubt about the frames is the underlying factor' (2001, p. 331). Therefore, wonder is capable of bringing us to the limits of our (present) knowledge or understanding (Opdal, 2001, p. 332, and see also Quinn, 2002, p. 28). Assumed that we think the latter is (also, or even, more) desirable: if we once more take the situation sketched in the introduction as an example, we think that pupils currently often learn the capacities to guess the right answers and to learn the right stuff for the tests (hence, stay within the accepted frames), whereas what we want them to develop is a certain stance

towards (acquiring) knowledge (as part of what schools are for) that is embodied by the capacity for 'genuine doubt' and, in relation to that, 'intellectual humility' (see for an analysis of the concept of humility for example, Waks, 2018).

We will explain what we mean by genuine doubt and intellectual humility as good capacities, or virtues, by looking at Kyra Ebels-Duggan's (2015) conception of autonomy as an intellectual virtue. Ebels-Duggan starts her interpretation of autonomy by disagreeing with the standard interpretation of autonomy as merely developing critical thinking – the holy grail in/of higher education. Because, as she observes, this often leads to the development of two 'vices'; namely, i) a certain 'overconfidence in critical stance' with which she means that students are only focused, for example, when reading (academic) texts, on discovering what is wrong with it; which is often accompanied by ii) a 'professed lack of positive convictions about normative matters', meaning that these students are not critical because of their strong normative beliefs in other ways, but typically without having such (strong) convictions at all (2015, p. 28).

Opposing this traditional view of over-criticalness as the main characteristic of autonomy, Ebels-Duggan argues that autonomy as an intellectual virtue ought better be understood as consisting of two important virtues: charity and humility. Charity, according to her, refers to the capacity to approach new texts and ideas (and people for that matter) from the assumption that there is something true and worthwhile to be found there (2015, p. 82), i.e. the reader takes a friendly, open, charitable, approach. We suggest that this is particularly the approach of a person who is acquainted with the idea that she does not know everything, and is able to be surprised and amazed to find something interestingly new, and is also acquainted with the possible feelings of confusion and (short-lived) insecurity that can come along with finding the worthwhile in something new. And as said, wonder contributes to refining our sense of not-knowing.

Humility, then, refers to the capacity to recognise 'the genuine difficulty of serious intellectual tasks' (2015, p. 82). In relation to wonder, humility also corresponds to the realisation of not-knowing, of not really (as in completely) understanding why the world is the way it is, and therefore responding from an appropriate stance of intellectual humility (as opposed to hubris).

Inquisitive and contemplative wonder both have a role to play here. The capacity to be struck by the mystery of a phenomenon is an important antidote to the overconfidence of which Ebels-Duggan speaks, and at the same time fills us with a sense that what we are dealing with is at the very least worth paying careful attention to – and often judged to be important and valuable – and thereby urges us to take a stand, to commit to something. If we are moved to examine the object of our wonder (as well as our own convictions), inquisitive wonder helps us approach the object with care and respect (in a thoughtful rather than 'thoughtless' manner), and we remain receptive to what it tells us, how it may correct our views, how it may be different from what we thought.

Wonder and imagination

These aspects of wonder can be connected to how Egan describes the capacity of *imagination*, which to him 'is a way [of thinking] that crucially involves our capacity to think of the possible rather than just the actual' (1992, p. 4). In a very basic sense, this is exactly what we would like to see our students do. Being able to be open to the idea that

there might be 'more than meets the eye' when it comes to other people, and/or other people's texts and theories, is a necessary part of being able to be charitable and humble. Because as Ebels-Duggan argued, one cannot be open to new things (texts, theories in her case) without being able to imagine what their possibilities might be. As Egan also notes, imagination and wonder are deeply connected. Egan (1992) considers imagination to be central to education, which follows the same line as we do in emphasising the role of wonder in developing students' capacity to become autonomous (in Ebels-Duggan's sense) thinkers. Also, 'Warnock holds that we must recognize the "universality of imagination" as a function, i.e. that imagination is exercised by everyone; a part of everyone's experience and should be educated' (Pedersen, 2015, p. 114; 2019). Imagination should especially be educated because, as Warnock writes, it does not only shape people intellectually but also shape their feelings (1976, p. 78). Pedersen argues that wonder, like imagination, is universal and can also be educated, and that it is thinkable that educating the imagination 'will help transform childish wonder into philosophical reflection' (2015, p. 114).

The rest of the paper is dedicated to how schools, through wonder, should do this.

What is it that wonder-full education should aim at?

We spoke about 'childish' wonder and a developed sense of 'reflexive' wonder. Both should be seen as aims of wonder-full (primary) education. First, it is important to preserve the child's 'natural and necessary' experiences of and with new things (Hove, 1996, p. 445; see also Egan et al., 2014, p. i). By 'natural and necessary' experiences Hove refers to the child's personal experiences with new things; they are natural because the child inevitably encounters new things when growing up, and they are necessary because they are what the child needs in order to develop. This can be considered the first 'phase' of wonder-full education, and it is here that wonder and imagination are especially intertwined.

Second, education should contribute to developing a reflexive sense of wonder. It can do this by *stimulating* wonder, i.e. try to make experiences of wonder in schools – or during a child's school years – occur more frequently, in other words, to strive for a quantitative 'improvement', but also by *enhancing* and *developing* wonder, terms that rather point to improving the quality of the experience; and, moreover, to improving the educational value of the effects of the experience: how, for example, an educator can use the experience of wonder in her education, as well as how the student can learn from her experiences of wonder. '*Cultivation*' refers to a third distinguishable possibility. It has both a qualitative and a quantitative aspect, in the sense that it points to both improving the quality of experiences and the quantity through habituation: making wonder into a disposition, developing the ability to wonder.

Third, by *using* wonder as an 'educational tool', according to Piersol, two valuable senses or dispositions can be triggered: a sense of mystery, and a sense of humility (2014, p. 12). These dispositions contribute to the development of perspective (see Opdal, 2001, p. 332). Perspective development can be considered an overarching or ultimate aim of wonder-full education. '[E]ducation should not be seen as 'the installing or maintaining of a fixed structure, but as the development of a perspective that increasingly becomes more adequate' (2001, p. 332). In this sense, the ultimate aim of wonder-full education is not only to stimulate experiences of wonder, but also to guide students to further develop

them in the sense of cultivating in students an ability to use their experiences to develop their perspective on the world. In other words, to develop a sense of genuine doubt and intellectual humility, or in Ebels-Duggan's words, to develop the virtue of autonomy, as discussed above. Of course, this does not yet say anything about how education should do that, which we will explore in the next section.

Fourth, Hadzigeorgiou argues that wonder also can play a role in students' motivation. Current research and policy seems to be focussing on stimulating motivation in students, regardless of the *object* of study (e.g. Liu et al., 2016). But because wonder 'responds to the pull of the object' it can help to encourage involvement in *what* one is learning in school, in addition to (merely) stimulating an interest in learning as a learning activity (Hadzigeorgiou, 2014, pp. 52–53; and see Nussbaum, 2001). If students experience wonder at or about the things that are offered to them in school, this might contribute to their motivation to 'get to the heart of it', and this might work better than investing in showing students why learning is important.

How should wonder-full education aim at stimulating and cultivating wonder?

Wonder-full education creates certain conditions and circumstances in which experiences of wonder can thrive. As explained above, a sense of wonder can be evoked by almost anything, which means that in this section we do not so much seek to spell out a 'wonder-full curriculum', but rather seek to provide guidelines, give suggestions, with which a school, on all its levels, can establish a 'wonder-full pedagogy' which provides fertile soil for children's sense of wonder to flourish.[4]

(a) Necessary and desirable characteristics of teachers

It is self-evident that teachers must play a large part in a wonder-full pedagogy. We think that it is *necessary* for teachers to recognise and facilitate experiences of wonder of the child and *desirable* if they are able and willing to wonder themselves, about and at the children they teach, and about and at the content of their curriculum.

If the teacher does not recognise the wonder experiences of the child, it is difficult to contribute to creating conditions in which wonder can thrive. Van Manen describes the idea of 'pedagogical tact', which is a kind of 'active pedagogical thoughtfulness' (2015, p. 78). We will argue here that pedagogical tact is shown when recognising and facilitating children's experiences of wonder. Pedagogical tact is important for all educational situations, but we argue here that it is especially significant with regard to a wonder-full pedagogy. Pedagogical tact:

(1) Manifests itself in everyday life as an instant action;
(2) Forms a way of acting that is first of all dependent on an intuitive sensibility and sensitivity (…);
(3) Is sensitive to the uniqueness of the child (…);
(4) Is sensitive to the particularities and context of the situation; and
(5) Is unique also to the personal character of the [educator] (Van Manen, 2015, pp. 78–79).

To be pedagogically tactful is to do what is right for the child, and to do so 'by exercising a certain perceptive sensitivity as well as practising an active, expressive, and caring concern for the child' (Van Manen, 2015, p. 79).

Piersol writes that we need to 'help our students realise that their knowledge is only a drop in the sea of the unknown. In doing so we need to continue to (. . .) [combine] such wonder with courage, otherwise students could end up feeling defeated by how little they can and do actually know' (2014, p. 12). To be able to support this process and not let the student drown in the 'sea of the unknown' Piersol suggests to deploy wonder (and not just wonder about, but also wonder at – wonder as a response to and recognition of mystery; see Piersol, 2014, pp. 12–13) as an educational tool to keep the student on the good side of a sense of humility towards knowledge. Here, it is not enough to merely 'allow' wonder to be experienced in class on a subconscious level: the teacher has to recognise the experience in order to be able to guide it appropriately. 'Pedagogical tact' is an appropriate term to describe the teachers' ability to do that. In his description of pedagogical tact, Van Manen asks of the educator to look at the child in an open, humble and charitable manner. In effect, this amounts to a kind of wonder *at* children – these remarkable new, developing human beings (who knows what and who they will become?) – a point to which we return below. This patient, receptive stance allows educators to pick up on children's wonder at or about things, to follow them in it, and to fan its flames. Therefore, we think that pedagogical tact is an appropriate description of the necessary characteristics of teachers within a wonder-full pedagogy, or at least it is an important part of how teachers should engage with wonder (see also Van Perlo & Wolbert, 2020).

There are two more reasons why it is also *desirable* for stimulating wonder in children that the educator is capable of wonder herself. First, an experience of wonder can 'expose our vulnerability'; it can create an awareness of vulnerability as a fundamental feature of human experience (Hove, 1996, p. 437). Wolbert et al. (2018) argue that educators engage in an existential risk when educating a child, because proper education requires putting oneself on the line. The vulnerability this creates is inherent in education. I suggest it is an important benefit of wonder that it reminds educators of the vulnerability of both being human and being an educator. To make this more specific with regard to teachers: because wonder heightens a sense of (fundamental) not-knowing, the teacher must be able to 'admit' that she also does not know everything (Piersol, 2014, p. 12). This might be a very hard thing for teachers to do, especially because students often expect teachers to have the right answers, at all times and to all questions. If the teacher can create an environment in which doubt and vulnerability are present, by being vulnerable and humble herself, she can create an environment in which experiences of wonder are stimulated.

Second, as Schinkel (2018) argued, wonder is important to understand and appreciate the 'otherness' of the other, by which he means the fact that we can never presume to completely 'know' another person – she will always elude our grasp. With regard to the teacher–pupil relationship it is just as important, if not more important, that the teacher is able to understand and appreciate the otherness of the pupil. To wonder at the child – which is a deeper experience than, for example, mere curiosity about how they 'function', or perceiving the child as an empty barrel to be filled with knowledge, or not being interested in the particular child at all – offers a possibility for real engagement, because

'wonder reveals things [and people] in a new light and tends to promote mindful and gentle regard for their inherent worth' (Hove, 1996, p. 437). We think that if educators wonder at and about the child, this opens up an opportunity to really see the child and connect with it.

(b) Wonder-full pedagogical tools

When examples of wonder in education are given, they usually take place outside of the regular curriculum, or literally outside of the classroom. Dave Trotman gives several examples of such experiences from his own school, among others a field trip and a Christmas celebration at school (2014). This makes sense, because many experiences of wonder are related to the unexpected, which is more likely to occur when you are actually doing something unexpected or out of the ordinary. Or, at least, when thinking of wonder-full experiences, unexpected events are more often referred to in the literature, although an important role of wonder in education, as discussed above, is to learn to see the wonder in the 'normal', which leads to questioning the 'normal' frameworks. Also, suggesting that a wonder-full curriculum should be an ongoing surprise is practically untenable. Moreover, unending surprise and spontaneity would probably fail to achieve its object, first because to distinguish the 'unexpected' one needs a certain amount of expectedness or stable factors to set against the extra-ordinary, and second because an overload of unexpectedness is likely to paralyse the student rather than activate her (drowning in the sea of the unknown). Besides that, surprise and spontaneity are not enough – in itself – to constitute wonder.

However, this does not mean that a wonder-full curriculum is an oxymoron. It is possible, as we will show here, to extract those distinctive elements out of the out-of-the-ordinary examples which are likely to contribute to evoking and stimulating wonder. On the basis of these paradigmatic examples, we then will provide four suggestions for wonder-full pedagogical tools (see also Hadzigeorgiou, 2016).

(I) ***Exploration***. In the field-trip example, the children wondered about and at things they encountered in the woods, for example, a spider that created an ingenious web, or a plant that had circled around a tree. These are objects or events that evoke awe (how magnificent that a spider can do that) and an inquisitive attitude (how did the spider do that?!). It is possible to take these kinds of examples into the classroom. It is important, then, to pay attention to whether the example in question activates wonder, instead of just curiosity, or just awe. It is important that the examples offer something more than the effect of a novelty. In order to succeed, the teacher has to be sensitive to the students' experience and guide them from, for example, mere surprise to a deeper experience of wonder (see Trotman, 2014, p. 37). It is more likely that these experiences evoke inquisitive wonder (how did the spider do that?!) than contemplative wonder (standing still to puzzle about the magic of the world), but the latter is not unthinkable either.

(II) ***Improvisation***. Responding to children's exploration of such examples is only possible if the teacher has room for improvisation, i.e. to go along with the road the children take. Due to time limitations, teachers have little room to start these kinds of explorations. This is completely understandable, given the conditions

under which teachers work (such as big classes, high administration load, etc.). Plus, as it is not obvious that wondering will immediately 'pay off' in terms of improving test-scores, it might be difficult to build a case for the importance of improvisation for the stimulation of experiences of wonder. Nevertheless, room for improvisation is necessary if we want to give room to a wonder-full pedagogy. In other words, the need is not so much for designated space for wonder on the curriculum, but for space for improvisation. Or, as Piersol puts it: 'It is not so much adding wonder to the curriculum as it is a process of uncovering the wonder that exists there already' (2014, p. 17). This needs to have the support of the management and direction of a school, and it should 'go without saying' that it is valued that the teacher makes time to follow a process of wonder.

Likewise with the example, we opened this paper with: we need to have time in our classes to explore their questions with them. Otherwise, it is not only the students who want the 'right' answer, but also the teacher who has only time to provide her students with the 'right' answer.

(III) ***Imagination.*** In the above, we argued that imagination and wonder are closely connected (see for example, Egan, 2008; Hadzigeorgiou, 2016). Moreover, Trotman argues that imagination has a link to empathy as well: imagining what someone else experiences stimulates empathy. This provides an emotional connection of students to the school subjects (Trotman, 2014, p. 37). Imagination can also be connected to and used in creativity: making things that do not exist (yet). The tendency of schools in Western-Europe to diminish the room for creative subjects (such as handcrafting and music lessons) does not contribute to wonder-full education this sense.

(IV) ***Personal interest.*** Fourth and last, Trotman proposes that in order to promote wonder, children should have opportunities to pursue projects that interest them personally (2014, p. 38). This echoes the idea that wonder 'responds to the pull of the object' (Nussbaum, 2001, p. 10), in the sense that wonder involves an interest in the object, as opposed to an interest in oneself or the act of exploring in itself (Hadzigeorgiou, 2014, pp. 52–53). Hence, doing projects that are chosen by the students themselves should contribute to better circumstances for wonder to occur.

(c) The ethos of the classroom and school

The 'ethos' of the school is understood here as the whole of the underlying norms and values of a school. These norms and values are overtly found in the formal and the informal curriculum, but also form for an important part the 'hidden curriculum' of a school – 'the norms and values that are implicitly, but effectively, taught in schools and that are not usually talked about in teachers' statements of end or goals' (Apple, 1971, p. 27). These are covert norms and values, which nonetheless (can) play a large role in schools.

In the previous section, we said that it should 'go without saying' (quite literally) that sensitivity (and time) for wonder-full experiences has to be supported by the management. It should be one of the values of a school, part of the ethos of a school, including the covert part. When this is not so, and a school, for example, emphasises wonder in its

mission statement, but covertly teaches a student learning ethic that values compliance with the given 'right' answers, and values teachers who for example, do not 'dwell on unimportant stuff' (topics that are not tested in exams, for example), this is contradictory and therefore problematic.

When aiming for wonder-full education, a school should be permeated with the value of wonder in all three 'curricula' (see Brighouse, 2008). We have given suggestions as to how to evoke wonder in the formal and informal curriculum, but this needs to be supported by the ethos of the school, including the 'hidden' part. What kind of norms and values are desirable in wonder-full education?

Hadzigeorgiou argues that wonder as a 'pedagogical tool' should result in five kinds of 'awareness':

(1) Awareness that one's knowledge can be incomplete or mistaken;
(2) That there is more to be learned;
(3) That some phenomena exist at all;
(4) Awareness of unexpected connections between phenomena and ideas;
(5) Awareness of the beauty of natural phenomena (2014, p. 50).

These points can be read not just as 'effects' of wonder, but also as five kinds of awareness that express what it means to *value* wonder. The way we see it, these points can be perceived of as 'principles of conduct' in an environment of wonder-full education; regulative principles that express a certain attitude towards what knowledge is, and with what ethos children should be educated (overtly and covertly) about knowledge, about the world as we (do not) know it, or guidelines for a wonder-full pedagogy. They are in line with the proposed dispositions evoked by wonder suggested by Piersol (2014): a sense of mystery (awareness that some things exist at all and awareness of unexpected connections), and humility (awareness of human limitations with regard to knowledge). Also, these principles point to the important value of respect or awe for nature and natural phenomena (awareness of the beauty of natural phenomena). The only thing that we miss in this line-up is an 'awareness of the Otherness of the other' which is stimulated by deep or contemplative wonder (as discussed in Schinkel, 2017, 2018, 2020), although it is implied by principle number one. 'Awareness of the otherness of the other' reflects the important value (for any ethos of any school) of respect for other beings, grounded in an awareness that the other is always 'other' than we think, in the sense that we can never think that we know and understand the other *entirely* – the other forever eludes our grasp, can always surprise us, and remains a carrier of the mystery of existence. We propose to make that principle number 6.

Conclusion

There are good reasons to try to promote (pupils' *and* teachers') wonder in schools. This requires a hospitable environment, determined in part by the school ethos. If the principles outlined above are truly embraced by the whole school, and are especially internalised in the implicit but effectively taught values of the school, i.e. the hidden curriculum, teachers will have more room to address and cultivate the sense of wonder in children, and will be more likely to be successful in this. These guidelines can help schools

establish, on all levels, a 'wonder-full pedagogy'. It is our hope that the children who grow up in schools that have an ethos that values wonder are more inclined to still ask 'wonder questions' if they arrive at universities or other schools.[5] In the end, though, the success of a wonder-full pedagogy hinges on the capacities of the teacher, both her pedagogical tact and her ability to wonder herself. The ethos of the school offers crucial preconditions – it helps create a climate that is more or less hospitable to wonder – but no more than that. Pedagogical tools are what they are only in the hands of teachers. And in the end the curriculum comes to pupils through teachers. So if the teacher does not recognise opportunities for wonder as such, and does not function as a facilitator of wonder on behalf of the children (by being sensitive, by asking questions, by offering examples, etc.), there will be no wonder-full education. Every proposal in the above section (b) depends on the teacher who must guide her students into (and through) wonder-full experiences. Therefore, in our opinion, her tact is a necessary prerequisite for wonder-full education. The teacher's ability to wonder herself, at and about her students and the content of her education, will contribute to this pedagogical tactfulness and is therefore desirable for wonder-full education. This is by no means intended to downplay the importance of the conditions under which teachers have to work – conditions which often are far from ideal for the promotion of wonder – but should rather be taken as a stimulus for schools and teacher training institutions (see Gilbert, 2013; Gilbert & Byers, 2017) to recognise the crucial role of teachers, and thus to facilitate their wonder-full work by any means available.

Notes

1. By a 'constructivist approach' Hadzigeorgiou refers to constructing (new) knowledge by the student (i.e. learning) on the basis of existing knowledge, not by starting from a wondrous or mystical experience.
2. We are well aware, as an anonymous reviewer understandably pointed out, that wonder has a long and interesting history in philosophy, but a review of that history lies beyond the scope of this article; and to attempt a very short summary would be foolish, since it could not begin to do justice to its subject. See for the history of (thinking about) wonder Quinn (2002), and also Daston and Park (1998), Martens (2003), Vasalou (2015), and Lloyd (2018).
3. Gess refers, with the author's permission, to the unpublished manuscript of Prinz's forthcoming book *Works of wonder*.
4. With thanks to an anonymous reviewer who suggested to emphasise that wonder-full education does not so much need a new curriculum (since wonder can be in almost everything), but it does need a wonder-full pedagogy.
5. Please note that we have not (empirically) proven that a lack of wonder(-full education) is the most pressing reason why the students in my tutor groups are busy guessing the right answer.

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