

The language of thinking: Reflecting on Tishman and Perkins

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Thank you for listening to this episode on the Metacognition Channel. In this episode I dig into what I mean by the term a ‘language of thinking’ and why it is important in our journey to understand metacognition, especially from a pedagogical perspective. I’m going to draw your attention to one particular paper that I think is very important for understanding the ‘language of thinking,’ and I’ll provide some insights into how this paper fits with my own views, past, present, and future, of how we can conceptualize and develop teaching strategies to develop and enhance individuals’ metacognition in all subject areas at all levels of schooling and education. To help you understand my reasoning, I’ll ask you to come on a short historical journey with me so that you can see how various ideas from various authors at various times have led to my understanding of the ‘language of thinking’ and its importance when considering metacognition.

This episode can trace its origins to my undergraduate studies at James Cook University (that’s in Townsville, Australia), especially in the years 1985 and 1987. In those years I was engaged in my science teaching methods courses about how to teach science. We had a small class of five (most-often) enthusiastic pre-service science teachers, and our instructor in science education was Dr. John Edwards, and he was as enthusiastic as we were...maybe more so. John had an interesting background. He was a trained metallurgist who had worked in industry. Before moving into academia, he was the Head of the Science Department at the Canberra Grammar School, the school I was to join as my first high school teaching appointment. John also had worked on the Australian Science Education Project (ASEP) (ASEP, 1974) which developed innovative, research-informed science-technology-society-environment curriculum materials for Australian schools in the early to mid-1970’s. I characterize John as a very creative person, always interested in ideas and possibilities. My impression was that he thought science education could and should be greatly improved, and that one of the key areas to such improvement related to explicitly (directly) teaching students how to think. Around that time of the early- to mid-1980s and into the early 1990s, there was a substantial movement that I call the ‘teaching thinking movement.’ This ‘thinking’ movement developed some momentum and, for me, people prominent in the movement at that time were Art Costa (e.g., Costa, 1986), Robin Fogarty (e.g., Fogarty, 1990; Fogarty & Bellanca, 1990), Robert Swartz and David Perkins (e.g., Swartz & Perkins, 1990) and Edward de Bono (e.g., de Bono, 1976, 1986, 1990). I’ll talk more about this movement in future episodes. The key tenet I drew from the amalgam of ideas emanating from such thinkers was that teaching what might be termed ‘thinking skills’ should be done explicitly in schools, that this was not happening in schools sufficiently or at all, and that it should be done as a priority. Now, I’m not a huge fan of the term ‘thinking skills’ and I will explain why in a later episode. However, for now, I’ll use the term where necessary as a convenient placeholder for referring to a specific cognitive process or a collection of cognitive processes.

John Edwards introduced our class to the ideas of Edward de Bono, as he knew de Bono and had engaged in some research on some of de Bono’s CoRT thinking skills (e.g., Edwards, 1987; Edwards & Baldauf, 1987). de Bono’s CoRT (Cognitive Research Trust) program consists of 6 sets of 10 ‘thinking skills’ each aggregated around particular themes such as ‘Breadth,’ ‘Organization,’ and ‘Information and Feeling.’ Each set of skills had student worksheets and a teacher’s guide. The compelling thing for me about the CoRT program back then, and still today, was that each of the thinking skills had a name, a justification for the importance of the skill, and

an explanation of what performance of the skill entailed. Irrespective of people's opinions of the CoRT program, these are important elements that should be apparent for the teaching of any skill, cognitive or otherwise. However, it was the naming of the skills, the assigning of an anagram or other truncated/representative tag to a cognitive process that most interested me. There, in hard copy, was my first introduction to what I now refer to as a 'language of thinking.' For example, the anagram CAF in the CoRT program designates the process 'Consider All Factors.' One performs a CAF "before choosing, deciding or planning," because, for example, "it is better to consider all the factors first and then pick out the ones that matter most" (de Bono, 1988). One could use the word 'variable' in lieu of 'factor,' and you could then be talking about a key cognitive process in scientific endeavours. So rapt was I in the ideas proposed in the CoRT program that I succeeded in having a modified CoRT program taught to all year 9 science students in my second school, albeit with varying levels of success and with varying levels of enthusiasm from my colleagues. I also centred my Masters' research project (Thomas, 1992) around the effects of me teaching two 'thinking' skills to the students in two of my Year 9 science classes. These were the CAF, and the FI-FE-FO (a modification of de Bono's FI-FO) (de Bono, 1988). The FI-FE-FO is a way of thinking about a process one might employ consciously when considering new or unfamiliar information. Using a FI-FE-FO requires that you first review the information In; that is the information being provided to you, taking it pretty much on face value and maybe asking yourself things like, "Are there any words or images that look familiar to me or are new?" Then you ask yourself, "what do I know about this information or topic from Experience?" trying to consciously connect the new information to what you already know. Thirdly, you try to identify what information has been left Out; what information might be missing, by asking yourself, "What information do I think I still need so that I can know and understand this material?" In my view, this FI-FE-FO links in very seamlessly with the sort of thinking we want students to acknowledge and engage in when they are presented with new or unfamiliar information, and this is what happens on a daily basis in schools and other education settings. Nowadays, I still teach my undergraduate pre-service science education students about these strategies and their value and use, and about how to teach them to their future students. One might say that the idea of a 'language of thinking' and its importance has part of me for quite a while; around 35 years at the time of this episode of my podcast.

At my first ever science education conference (ASERA 1993) in Lismore, New South Wales, I presented a paper from my Masters' research. I had moved from Victoria to a new school in my home state of Queensland to be the Head of the science department, and the ideas of teaching students to think, developing and enhancing students' metacognition, and doing more research in these areas still deeply fascinated and motivated me. At that conference I met Ken Tobin, a renowned science educator and one who was always happy to mentor and support young scholars. Ken had been exploring the use of metaphors as master switches that might alter teachers' practices (Tobin, 1990). Metaphors are important linguistic elements for communicating concepts and ideas, and the idea of using metaphor, with students rather than teachers struck me. I asked myself, "If Ken can use metaphors with teachers to inform them about matters that are hard to explain and not immediately apparent, maybe I can use metaphors with students to communicate with them about what learning (science) is and how to go about it?" Over lunch with Ken and Cam McRobbie (Thomas & Skamp, 2009) (who would become my PhD supervisor) I floated this idea. Both were enthusiastic about it, and I enrolled in my PhD program at the Queensland University of Technology soon after.

Now, you might be asking yourself, “what is the relevance of these bits and pieces of Greg’s life story to the topic of this episode ‘the language of thinking,’ and what is this paper that he mentioned earlier?” Before I try to make those matters clear to listeners, I want us to go back to the previous episode of this podcast in which I spoke about the need to have a shared perspective and definition of thinking, and why this is important for considering metacognition.

You might recall that, in that episode, I drew on the writing of Anna Sfard (Sfard, 2008) who stated that “Thinking is an individualized version of communication” (p. 81); the type of human doing that emerges when individuals become capable of communicating with themselves the way they communicate with others” (p. 91). From there I went on to suggest that “metacognition is one’s knowledge, control, and awareness of how one intra-personally communicates,” and that “developing and enhancing students’ learning processes becomes about...explicitly teaching them about how they can communicate with themselves about how to engage and interact with the material in its various forms they are being asked to learn and understand.” This line of thought necessitates consideration of how we can explicitly teach students about how they can communicate with themselves, and the use of words and language tropes such as metaphor, as I have identified above, are ways to do this that I have employed as both a teacher and a researcher. This position brings me to, what I consider, to be an essential article by Shari Tishman and David Perkins, ‘The language of thinking,’ (Tishman & Perkins, 1997). This article resonates strongly with my views and brings many ideas about the language of thinking to the forefront for our consideration. I’d like to spend some time exploring some of the ideas in this paper.

From the outset, Tishman and Perkins note that “words and thoughts live through each other” (p. 369). They draw attention to the “special class of words we have for talking *about* thought - words for talking about the thinking processes that lead to products of thought such as ideas and theories,” and they state that the “language of thinking embraces the many ways we describe our own and others’ mental states and mental processes (p. 369).” The importance of words for describing thinking is very important for me, as the use of ‘thinking’ words and terms can enable us to better characterize and enable our own intra-personal communication regarding our own cognition, as well as enabling us to communicate with others about specific cognitive processes, or skills as I referred to them previously. Tishman and Perkins use the words “guess, suppose, surmise, assume, speculate...contemplate, ruminate, reflect, and ponder...analyze, doubt, claim, investigate,” (p. 369) as examples of these thinking words. Most if not of these words will be familiar to listeners. They are words used commonly in everyday speech and writing. Further, many of these words are commonly referenced in Bloom’s Taxonomy (Bloom *et al.* 1956). In David Krathwohl’s (2002) revision of the taxonomy we see that the cognitive process dimension is categorised as: remember, understand, apply, analyze, evaluate, and create (p. 215). Within those categories are other terms referring to cognitive processes such as recognizing, recalling, inferring, interpreting, executing, differentiating, and generating (p. 215). These kinds of words are important in the language of thinking, and we often see them used in schools and everyday life. However, it has been my experience that seldom do we see explicit instruction or discussions with students in schools and classrooms about what these words mean in general or in specific subject contexts. In other words, we might use the lexicon of a language of thinking in education settings, but we do so in superficial ways, often expecting that students just ‘know’ what we are talking about when we use these words. Let me give you an example of this, and a thought experiment to engage in.

Take the word/verb ‘analyze.’ In general, what does this word mean? Does it mean different things in different contexts? If you walked into a hotel foyer, or a school staff room, or an academic lounge and asked everyone who walked through those sites over one day about what the word ‘analyze’ meant for them in general, and then in relation to their specific subject areas or professions what do you think the responses would be? I suspect we might get some consensus on what the term means in general, but that there would likely be clear variations across subject areas and professions. I also suspect that I would get some blank looks, depending on whether those being asked have ever even considered this before. I also suspect that if we conducted the same exercise in schools or universities that we would get substantial variations between students. I don’t know for sure if my guesses are correct; I’m just speculating. On that note, I consider that some of the words and terms in the language of thinking are less prone to variations in meaning depending on the context or situation in which they are used. Take for example the two terms I just used: guess and speculate. The meanings and mental operations of these terms seem to me to be invariant across contexts. I’m sure there are other examples you can think of. From those in Tishman and Perkins’ article, ‘contemplate,’ ‘ruminate,’ and ‘reflect,’ would be, for me, examples of such more invariant terms.

Now, again, you might ask yourself, “Ok, so what? You have variations in what people understand by particular terms within in the language or lexicon of thinking. So what? Why is this important?” This is a good question. My perspective is that we have an educational obligation to teach these words, phrases, and terms and their meanings explicitly to students within our education systems. It should be a duty of every teacher, without exception. I know from my own experience as a teacher and from my research that students listen to teachers and what they say. Changing the words we use and how we explain them alters the metacognitive orientation of the learning environments of our classrooms and other learning settings. For example, let’s imagine that all the Year 9 teachers in a school adopted a shared, common definition of the term ‘analyze.’ Let’s imagine further that they then contemplated what the term ‘analyze’ meant for the thinking necessary and expected in their specific subject areas or for particular topics, and that they were able to write down that meaning so that it could be communicated to students in written or spoken form. Then, let’s imagine further that when they were with their students, they began a lesson (or part of a lesson) with a script like,

Today we’re going to pay attention for a few minutes to the word ‘analyze.’ You might have heard from other teachers that the word ‘analyze’ generally means However, in (subject area) we think about what it means to ‘analyze’ a bit differently, and today I’m going to talk us through an example to demonstrate to you the sort of self-talk we can use when we ‘analyze’ in (subject area).

And imagine that every teacher in a school did this, a little bit in every lesson, in relation to the thinking they wanted the students in their subject areas to learn about and employ. The teachers would explicitly use the language of thinking with their students, and demonstrate to students using, for example, a think aloud strategy, the type/form of self-communication the students themselves could employ when engaging such thinking. I think a cross-curricular, whole school approach like this would be very powerful for students’ thinking and learning. I can only imagine that this school would be very different to what we observe commonly in the vast majority of today’s schools and the classrooms within them. This is not to say that individual teachers should not consider this and ‘go it alone’ if a whole school approach is not possible.

Students, as I stated before, notice changes in what individual teachers say and do, and individual teachers can make a huge difference for their students.

There is one thing I am sure of. I'm sure that if teachers explicitly use the language of thinking and demonstrate to students how to engage in the self-talk necessary to perform the mental operations related to specific 'thinking words' that metacognitive experiences would be stimulated in students. It is these metacognitive experiences that are essential for the development and enhancement of individuals' metacognition. As an aside, I'm also confident that teachers contemplating the meaning/s of words, terms and phrases from the language of thinking for their subject areas would have metacognitive experiences stimulated in them as they tangle with their thoughts on such matters.

You'll note here that I am not suggesting any demarcation between the teaching of the thinking process and the subject area/s; I'm not suggesting a context-free teaching of general thinking skills. It is important to recognize that schools tend to be structured from the more general to the more subject-specific as students progress from pre-school, to elementary school, through to secondary school, and beyond. This is unlikely to change in the near future. We need to be able to work and progress within our existing contexts, changing them gradually as we go.

Tishman and Perkins also propose, importantly, that "the vocabulary of thinking can be roughly divided into terms that fill three different functions: terms that mark an epistemic stance, terms that describe an intellectual process, and terms that describe an intellectual product" (p. 369). Let me sketch briefly some of my thoughts on each of these functions. I say briefly at this time because each of them deserves substantial attention, and I plan to provide that necessary attention in future episodes.

Vocabulary that reflects the epistemic stance is clearly evident in schools, but it is often used in a way that makes assumptions about the extent to which students and teachers assign the same or even similar meanings to that vocabulary. Let me give you an example. Take the word 'understand.' This word is widely used in education settings. Teachers ask students, for example, "Do you understand: this idea, what I'm talking about, or what you are reading?" However, explanation/s of what it means to 'understand' are typically and noticeably absent in classrooms. What does it mean to understand, in general, and in relation to specific subject areas and topics? How are students expected to work this out? Do they work this out eventually, and what happens if they don't? My own work and research with science students in high schools and with pre-service science teachers suggests that these groups of students often have less-than-satisfactory, underdeveloped conceptions of what it means to understand the subject material they are being asked to learn, 'understand,' and even teach. This vocabulary is taken-for-granted in almost every classroom or educational setting that I have ever witnessed. We want students to learn what it means to understand, and for them to know the processes they can employ to develop their understanding and monitor the development of that understanding. The good news is that when teachers develop conceptions of what it means to 'understand' in their subject areas they can communicate with their students to develop shared, mutually acknowledged conceptions of what it means to 'understand.' Students can find this very useful.

As I mentioned earlier in this episode, I have consciously and explicitly used vocabulary that, as Tishman and Perkins suggest, characterizes "the *process* of thinking and express its flow, structure, and feel" (p. 369). I've also promoted the development and explicit use of such vocabulary over my time in all fields of education and across my audiences. The FI-FE-FO I mentioned earlier is one example of this. I can use this term to explain a process, consistent with constructivist learning theory, to teach individuals about thinking they can employ when

attending to information they may be variously familiar with. Another obvious example of this process-oriented vocabulary is the term ‘memorize.’ It doesn’t seem that fashionable in education circles nowadays to promote memorization as being an essential, foundational learning process, and I regret this situation. I contend that it is important that memorization and its role in learning should be discussed with students from an early age, and that students should learn memorisation techniques from their teachers, that the teachers themselves have used and found to be effective and valuable. #teachersaslearningrolemodels This cognitive and metacognitive mentoring is an essential component of metacognitively oriented learning environments. As we’ll explore in future episodes, this process-oriented language of thinking can be situated within the procedural metacognitive knowledge category of metacognitive knowledge.

The third category of terms in this language of thinking as conceptualized by Tishman and Perkins is that of “nouns that mark differences among kinds of ideas – ideas that are typically the outcome of a thinking process or that play a particular role in a thinking process” (p. 369). They draw our attention to the general and, I would argue, potentially vague meanings of the term ‘idea’ as it is used in everyday parlance, and suggest we consider using words such as “*conclusion, hypothesis, opinion, solution, reason, claim, and theory*” (p. 369). I fully agree with their position on this. The use of such words communicates to an audience more specific meaning for the outcome of a cognitive process. We can see evidence of some of this language in research on argumentation in science education (e.g., Erduran & Jiménez-Aleixandre, 2007) where claims and processes involving the selection and use of evidence to support those claims is at the forefront. I see it as important that we explore increasingly the development of pedagogies that help students link these words that describe the outcomes of thinking processes with the processes that lead to the production of these outcomes.

There is just so much in this article by Tishman and Perkins, and time does not allow me to dig as much into the propositions contained therein to the extent I would like to in this episode. However, I will return to this paper again. For now, I’ll just draw listeners attention to one more important point that these authors make in their paper; a point that links their thoughts to some of the content of my previous two episodes. As we come to the end of the fourth episode of this podcast, you might be asking “What do all these ideas about thinking and the language of thinking have to do with metacognition?” This is a good question, and the answer is embedded in the second episode, although it may have gone unnoticed.

My position is now, and has been for a very long time, that we ‘get at’ or undertake developing and enhancing students’ metacognition not by focusing on metacognition per se, or by teaching metacognition, but by focusing on students’ cognition and stimulating metacognitive experiences in them that prompt them to become conscious of their thinking and learning processes and the nature and efficacy of those processes for achieving their goals. We teach for metacognition by focusing intently and the cognition we seek to have students develop and use. Communication with students is essential to do this and, as Tishman and Perkins assert, “an obvious and important purpose” of the language of thinking “is communication” (p. 370). The development and enhancement of students’ metacognition becomes a consequence of explicitly targeting students’ cognition and, because we use so much verbal communication in classrooms and other education settings, teachers knowing and using this language of thinking is an essential part of them being able to target their students’ cognition with precision. And this precision is important. However, of course, knowing about and employing the language of thinking is not all there is in terms of teaching students about how to self-communicate. We can use and teach about other forms of self-communication such as graphic organisers, and there are numerous

examples of these in the literature that we will review in due course. However, acknowledging the nature and importance of a language of thinking accords with my previous position that “developing and enhancing students’ learning processes becomes about...explicitly teaching them about how they can communicate with themselves about how to engage and interact with the material in its various forms they are being asked to learn and understand.” In future episodes, I’m going to keep returning to this fundamental tenet of mine and explain how it can be operationalised in real world educational settings.

Thanks for listening to this episode on the Metacognition Channel. I hope you’ve enjoyed it and maybe it’s given you some propositions and possibilities to ponder. There is a transcription of the episode available and the links for it are available in the description of this episode on the Podbean site for this podcast. Please subscribe to receive notifications of new episodes. I look forward to sharing future episodes about metacognition with you.

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