Pre-print draft of Wegerif, R. (in press for 2018) A dialogic theory of teaching thinking. In Kerslake, L and Wegerif, R. (Eds.) The Theory of Teaching Thinking. Vol 1 in Li, L, Kaufman, J and Wegerif, R. (Eds) Research on Teaching Thinking and Creativity book series. Routledge.

A dialogic theory of teaching thinking

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Abstract

There is growing evidence that dialogic education is an effective way to teach the kind of general and transferable thinking skills and dispositions that have always been valued by the teaching thinking movement. However, dialogic theory implies an understanding of thinking, and, more specifically, of good thinking, that is distinctive. For dialogic theory, thinking is understood as an attribute of embodied dialogue. This means that thinking is not an abstract skill or set of skills separable from content knowledge and is not primarily something that is done by individuals but is in fact an effect of the 'dialogic space' that opens up when people or perspectives enter into dialogue. Learning to think can be understood as being drawn into dialogue and so teaching thinking is about drawing students into dialogue through invitations based upon relationships; drawing students into dialogue in classrooms through opening dialogic spaces, drawing children into the long term dialogues of culture through teaching these in a way that focuses as much or more upon questions than upon already achieved answers, changing the culture of schools and classrooms to make them more supportive of dialogue and, through Internet-mediated dialogue across difference, drawing students to participate in ongoing global dialogues as part of a long-term teaching thinking project to create a more intelligent planet.

Introduction

The growing recent movement for dialogic education overlaps with the project of teaching thinking. Philosophy for Children, for example (see Kerslake, this volume), is both an excellent example of dialogic education and also, according to evaluations, one of the most effective stand-alone approaches to teaching for general and transferable thinking skills[1].

[1] Using skills here in the sense of a socially valued performance (Bailin, 1987)

Dialogic education programmes that integrate thinking through dialogue within the curriculum such as Thinking Together and Alexander's approach of Dialogic Teaching are clearly intended to promote general thinking strategies, skills and dispositions as well as any other goals that they might have such as oracy skills and curriculum learning. Recent surveys of evaluation studies in the area have even suggested that dialogic education might be the most effective way of teaching for general thinking skills and dispositions (Clarke et al 2016, Resnick and Schantz, 2015). However, if we take the dialogic theory that lies behind dialogic education seriously, then this has important implications for how we understand what thinking is and therefore what teaching thinking means. Thinking, or, more specifically the kind of socially valued thinking that many teachers and researchers want to promote in education, looks rather different through a dialogic theory lens than the kind of general thinking skills and dispositions originally aimed at by the teaching thinking movement. The idea of a discrete cognitive skill, for example, now becomes an aspect of situated dialogues and intellectual dispositions are translated as aspects of relationships within cultures. In this chapter I will explore what dialogic theory has to say about what it means to teach for thinking, looking first at what it has to say about learning and teaching in general, then about what it has to say about thinking and learning to think. Finally, I draw these different strands together into a coherent dialogic theory of how we can teach for thinking by opening, widening, deepening and sustaining dialogic spaces and dialogic space.

What is a dialogue?

Imagine if we were to get two robots – or chatterbots – each programmed to respond to words and categories of words with pre-prepared utterances and we made them interact, the results might look externally like a dialogue but it would not actually be one. Some so-called dialogues in social life can be a bit like that. It is quite possible for people to falsely claim 'we are having a dialogue' when they are just talking at each other or talking past each other. Fortunately we know when social interaction is not real dialogue because we all know the experience of engaging in a real dialogue. Real dialogues happen when people listen to each other and learn from each other. Real dialogues tend to feel exciting and enjoyable. One way to characterise real dialogues, so as to distinguish them from mere external interaction of the robot kind, is to point out that in a real dialogue shared thinking occurs

such that it is not always possible to say who is thinking. One could say that in a real dialogue there is no longer just 'I am thinking' and 'you are thinking' but there is also the experience that 'we are thinking together'. But the idea of 'we' thinking might not be quite right, it might not even go far enough. The experience of dialogue, especially dialogue about a shared interest, can also be of a kind of thinking in general that takes hold of us both and carries us along further than we might have thought possible. Describing this experience Merleau-Ponty writes of a successful dialogue that:

> Life becomes ideas and the ideas return to life, each is caught up in the vortex in which he first committed only measured stakes, each is led on by what he said and the response he received, led on by his own thought of which he is no longer the sole thinker. (Merleau-Ponty 1968, 119; 1964, 159)

I find the concept of entanglement as this has been developed in quantum theory useful as a way of thinking about what happens to voices in dialogue. Entanglement, perhaps the key defining concept of quantum physics (SchrÖdinger, 1935) occurs when pairs or groups of particles interact in ways such that the quantum state of each particle cannot be described independently of the others, even when the particles are separated by a large distance but instead, a quantum state must be described for the system as a whole. In dialogues voices become entangled[2]. And not just human voices but also objects and domains of knowledge can become entangled within dialogues.

One way to understand the entanglement involved in dialogues is through the kind of circularity of reference that Rommetveit refers to, quoting Barwise and Perry, as 'attunement to the attunement of the other' (Rommetveit, 1992). In communications theory, Rommetveit points out, messages go one-way from a sender to a receiver, whereas in a dialogue the process is more circular. The 'other' is always already on the inside of every utterance. This is because each utterance responds to what the other has said in a way intended to relate to the other. This model of dialogic inter-subjectivity through mutual attunement needs to be extended to include apparently non-human voices, the voice of Mathematics for example. We know in education that an area of discourse like Mathematics

[2] This could just be a useful metaphor borrowed from another strand of science - or it might refer to a hypothesis about the nature of thought and of dialogues on the material level of analysis – time will tell.

can appear external and static or can enter inside a learner to become a living voice (Cobb and Hodge, 2010).

Every theorist who can be referred to as dialogic addresses the entanglement aspect of dialogue, but each do so in different ways. Bakhtin explicitly links dialogue to learning through his concept of the 'internally persuasive discourse' (Bakhtin, 1981, p376). Authoritative discourse, he writes, remains 'outside' us and remains static in meaning. You either accept it or reject it but you can't engage with it. In contrast the internally persuasive word or discourse is one that enters inside you as if it was one of our own words, it is 'half ours half someone else's' and so it is able to re-organise our words from within and also to engender new words and new ideas.

In a similar way Buber contrasts the objectifying 'I-it' attitude that turns the other into an object to the the 'i-thou' attitude that engages responsively with the subjectivity of the other. The 'I-thou' attitude leads to entanglement which Buber characterises with a spatial metaphor, the space between or simply 'the between' ('Zwischen', Buber, 1958). Buber extends the apparent inter-subjectivity of the I-thou relation to include relationships with non-human subjects such as 'God' and also non-human objects such as trees. This extension of dialogic relationships beyond human voices is found in Bakhtin who remarked 'I hear voices in everything' and is important to educational dialogic theory.

What is dialogic space?

Dialogic means seeing things (or feeling things or thinking things) from at least two points of view at once. Monologic means only acknowledging one correct point of view as if everything was visible all at once laid out flat on a table in front of us. It is only through entering into dialogue that ideas change and new perspectives can be taken on board. To enter into dialogue with each other, ideas[3] need to move into a shared space where they can resonate together, merge in some ways, clash in others and stimulate the emergence of new ideas. This shared space of mutual resonance is 'dialogic space' and without it there is no real dialogue and no real learning.

[3] Ideas here are not assumed to be non-material but rather parts of the visible, tangible, audible world that turn back upon it to reflect it. Just like words and gestures, signs all have a material aspect.

An article I wrote with Neil Mercer introduced the idea of dialogic space into our analysis of classroom talk (Wegerif and Mercer, 1997). The issue at the time was how to understand social cognition in the way in which the upper primary children (aged 8 to 11) were talking together in small groups. There seemed to be at least three significant types of talk, disputational talk when children disagreed with each other without giving reasons, cumulative talk when they agreed without reasons and 'exploratory talk' where they genuinely engaged with each other's ideas. We realised that each type of talk reflected an intersubjective orientation related to a form of individual identification. In disputational talk children identified with their own self-image or ego and each wanted to be the one to win the game and get the answer and in cumulative talk children identified with their image of the group as a harmonious unit and so did hot want to criticise. This seemed clear but then we asked ourselves, what is the form of identification involved with 'exploratory talk'? A key feature of exploratory talk is being able to change one's mind. The question then was, from what position is it that individual children are able to look at what they have said, find it wrong and so change their minds? This way of thinking about this practical issue led me to introduce the idea of identification with a 'space of dialogue' or 'dialogic space' as a key part of learning to think (Wegerif, 2007). Many years before this I had read and been inspired by Buber's 'I and Thou' (1958) and, although I was not fully aware of this at the time, I can now see that the idea of dialogic space opening up in classrooms is an applied version of Buber's concept of the Between.

While Buber's 'Between' is always referred to as if it was an abstract notion, the idea of dialogic space has a material aspect. Dialogic spaces can be felt to open up and to close down at specific times that could potentially be recorded. We saw the material side of dialogic space recently in a classroom where a group of three upper primary children were arguing about a puzzle presented in a tablet. Not only did their body language converge on this central focus but so did their fingers. Each put their hand on the tablet to point out what they thought the key aspect of the puzzle was and how it could be solved through moving the pieces. Pretty soon it was clear that much of the shared thinking was being done by their fingers (Wegerif et al 2017). When thinking become embodied in this way it occurs in a shared physical space and creates a shared dialogic space out of that shared physical space. Merleau-Ponty makes a similar point when he says of real dialogue 'No one thinks

any more, everyone speaks, all live and gesticulate within Being' (Merleau-Ponty 1968, pp. 119; 1964, 159). His point is that thought moves from the idea we might have that it is something individual occurring silently in separated brains to being something shared because audible in a shared space where the words and gestures and intonation and body language carries the shared thinking.

In this sense dialogic space is similar to the notion of a 'blended space'. 'Blended space' is a new term for using augmented reality to link objects in a physical space with digital objects in a digital space (Wu et al, 2013). In augmented reality the blend is usually a simple match between physical space and digital space. A park bench in physical space might be blended with a Pokemon Go monster in virtual space such that, with the right glasses or smart phone, the monster can be seen sitting on the bench. In dialogic space the blend is more complex since it is between physical space-time on one side and on the other the open-ended cultural space of ideas where all ideas are embodied and all forms of embodiment can be read as ideas.

Let me explain dialogic space using a café table as an illustration. Before dialogic space opens up things tend to be thought of on the model of the ontology of identity (Wegerif, 2008). Identity ontology says that 'a thing is what it is and not another thing'. The pepper and salt pots plus cutlery on the café table are just pepper and salt pots plus cutlery. When dialogic space opens then material things, bodies, hands, voices, gestures, pixels on the screen, become signs for other things and representative of voices that are not present. Depending on the dialogue the pepper pot could become Lionel Messy scoring a goal for Barcelona, dribbling brilliantly around the salt pot and into a goal marked out by knives and forks, or the two pots could represent the relationship between a proton and a neutron in a hydrogen atom surrounded by an electron cloud of scattered pepper on the table or they could stand in for almost anything at all.

Although all dialogic spaces are unique due to their context they also share something in common which is the opening of the space itself. While in practice any given dialogic space might have a limited range of themes and probable outcomes these cannot be determined in advance because, in principle, any real dialogue opens up the potential for infinite meaning. This is just another way of saying that the context that could be brought into any

dialogue is unbounded. In practice the children might just mention references from the TV that they saw last night but in principle anything could be brought to bear on the problem at hand. I tend to refer to dialogic space rather than dialogic spaces in order to draw attention to this unity of the structure of dialogic space as always opening up unbounded contextual meaning within the diversity of specific contexts. But, of course, dialogic spaces are also all different in their physical location. The neologism of 'dialogic space(s)' would be the most accurate term with the singular 'space' referring to the unbounded ideas side of the blend and the plural 'spaces' to the physical concrete side.

It is important to have a notion of dialogic space(s) or other cognate term in education (entanglement, dialogic flow, intertextuality, internal relations etc) to avoid the reduction of dialogic education to the hegemony of the external. I have read studies that refer to 'dialogic' in education in an entirely external way, coding each utterance and trying to pin everything down to the visible and tangible surface of things. This is a conceptual confusion. Dialogue is interesting because of its dialogic nature, to study it monologically excludes that essential aspect. The only reason why dialogue works and is in fact necessary for learning is because it opens up an invisible space of potential in which the logic of the surface – a logic where every identity is fixed and separated, in its proper place - becomes turned inside out such that the surface becomes richly resonant. In real dialogue you are part of me, I am part of you and we together are part of the surrounding world. Each of our words then has the potential to resonate in an unbounded way and so to bring new aspects of reality into visibility for us and perhaps also to bring them into being where they did not exist before as nameable differences.

What is thinking?

Defining thinking is inevitably difficult because thinking is already implied behind the action of defining. The task of understanding thinking is a bit like a short cartoon I recall watching as a child in which the Pink Panther sucks himself up entirely in a vacuum cleaner that he himself is holding – this sucking yourself up in your own vacuum cleaner move is not really possible but we enjoy imagining it as if it was possible.

When people write and talk about ‘teaching thinking’ they do not just mean teaching any and all types of thinking because some thinking is obviously quite bad. They mean teaching ‘good thinking’ which they might call ‘intelligence’ or ‘higher order thinking’ or some other technical sounding term which always really translates most accurately as ‘the kind of thinking that we do not think we see enough of and that we want to see more of’. Since this idea of good thinking is dependent on a social context one sensible research strategy to find out more about good thinking is simply to ask many people how they understand this concept. In the 1980’s Lauren Resnick chaired a US government enquiry into teaching thinking in the USA and asked many expert teachers what they understood by ‘Higher Order Thinking’ of the kind that they wanted to teach. The phrase Higher Order Thinking and Higher Order Thinking Skills comes from Bloom’s taxonomy (Bloom, 1956) where ‘higher’ skills such as evaluation and synthesis were separated from ‘lower’ skills such as ‘memory’ and ‘reading’. There is no good research basis for this distinction but in this study Resnick is not really using Higher Order in any technical sense, she simply uses it in a way that refers to the kind of thinking we value and want to teach. She concluded that Higher Order Thinking was hard to define in advance because it was surprising. In her final report she wrote: Thinking skills resist the precise forms of definition we have come to associate with the setting of specified objectives for schooling. Nevertheless, it is relatively easy to list some key features of higher order thinking. When we do this, we become aware that, although we cannot define it exactly, we can recognize higher order thinking when it occurs. The following are all characteristics of Higher Order Thinking made by Resnick:

- Higher order thinking is non-algorithmic. That is, the path of action is not fully specified in advance. Higher order thinking tends to be complex. The total path is not “visible” (mentally speaking) from any single vantage point.
- Higher order thinking often yields multiple solutions, each with costs and benefits, rather than unique solutions.
- Higher order thinking involves nuanced judgment and interpretation.
- Higher order thinking involves the application of multiple criteria, which sometimes conflict with one another.
- Higher order thinking often involves uncertainty. Not everything that bears on the task at hand is known.

- Higher order thinking involves imposing meaning, finding structure in apparent disorder.
  (Resnick, 1987)

Resnick was referring to thinking as something that individuals do when she wrote these criteria, in keeping with the dominant assumptions of the cognitive psychology of that time in the USA, but it is noticeable that these points could equally apply to dialogues as defined by Bakhtin (above).

In order to try to account for the nature and origin of the complex and surprising thinking that we value and want to teach more of, dialogic theory puts forward the metaphor of thinking as embodied dialogue. This metaphor is offered not in order to replace all the other possible metaphors but in order to add a useful new voice to the ongoing dialogue. Educational research has confirmed that the metaphor of thinking as dialogue is a fruitful one. This metaphor lies behind programmes that have been successful at teaching thinking. Bakhtin's clarification that dialogue occurs when answers give rise to new questions suggests that the dialogue we refer to is not just interaction but those kinds of dynamic relationships in which there is mutual illumination across a gap of difference.

Considering what is wrong with existing and previous metaphors for thinking in cognitive psychology can help us to understand the potential value of the metaphor of thinking as dialogue. I am thinking here of behaviourism's metaphor of thinking as 'nothing but talking to ourselves' producing sub-vocalisations that can be measured as behaviour (Watson, 1959) or the metaphor of thinking as nothing but information processing using a machine code programming language which Pinker referred to as 'mentalese' (Pinker, 1999) and now the new metaphor of thinking as nothing but neural activity in the brain. These various metaphors or lens have all proved insightful in different ways. The problems with them arise from their tendency to be taken up as 'nothing but' theories. Dialogic theory says that, where we really do not know something, and there are good reasons why we should not pretend to ever completely understand thinking, then the 'truth' is unlikely to be found in any one metaphor but truth as an aim is more likely to be advanced by having a range of different metaphors in dialogue with each other. This is the polyphonic version of truth put forward by Bakhtin, truth as a direction tended towards by a dialogue of multiple perspectives and not as something that can be found in a single voice (Bakhtin, 1991). This is

also the epistemology of transdisciplinarity in science – the idea that the truth is not normally the product of increasing rigour in applying a single model but, on the contrary, truth is often best found in flashes of insight that occur across and between different models, metaphors or, more generally, different points of view (Nowotny 2004).

Some might challenge applying the metaphor of dialogue to thinking by saying that some individual thinking is done alone and in silence. However, there are good reasons to think that this silent individual thinking takes the form of inner dialogue (Fernyhough, 2008). Sometimes this is obvious and we engage in an explicit dialogue between voices. At other times the inner dialogue is significantly transformed from outer dialogue, more abbreviated and grammatically much simplified but nonetheless with traces that indicate its origin in social interaction (Fernyhough, 2008).

Dialogue as a metaphor for thinking is both specific and general. Specifically it draws attention to and promotes real concrete face to face dialogues in classrooms when the thinking is found in the speaking or the gestures and the movements of fingers together on a screen. More generically it offers a new way of thinking about the relationship between social dialogues and silent inner thought that others have previously imagined as non-dialogic or as quasi-mechanical operations in the brain of individuals. The way that small groups work together to solve problems and to pose problems is already thinking (Woolley et al 2010: Stahl, 2009). The way in which cultures, societies and communities respond to challenges and design together for a collective future is also thinking (cf Dewey on the importance of 'social intelligence' 1993, p104).

Learning to think

According to Vygotsky children learn to think as individuals by internalising cultural sign-tools that are first used in social interaction. Vygotsky claimed that children learnt the first sign, pointing, when they found that their reaching for a cup or a toy that they wanted led their mother to complete the gesture by giving them the cup or the toy. As Vygotsky argues such 'sign-tools' are, at one and the same time, both external tools and internal cognitive

tools guiding our cognitive activity (Vygotsky, 1987). More recent empirical research on how children learn to point suggests that Vygotsky was wrong. His account, while broadly on the right lines, misses out the essential dialogic element in learning to think or, as Tomosello puts it (2008), the important caveat that intersubjective relationships have to proceed signs and language.

Baron-Cohen conducted a series of studies on infants first use of signs and he argues, from the evidence, that to understand the genesis of symbolizing we need to distinguish between two kinds of pointing: just pointing to get what you want (proto-imperative) and pointing to draw another's attention to something (proto-declarative). The first kind of pointing, the kind Vygotsky referred to, does not imply inter-subjective awareness and so is not the beginning of language and of thinking. Baron-Cohen provides convincing evidence that autistic children have no trouble mastering 'proto-imperative' use of pointing to show that they want something even when they fail to master more communicative 'proto-declarative' use of pointing as a sign intended to direct another's interest (Baron-Cohen, 1994). The concern that the other understands the sign and has their attention appropriately directed is shown only when the child follows the eyes of the mother. The significance of this is that in order to use pointing as a sign it is necessary first to have a sense of the other person as someone with their own distinct perspective on the world. Thinking then, if we define this as intentional sign use, begins with drawing others to pay attention within a relationship while also being drawn to pay attention within a relationship. In other words thinking as symbolic sign use, begins by being drawn out within a dialogic relationship (Braten and Trevarthen, 2007).

The dialogic relationship behind thinking is characterised as much by difference as by unity. The unity can be found in the coupling of two entities following each other's eye gaze to judge each other's intentions. The difference is why things need to be pointed out by signs in the first place. It is because we do not understand each other and do not know what each other is thinking that we need to communicate and create spaces of partially shared meaning that are also spaces of thought.

One way of thinking about why using shared signs within relationships to direct each other's attention leads on to the kind of complex and nuanced thinking that Resnick described is through the idea of the superaddressee developed by Bakhtin (1981). This is the idea that

having two perspectives on the world, one's own and someone else's implies a third perspective, the perspective of the relationship itself or what Bakhtin referred to as the superaddressee or also as the witness position (1981). The child does not learn to see herself only by seeing herself reflected in the eyes of her mother, she learns to see herself from the perspective of her relationship with her mother. We can see this effect clearly if, when, playing alone with a toy car, the child says to itself 'Sarah can drive'. This is important to understanding how thinking is not just being called out in a specific relationship, for example a child's relationship with her mother, but also in relationship with a world or the outside in general. This outside point of view is really present in thinking in the form of an invisible dialogue partner. This world or outside point of view can sometimes seem to us as if it was a fixed context, as if we knew where and when the child was situated, but it does not strike the child as a fixed context but rather as a series of questions.

Good thinking of the kind we want to teach is creative. The emergence of creative thinking in imaginative play is described well by Hobson (2002) as an inevitable result of seeing things from two points of view in relationship. Once the child discovers that the same thing, perhapsa toy, can be seen in one way by the child and in another way but her mother then it becomes possible to see the worod as a set of perspectives or, as Bakhtin put it, to see voices in everything. A toothpick can become a javelin and a napkin can become a blanket for a doll. The world has a thousand voices and a thousand eyes. Universal metaphoriticy is described by Merleau-Ponty as when every part of the world can become a total part from which to see and 'understand' the rest of the world. That advanced thinking also remains rooted in this more primordial experience of metaphoricity is now a widely accepted theory of thinking (Lakoff and Johnson, 2008).

But good thinking of the kind we want to teach also includes criticality which is about using judgement to select the good metaphors and reject the bad. Judgement begins in responsibility to others. First the child needs to explain herself to significant others such as her mother. She learns that she cannot say just anything, she learns which reasons for actions are accepted and which are not. The next key stage in learning to think is marked by the use of the term accountability in the successful educational programme 'Accountable Talk'. This is about accountability to standards of good thinking within a community. In

learning to think for ourselves we create a fictitious dialogue partner which could be alled 'what everybody thinks' - a personification that George Herbert mead called 'the generalised Other'. The Generalised Other is your community. It can tell you whether your thinking is good or bad and whether or not you are following the appropriate rules for thinking.

Creative thinking comes from discovering, out of our engagement in dialogic relationships, that everything and anything can be experienced as a kind of light or metaphor for illuminating the world. Critical thinking comes from internalising the judgements of others and seeing through the eyes of 'what everyone thinks' in order to select down from the infinite metaphoricity of things to the few pathways of meaning that are appropriate and useful to the context. On the whole what most people think of as being reasonable or being rational remains at this level of accountability to a community. But increasingly we find ourselves members of many communities and they do not always agree on what are and what are not the rules of good thinking. This leads to a certain responsibility to think beyond our community or an accountability to what Lingis calls 'the community of those who have absolutely nothing in common' (1994). Adapting an idea from the French philosopher Levinas (1961) I have referred to this third aspect of learning to think as dialogue with the Infinite Other. The Infinite Other is not a thing or a real person but it manifests as a kind of voice that questions us and disrupts our certainty. For every community it is possible, if you listen closely enough, to hear a voice from outside the community challenging its claims to rationality. For every answer there is always a further question in an infinite regress. The innovation involved in the concept of the Infinite Other is the recognition of the phenomenological reality that this process of apparent infinite regress can manifest as if it was a voice in a dialogue[4]. This voice from the outside has been there from the beginning, from the moment the child learnt to say 'Sara can drive a car'. It is always the most important voice to learn to listen to in learning how to think.

[4] This idea that an infinite regress can return as an active response to our question is also inspired by Hofsteder in his book, Godel Escher Bach (1980, 121). He refers to this as a strange loop and links it to the nature of consciousness (Hofstedter, 2007).

Teaching thinking

The word ‘teach’ comes from an old German root ‘tǣcan’ which means to point out. Teaching is about pointing things out. It is only possible to point things out in the context of a relationship where you can follow my gaze and I can follow yours. So teaching involves first building a relationship and then directing the attention of students within the context of that relationship. If we want to teach thinking then the most important thing to point out is ignorance: just how much we do not know. Rather than simply being a model for ignorance, by asking questions a teacher can serve as a model for curiosity.

Teaching questioning

People might say that questions are always asked in a context and are always questions about something. I am not so sure. I think that, independent of any language or any sign system there is somehow always the archetypal question. Not a questioning of this or that but just a general questioning. This is perhaps what Heidegger meant with his ‘fundamental question’ which he expressed as ‘why is there something rather than nothing?’. But this fundamental question should not be verbally expressed, it is not a specific question, it is more of an attitude. This attitude is one of curiosity certainly but it is also one of humility. The point is that however much we think we know, we know that only within a context, the larger encompassing context of what we do not know, including the many things that we do not yet even know that we do not know. As we find out more about this context we will find that we have to re-interpret all the things that we think we know meaning that really we do not know anything at all for certain.

Whatever you point out to learners it is possible to point it out in a way that closes down the fundamental question or in a way that opens it up. Knowledge, as this is taught in schools, is only the dialogue so far meaning that it consists only of answers that have been given to questions that have been put. Teaching knowledge as the story of a dialogue leaves a space for the learners to enter into that ongoing dialogue themselves as thinkers able to ask further questions and so to find further answers. In this way anything and everything can be taught as an invitation to join a dialogue and so as an invitation to think (Langer, 2016).

Opening, widening and deepening dialogic space

Constructivist accounts of thinking tend to emphasise the positive ability to build models and systematically apply thinking tools (Holyoak and Morrison, 2015). A dialogic approach lays more stress on what the poet Keat's referred to as 'negative capability' or the ability to remain in uncertainty until a creative solution emerges (Keats, 1817). The idea that we can teach teaching indirectly simply by opening a space for reflection can be illustrated by the extensive evidence on the value of introducing pauses into teacher student interaction. Research has shown clearly that the quality of student's understanding of new concepts can be increased in classrooms simply be extending the length of time that teachers pause after asking a question and before expecting a response (Dillon, 1990). Simply pausing after asking a question is a good illustration of what it might mean in practice to teach thinking by opening a space.

The kind of talk moves promoted in dialogic education usually include asking open questions such as 'why do you think that?'. Such moves do not work as positive tools to co-construct meaning but as a negative and indirect way to open a space for reflection and the resonance of multiple voices out of which a creative response might (or might not) emerge.

Opening a dialogic space begins with a relationship within which it is possible to shape the attention of the other. The opening teacher move is drawing attention to unknowing by asking a question or posing a challenge. In some cases this is drawing students into dialogue about immediately present objects or issues but in others it might be helping to graft them onto long term dialogues of the culture so as to ask questions within a tradition, question that continue that tradition and take it further. Widening the space is asking everyone what they think and also actively seeking out a range fo views perhaps by going to the internet to find alternatives and to invite in different voices. Deepening the space is questioning the frame that has been assumed up to now, asking 'wat are the assumptions that we have taken for granted? Are we sure that they are right? Could the whole area or issue be seen differently?'

Dialogic switch in perspective

In a dialogue we sometimes do not understand the other person's point of view initially and have to work to re-construct it so that we can practice inhabiting it ourselves. This switch in perspective to facilitate understanding is not a once and for all switch, we do not lose our initial perspective in making the switch, but it is more about being able to hold different perspectives in tension together. The ease with which children can make this switch depends on the quality of their relationships. However nicely children talk together to ask each other questions and give each other reasons this will not automatically translate into insight unless they allow themselves to switch positions with other speakers. Such switches do not only occur with physically present voices and physically present tools but also with virtual cultural voices, for example the virtual voice of a 'generalised other' (Mead, 1934) or a 'superaddressee' (Bakhtin, 1981) position which might be that of, for example, the personified point of view of the community of scientists or the community of mathematicians (Kazak, Wegerif, & Fujita, 2015).

Identification with dialogue

Different ways of talking in classrooms are related to different kinds of identification (Wegerif and Mercer 1997). Where children identify with themselves only and reject the other they might be prone to what Mercer calls 'disputational' talk (Mercer and Littleton, 2007) and what Habermas refers to as 'strategic' reason which is reasoning that does not take the other seriously (Habermas, 1984). However when they identify strongly with their group they might be prone to what mercer calls 'cumulative talk' and what is often referred to in psychology as 'group think' (see Brown, this volume) which is when the harmony of the group prevents critical questioning and good reasoning. Issues of identification seem important to group thinking and one mechanism of successful dialogic thinking might be shifting that identification away from all static bounded objects, be that an image of the self or an image of the group, onto identification with the open-ended process of dialogue itself. (Kumpulainen, & Rajala, 2017: Ligorio, 2010; Wegerif, 2011).

Changing the culture

Many of the proposed mechanisms for understanding why dialogic education works are psychological, focussing on changes within individuals. But individuals are shaped within cultures. One way to understand this, informed by Rom Harre's positioning theory (Harre, 1999), is about how different cultural 'discourses' offer different 'speaker positions'. In standard classroom cultures, for example, students are often positioned as not being able to initiate dialogues. An element that is common to all dialogic education approaches is a concern to address behavioural norms directly by explicitly questioning old norms and teaching new norms or what Mercer calls 'ground rules'. These new ground rules or behavioural expectation in turn shape how individuals see themselves and their possibilities (Wegerif 2002). Teaching ground rules is a way of teaching thinking through changing the culture such that a different experience of individual agency is produced, an experience that is less egotistical, less tribal and more tolerant of uncertainty and multiplicity because open to learning from the others and from otherness.

Design for collective global intelligence

Thinking on the metaphor of dialogue is as real, if not more real, when conducted between people in small groups or in whole cultures than in the internalised form of silent individual thought. Designing the culture of classrooms to support small group dialogue is one way to teach thinking. Designing a global culture that thinks together better is another way.

Designing for social intelligence is a technical issue and a political issue as well as being an educational issue in the broad sense. Even if the dialogues of oral thinkers in oral societies are intelligent they do not tend to reach very far in their influence across space and time simply because they disappear almost as soon as they are spoken (Ong, 2013). We know that the dialogues of oral thinkers like Socrates, Gautama Buddha and Confucius were intelligent because their followers wrote them down. Because of the technology of literacy and because of mass education policies we have something that Oakeshott (1961) referred to as the 'Conversation of Mankind' and the associated ideal of education as joining this ongoing conversation or dialogue. Education in this sense depends upon technology, the technology of literacy, and so it is not surprising that schools focus so much on what has

been called the 3 ‘R’s = reading, writing and arithmetic. The advent of the Internet brings this ongoing dialogue of humanity into real-time. Through access to the Internet we can all potentially participate in global dialogues that respond to challenges and design the future together as well as building shared understanding and knowledge in every area. Realising this new potential for real-time global collective intelligence requires teaching thinking as a form of educational design. Literacy is a communications technology that does not work without education. Perhaps the same is true of dialogue mediated by the Internet. The Internet without supporting education into effective dialogue online could lead to increased stupidity and tribalism. The Internet with education might be the beginning of a new age: not so much a ‘post truth’ age as a ‘new truth’ age or an ‘everyone involved in creating truth together’ age.

Summary and conclusions

The metaphor of thinking as dialogue leads to an understanding of teaching thinking as drawing students into dialogue. This has some overlap with other models of teaching thinking and also some differences. It overlaps in seeking to produce thinking dispositions such as curiosity and thinking strategies such as asking questions and reasoning. The main differences stem from the understanding that dialogue between people and dialogues carried by media in society as a whole is already thinking such that silent inner thought is just a modality of this larger dialogue. One aspect of teaching thinking is to be concerned to teach individuals to think through internalising dialogue such that they end up carrying their own inner dialogic space around with them. But more than that a dialogic approach to teaching thinking is concerned to open, widen and deepen shared spaces of dialogue in the school classroom and beyond. A dialogic theory of teaching thinking suggests that it is important to teach cultures to think as well as individuals and ultimately to teach our increasingly global society to think. The project of teaching thinking through engaging students in dialogue therefore connects a focus on dialogues in classrooms to the design of educational technologies, including pedagogies, which will promote and sustain a more global dialogue.

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