CHAPTER 1

Six Powers of Making Thinking Visible

To really focus on making thinking visible fundamentally changes the role of student and teacher. As I utilize thinking routines and document our learning, I notice my students speaking up more and guiding our learning. Focusing on students' thinking places the power in their hands and fosters a teacher–student relationship built on mutual trust and respect.

Alexandra Sánchez, Third-Grade Teacher Parkview Elementary School, Novi, Michigan

When I make my classes' thinking visible, it's like putting a dipstick in to check the oil. I can immediately see what they do and don't understand. It's a cue to what I need to do next in my teaching. This is probably the biggest way that my teaching has changed since I started teaching 25 years ago. I'm now much more responsive to my students' thinking.

Cameron Paterson, Director of Teaching and Learning, Secondary History Teacher, Shore School, Sydney, Australia

Witnessing nonverbal students with moderate cognitive impairments shift from struggling to answer assigned reading comprehension questions to proudly displaying their thinking has forever changed my view of supporting learners with neurodiversity. Making thinking visible practices offer these students a path previously untraveled, giving them a voice, a purpose, and a sense of pride. I see a huge shift in attitudes regarding the learning outcomes and thinking abilities of these learners across our school.

Erika Lusky, Secondary Speech and Language Pathologist, Instructional Coach Rochester High School, Rochester, Michigan

Alexandra, Cameron, and Erika speak eloquently to the power of making thinking visible (MTV). Theirs are not isolated voices. In diverse classrooms from around the world, teachers have shared with us the difference MTV has made in both their own teaching and their students' learning. As researchers observing in classrooms, we have seen this for ourselves, witnessing a new paradigm of schooling emerge within the context of engaged, purposeful learning. This has propelled much of our research and development work since the original publication of *Making Thinking Visible* in 2011. In our ongoing collaboration with schools, we have sought both to capture the ways we have seen teachers engage students in thinking and make it visible, as well as to understand the difference these efforts have made. How do MTV practices change students and teachers? What makes this set of practices powerful? How do efforts to make students' thinking visible transform the traditional story of schooling we have known for so long?

In this chapter we articulate six ways in which we see MTV practices exert transformational change in classrooms. MTV has the power to:

- Foster deep learning
- Cultivate engaged students
- Change the role of students and teachers
- Enhance our formative assessment practice
- Improve learning (even when measured by standardized tests)
- Develop thinking dispositions

We explore each of these powers by drawing on the voices of teachers who have shared where they have seen the power of MTV practices in their teaching and in their students' learning. We expand on these commentaries by connecting them to relevant research. Finally, we explain exactly why and how these "powers" exist in visible thinking practices generally and thinking routines specifically. What is it about MTV practices that help establish this power? How can teachers realize that power in their own classrooms?

FOSTERING DEEP LEARNING

The Visible Thinking project, which began in 2000, built on the preceding Teaching for Understanding project from the 1990s. These two ideas – understanding and thinking – are core to conceptions of deep learning. While no single definition exists of deep learning, The Hewlett Foundation, a major supporter of research in this area, defines deeper learning as the significant understanding of core academic content, coupled with the ability to think critically and solve problems with that content (Hewlett Foundation 2013). These core academic competencies are joined by the interpersonal and intrapersonal abilities of collaboration, communication, directing one's own learning, and the possession of positive beliefs and attitudes about oneself as a learner that serve to motivate one's ongoing learning.

Based on extensive research in schools and classrooms where deeper learning was occurring, Jal Mehta and Sarah Fine (Mehta and Fine 2019) assert that deeper learning emerges at the intersection of:

- *Mastery*: the opportunity to develop understanding
- *Identity*: the opportunity to connect to the domain and develop as a learner with a place in the world
- *Creativity*: the opportunity to produce something personally meaningful

These opportunities are infused with critical thinking, grappling with complexity, challenging assumptions, questioning authority, and embracing curiosity – all core elements of what it means to learn deeply.

Erik Lindemann from Osborne Elementary School in Quaker Valley, Pennsylvania, sees these elements coming into play as he makes thinking visible in his third-grade classroom. "The story of our classroom learning is dramatically different when we use visible thinking routines. The routines build learners' capacity to engage with complexity while inspiring exploration. As my students begin internalizing and applying these thinking tools, I become a consultant in their ongoing investigations. Curiosity and excitement fuel deeper learning as my students take the lead," he observes. Erik's remarks attest to the transformative power of making students' thinking visible. They move teaching beyond the realm of transmission, focusing on transformation not only of the content but also of the learner.

Secondary math teacher Jeff Watson at the International Academy in Oakland County, Michigan, has also noticed this movement from transmission to transformation. "Math classrooms that I have visited have mostly been lecture-oriented, teacher-centered environments. Many times, the only interaction is a response to the question 'Are there any questions?'" he laments. In contrast, Jeff notes that "thinking routines are an incredible way to change the entire classroom dynamic, as learning naturally turns over to the students and places them in a more active role. The best part is that while the changes are so powerful, they don't cost any money, require any curriculum changes, or sweeping reform."

As we have identified, an agenda of understanding and thinking rests at the core of deeper learning and are both central to the effective use of thinking routines. In using a thinking routine, teachers need to situate its use within the larger context of building understanding: How does this particular lesson fit within the larger enterprise of understanding I am striving for? Teachers can then begin to focus on the goals of a particular lesson: With which ideas do I want students to begin to grapple? Where are the complexities and nuances that we need to explore? How can I push students' understanding and move it forward? With these questions answered, teachers are ready to identify the source material and the kinds of thinking that might best serve the exploration of that material. Only then are teachers in a good position to select a thinking routine as a tool or structure for that exploration.

CULTIVATING ENGAGED STUDENTS

Reflecting on the difference MTV practices have made in the learning of her third- and fourth-grade students, teacher Hardevi Vyas from the Stevens Cooperative School in Newport, New Jersey, notes the power of thinking routines to engage learners:

"The continued use of thinking routines when exploring primary and secondary sources, as norms of conversation, as prompts for thinking has been the driving force that moves students from a place of interest, to deep engagement, to a real desire to take action by identifying the steps to take to make a difference. Thinking routines emotionally engage students, leading to a high level of intellectual rigor and ethical reflection."

Hardevi's comments identify three specific types of engagement: (i) engagement with others, (ii) engagement with ideas, and (iii) engagement in action. In engaging with others, we recognize that learning unfolds in the company of others and is a social endeavor. We learn in, from, and with groups. The group supports our learning as well as challenges it, allowing us to reach higher levels of performance. At the same time, learning demands a personal engagement with ideas. Whereas we might be able to receive new information passively, building understanding is an active process that involves digging in and making sense. We bring ourselves to the learning moment. Sometimes this is identified as cognitive engagement, to distinguish it from mere engagement in activity. It is cognitive engagement with ideas that leads to learning. Exploring meaningful and important concepts that are connected to the world often means students want to take action. Providing opportunities and structures for them to do so encourages students' agency and power while making the learning relevant.

We found this three-part framing of the nature of engagement powerful for understanding the different ways thinking routines engage students. Consequently, we have used this framing to organize the routines we present in Part Two of this book. Of course these three types of engagement are not discrete, and neither are the routines we present under each of these headings. While a routine might provide a great way to engage learners with others, students are still engaging with ideas. Likewise, when thinking about taking action we may work with others, and ideas will still remain at the core.

It may be tempting to blame students for their lack of engagement. After all, it is their behavior (or lack thereof) that we are noticing. However, research by David Shernoff found that 75% of the variation in student engagement was attributable to differences in the classroom learning context while only 25% could be explained by students' own background characteristics (Shernoff 2010). Furthermore, Shernoff and colleagues found that involving high school students in thinking led to greater levels of student-reported engagement in classes (Shernoff 2013). These findings mirror those of other researchers assessing urban middle school students' perceptions of their teachers. When teachers engaged students in independent thinking, students recognized this as useful to their development of understanding and autonomy as learners (Wallace and Sung 2017). The importance of deep engagement and thinking opportunities for all students was also

a common theme among the teachers Mehta and Fine studied in their dive into deep learning (Mehta and Fine 2019). They found that teachers who promoted deep learning viewed thinking and engagement as a necessary part of learning and as something *all* students were capable of. This was in contrast to those teachers who failed to engage students in deep learning consistently. These teachers were more likely to view understanding, thinking, and engagement beyond the reach of their students.

This phenomenon of thinking leading to engagement is not limited just to middle and high school students. Lecturer Katrin Robertson experienced it in her arts education classes at the University of Michigan. "For many years I used question prompts to engage my university students in discussing texts. These 'discussions' often ended up being ask-and-answer sessions where the students simply responded to me but didn't speak to each other. Engagement felt compulsory and sometimes like we were all sleepwalking through class," Katrin observed. Not being content to blame her students for this pattern of behavior, Katrin made a shift. "When I began using routines everything changed. Students were given space to make their thinking visible versus merely answering my prompts. The room became energized with conversations. Students' ideas blossomed, new perspectives were revealed, wrestled with, and shared in a multitude of forms. I wish I had done this way earlier in my career," she said. On the other side of the world at Australian Catholic University, Kathy Green experienced the same reaction to the use of thinking routines. After experiencing them, her students asked, "Why aren't our other university classes doing this? It's so much more meaningful and useful."

CHANGING THE ROLE OF THE STUDENT AND TEACHER

In the traditional transmission model of teaching, the roles for students and teachers are well defined. The teacher delivers, often through lectures, PowerPoint slides, or assigned readings, and the student is the receiver, taking in the delivered information. If classes are interactive, they often consist of little more than teachers questioning students to see if they know the material. In this model, "good" students are well prepared, so as not to be caught out by the teacher's questions, whereas so-called "poor" students merely disengage or participate only when required. Unfortunately, this parody is a well-documented reality for far too many students (Lyons 2004; Pianta et al. 2007; Ritchhart 2015; Mehta and Fine 2019).

When teachers embrace the goal of making their students' thinking visible and begin to make use of the associated practices, they begin to see shifts in the roles played by teachers and students. These shifts are small at first but over time have the potential to become seismic. To be sure, when many teachers start using thinking routines they may

be merely tacked on to the traditional transmission model of teaching as ways to enliven learning. Even when this happens, teachers still may see glimmers of what's possible. Teachers must then embrace this potential and cultivate it through the regular, thoughtful application of MTV processes. They must adopt not only the practices but also the goal of visible thinking. This necessitates taking a new stance toward teaching, of changing the story of learning one is telling, and reconceptualizing the goals of education.

While teachers whose classrooms are most transformed do not abandon curriculum or preparing students for high-stakes tests, they see their role as teaching beyond the test toward preparing students for a lifetime of learning. The test is only one small marker along the way. Listen to Cameron Paterson: "While I want my students to do well on the tests, I also want them to develop the dispositions they need to thrive in a globalized world full of robots — to be able to think for themselves, create and question." Assuming this stance toward teaching, teachers don't aim to simplify challenging material and make it easier; they explore how to make those ideas accessible. Students' questions excite rather than distract. When they look at the many elements crammed into their courses, they recognize that not all content is equal and so eschew coverage. They know depth of understanding is good preparation for future learning (Schwartz et al. 2009).

When teachers make these mental shifts and adopt new mindsets, the practices of MTV can be transformative, and teachers notice changes in both themselves and their students. Third-grade teacher Mary Beane from Hilton Elementary School in Brighton, Michigan, recognized this transformation happening in both herself and her students. "Making thinking visible and focusing on developing a culture of thinking has taught me how to help children develop a voice for their thinking," Mary reflected. "In a classroom culture where student thinking is valued by all, students organically begin to take initiative in ways I never knew were possible. I now have students suggesting routines to be used to help uncover the complexities of a topic. I am able to step aside so students can sit in a circle together to consider various viewpoints. Shifting our roles has allowed me to observe not just what children know, but how they listen, think, engage, and respond."

Mary has shifted her role from that of deliverer to *orchestrator* who works hard to establish a supportive culture and to create conditions for inquiry and opportunities for meaningful exploration. The dominant voice in the class shifts from that of the teacher to that of the students. Her students are no longer passive receivers of knowledge but active creators, directors, and community members. Recognizing her students' capacity for initiative, Mary has to guard against the teacher tendency to pull in the reins and exert control. Instead, she celebrates this new level of engagement and seeks to promote it, empowering her students and creating a sense of agency.

The idea of agency and initiative resonates with kindergarten teacher Denise Coffin from Sidwell Friends School in Washington, DC. "In making their thinking visible I empower my students. They begin to demonstrate an intention to 'be bigger on the inside' – their words, not mine. This means that their ideas and plans for action can be as valid and as complex as those of their older school peers and adults."

Another way in which MTV changes the role of the teacher is that teachers become students of their students. That is, they become curious about their students' learning, how they are making sense of ideas, what they are thinking, and what ideas engage them. MTV both allows and asks teachers to know their students in a different way. Traditionally, we have known our students by their academic performance and the skills and knowledge they possess. Many school systems rely on end-of-school comprehensive exams to define students through a single reductive score. When we focus on students' thinking, we see them as much more. We become interested in how they come to know what they know, what questions they have, and what challenges they face. We no longer see these challenges as deficits but as interesting opportunities for exploration. This curiosity in our students' thinking further drives our efforts to make their thinking visible as a mechanism for better understanding them and providing more responsive instruction.

ENHANCING OUR FORMATIVE ASSESSMENT PRACTICE

As the education world has learned about the usefulness of feedback and formative assessment to advance learning (Black and Wiliam 2002; Hattie 2009), policy makers and program marketers have sought to embed and formalize the practice of formative assessment in schools. Unfortunately, this has too often taken the form of requiring teachers to design and give set formative assessment tasks. In some instances these tasks must be written down formally, even before the students have started their learning, as part of curricular plans. We have heard teachers announce to students, "This is a formative" before handing out formal, predesignated tasks. Most students hear this announcement as, "This doesn't count." Thus, the task meant to inform teaching and learning becomes meaningless in the eyes of the student and assessment is seen as something done *to* them rather than *with* them. The problem with efforts to formalize formative assessment is that formative assessment is not a task; it is a practice. If you rely on and design formal tasks for the purpose of providing yourself and your students with "a formative assessment," chances are you have a weak formative assessment practice from which your students benefit little.

True formative assessment is the ongoing and embedded effort to understand our students' learning. It is a two-way street actively involving students and teachers in

dialog about learning. It doesn't reside in a task and is not the evaluation of one's performance on that task. Formative assessment lives in our listening, observing, examining, analyzing, and reflecting on the process of learning. Even then, our assessment becomes formative only when we use that data to in*form* our teaching and students' learning. Formative assessment then is driven by our curiosity about our students' learning and the desire to make sure our teaching is responsive to their needs as learners.

If we want to know not just what our students know, but how they know it, then we must make their thinking visible. Thus, making students' thinking visible is a formative assessment practice. As Stevens Cooperative School principal Shehla Ghouse explains, "Insights into student thinking provide teachers with invaluable information that can be used to plan next steps for individual students. It also helps us better understand the individual learner and ways in which to reach them more effectively to further their learning."

Speaking about the specific benefits of thinking routines as formative assessment tools, Katrin Robertson identifies their open-ended nature as being particularly useful with her university students. "By asking students to make their thinking visible through a thinking routine (as opposed to a quiz or some other predesigned tool), I not only can collect data about specific areas of their learning that I want to understand, but also am able to reveal students' learning in ways that I had not considered or anticipated." She adds that by providing both sought after and unanticipated information, thinking routines "help me design better learning opportunities that support and extend students' learning in rich and nuanced ways as we move forward in our learning."

In each of the routines shared in Part Two, there is a section on "Assessment." However, you won't find information on how to score or evaluate students' responses to the routine because doing so will quickly send a message that you are looking for a specific answer rather than their thinking. What you will find are general guidelines on what to look for and pay attention to both as you carry out a thinking routine and examine students' responses afterwards based on the thinking the routine is meant to promote. You'll also find suggestions on how to respond if you notice weak or limited responses or if students are struggling.

If you do need or want a summative assessment, we suggest that the thinking routine be used as a vehicle for building understanding, with all the messiness that entails, and then followed up with a more traditional assignment in which students share their understanding. A great example of this is Tom Heilman's use of *Peeling the Fruit* (see page 113). Tom's high school students at Washington International School (WIS) use this routine to work in groups to build their understanding of a poem. Students then write an individual critical commentary of the poem. Tom intervenes, questions, prompts, and

supports students' learning as they use the *Peeling the Fruit* routine. This is formative assessment practice in action. He then grades students' critical commentaries based on the case they are able to build about the meaning of the poem based on the evidence from the poem. Thus, students value their time *Peeling the Fruit*, not as an ungraded formative assessment task, but for the opportunity for building understanding it provides (see Tom discussing his use of *Peeling the Fruit* and assessment at https://www.youtube.com/ThePowerOfMakingThinkingVisible).

IMPROVING LEARNING (EVEN WHEN MEASURED BY STANDARDIZED TESTS)

When we first began the Visible Thinking project we had a hard time getting schools in the United States to work with our research project, even for free, because our work wasn't specifically about raising test scores. This was at the height of the "Standards and Accountability" movement in the States. We explained that our project was about getting students to think, engage, and develop understanding, but still we had no takers. Later, when we began sharing the work of the project and the associated thinking routines more broadly, we continued to receive questions about how they related to students' test performance. To be honest, we couldn't answer those questions. We knew that the routines engaged students in their learning, got them to think, and helped them build understanding. We felt this would help them on standardized tests, but we had no evidence. However, in the intervening years we have been able to collect this data.

As third-grade teacher Erik Lindemann notes, "Today's standardized tests include more open-ended problem-solving components requiring more complex analysis. Making thinking visible helps students to understand these questions as well as the types of thinking necessary for completing the tasks. When students have a deep understanding of their own thinking process and how to apply them, they can perform with 'proficiency.'" Because we consider MTV to be a complex set of practices that need time and support to mature, we don't view it as a program one adopts and then evaluates the results. Therefore, to check the effects on students' performance we rely on the data from individual teachers and schools who have embraced MTV as both a goal and a practice and nurtured it at their schools or classrooms through sustained professional learning.

The results have been impressive. In 2010, the English department at Washington International School saw average student subject scores on the International Baccalaureate (IB) Diploma, both Higher Level (HL) and Standard Level (SL), increase significantly over the previous year (see Figure 1.1). These gains were especially dramatic for student in the SL

Figure 1.1 Washington International School's International Baccalaureate (IB) diploma scores on A1 English exams for years 2009–2011.

IB English A1 Higher Level				IB English A1 Standard Level			
Year	N	Average Score	Percentage scoring 7 or 6	Year	N	Average Score	Percentage scoring 7 or 6
2009	29	5.07	24.1%	2009	30	5.20	30.0%
2010	36	5.58	52.8%	2010	29	6.07	79.3%
2011	24	5.54	50.0%	2011	31	6.23	87.1%

English classes where average scores went from 5.2 (on the IB Diploma's 7-point scale) in 2009 to 6.07 in 2010. Furthermore, a full 79.3% of SL students received a top score of a 7 or 6 on their English subject area exams in 2010 compared with just 30% in the previous year. In 2011 scores held steady for students in the HL classes but continued to climb for SL English students, reaching an average score of 6.23 with 87.1% scoring a 6 or 7 and no student scoring below a 5. This was not only a strong uptick in performance but also one that was surprising due to the larger number of learning support students in the 2011 class. Teachers attributed this to the fact the 2011 cohort had experienced three straight years of MTV practices. While English performance was dramatic, other subject areas at WIS saw similar gains. Performance levels have remained fairly consistent over the subsequent eight years.

In Melbourne, Australia, when Nathan Armstrong began working with visible thinking and building a culture of thinking in his senior English classes at Wesley College, he saw the percentage of his students scoring in the top 10% on the Victoria Certificate of Education (VCE) increase 2.5 times, rising from 21% of his students in 2007 to 55% in 2008. This high rate of performance has remained steady over the subsequent years. At St. Philip's Christian College in Newcastle, NSW in Australia, parents even recognized the difference MTV practices were making for students. One parent wrote high school English teacher Judy Anastopoulos the following:

> Dear Judy,
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> James [a pseudonym] was a below average English student in Year 10 with little ambition to achieve successful results in his HSC [Higher Secondary Certificate]. His application to English with the introduction of a new approach to learning using Thinking Routines has increased his spoken language and confidence but the off shoot of this is the written script that earns him a Band 6 [Highest level of performance] in his HSC for English. My thanks and ever grateful appreciation for my son's progress!!!!!!

St. Leonard's College, in Melbourne, Australia, has worked to build a culture of thinking by employing MTV practices for the past four years. Principal Stuart Davis knows that there is a tendency for schools to celebrate top performing students and to market themselves based on the number of students they can get in the top rank. However, when students are ranked against each other, as they are in Australia, this means only a very small percentage of students in the country can ever reach these levels. The top 1% is limited to just 1% of students in the country each year. Furthermore, by focusing excessively on top performers, schools neglect the vast majority of students they are charged with educating. Stuart believes the best way to assess the difference MTV practices have made is to look at what is happening to median scores (the point at which half the students score above and half below) and at the scores of students in the bottom quartile of the school as opposed to just top performing students. In other words, do MTV practices help lower and average students? At St. Leonard's, the median ATAR scores (Australian Tertiary Admission Rank representing a percentile ranking of all grade 12 students in Australia) have climbed steadily each year: 2015 = 81.55, 2016 = 85.58, 2017 = 87.4, and 2018 = 90.5. As have those for the lower quartile of students at the school: 2015 = 68.92, 2016 = 73.06, 2017 = 76.97, and 2018 = 78.24.

At the middle school level, the Intellectual Virtues Academy in Long Beach, California, a school that has made thinking routines a core since its founding in 2013, topped their district's performance on the 2015 Smarter Balanced Assessment (the first year of such testing) in both math and reading and dramatically outperformed state averages. The Mandela International Magnet School (MIMS) in Santa Fe, New Mexico, was founded in 2014 as a nonselective middle school magnet using the IB Middle Years Program. The school would eventually grow to include students in grades 7–12. We have worked with this school since its inception under a grant from the Melville Hankins Family Foundation. During the three years New Mexico administered the Partnership for Assessment of Readiness for College and Careers (PARCC) exam consistently, MIMS scores steadily rose in eighth-grade English with proficiency rates of 46% in 2016 (27% for Hispanic students), 60% in 2017 (41% for Hispanic), and 67% in 2018 (59% for Hispanic). In eighth-grade math, the scores have not been as consistent at 44% in 2016, 39% in 2017, and 49% in 2018. However, the scores do show long-term growth and are extremely strong when compared to the district average of 17% for this time period. It is also instructive to look at a cohort of students progressing through the school to see what happens to their proficiency levels over time. When following the 2016 seventh graders as a cohort, their English level proficiency rates as a whole went from 46% in 2016, to 67% in 2017, to 77% in 2018. Considering just Hispanic students in this cohort, scores went from 24% in 2016, to 41% in 2017, to 56% in 2018.

In 2010, Way Elementary in Bloomfield Hills, Michigan, saw students' performance on the new state writing assessment far outpace district peers who were using the same writing program with 82% of their students scoring proficient or above versus 66% in the district as a whole. The only difference was that Way was dedicated to being a "Visible Thinking" school starting in 2008. As a new assessment there are no data on prior years, but the comparative data between Way Elementary and schools having a similar student population in the district and using the same writing program provides a good quasi-experimental comparison. Likewise, Bemis Elementary in Troy, Michigan, had reached a rate of 85% proficient or above in English language arts in 2010 and saw that increase to 98% in 2013 by having visible thinking a regular part of their practice. Bemis also saw a dramatic increase in students scoring at the *advanced* level in mathematics with initial performance of 28% in 2010, 37% in 2011, 49% in 2012, to 50% in 2013.

These examples could be dismissed as nonevaluative and not rigorous as it is not an experimental research context (a rare occurrence in educational research). There is no way based on these data to measure what level of effect size one is likely to get if one "implements" MTV practices. Nor is it possible to see how it stacks up against more straightforward interventions or single-focused programs. Furthermore, we recognize that there are confounding variables in that these schools had a clear purpose and vision and were guided by strong leadership, which we know affects students' learning. What we think the data do tell us is that efforts to make thinking visible can, in the right hands and pursued over time, greatly enhance students' performance – even on standardized tests.

This is not surprising. When students are more cognitively engaged, we know that performance goes up (Newmann et al. 1992; Shernoff 2013). A recent study by physics professors at Harvard found students learned more from active learning methods than from more direct, passive lectures (Deslauriers et al. 2019), despite students feeling that they learned better from lectures. When students understand material deeply, they tend to recall it more easily, are better at transferring it to new contexts, and perform better in problem-solving situations (Newmann et al. 1996, 2001). And when students are engaged in thinking, their understanding increases. Therefore, we shouldn't be too skeptical that such efforts, even when not designed as a program to implement, would have an effect on students' performance. As Cameron Paterson states, "When I make students' thinking visible, it becomes shared, so it is 'our' thinking, bounced off each other, rather than locked inside their heads. This process of publicly sharing thinking builds our collective understanding. We all learn more AND they do well on the tests." Furthermore, we have never seen scores decline when schools or teachers embrace visible thinking. This is consistent with other efforts to engage students deeply in learning (Claxton et al. 2011).

For those interested in experimental data in which the use of thinking routines is used as a treatment to compare with the performance of a control group, a recent quantitative study by Yerko Sepulveda and Juan I. Venegas-Muggli at the Universidad Tecnológica de Chile INACAP is instructive (Sepulveda and Venegas-Muggli 2019). They studied 883 business school students taking a core Cost and Budgeting course (using the same syllabus, quizzes, and exams) distributed across 32 different course sections and three different campuses. The 152 students who were taught using thinking routines (five different routines were regularly used) achieved a final exam grade that was on average 1.3 points higher (on a 1–7 scale) than their peers taught using traditional methods identified in two separate control groups.

A related question we are sometimes asked about visible thinking is: What is the empirical evidence for their effectiveness? Although it may seem that this question is the same as the one about test scores, empirical evidence and experimental evidence are not necessarily the same. Empirical evidence has to do with what can be observed or verified from experience. The empirical evidence for MTV is accessible to all. When you use a thinking routine you can answer for yourself: How did this change students' engagement? Are students building understanding? How did the routine facilitate their exploration of the topic? Did students go deeper than with the more traditional approach I have used? What you see in the moment, from debriefing with students, and from your analysis of and reflections on students' work afterward, constitutes your own empirical evidence and should be valued. We shouldn't let test scores be the only story that is told of our schools and classrooms. It is time we provide much more robust evidence of learning to parents, students, and the community.

Although we have not focused on MTV practices as a means of raising test scores does not mean we have not done research on their effects. Since we designed routines to develop students' ability to think, this is what we evaluated in our earlier research. We found that regular use of MTV practices had a dramatic effect on the development of students' meta-strategic knowledge, that is students' awareness of the strategies they had at their disposal. One's meta-strategic knowledge is a key factor in one's ability to direct one's thinking and tell oneself what to do as a thinker. Thus, MTV practices facilitate students' development as thinkers and learners. See Ritchhart et al. (2009) for a full explanation of this research.

DEVELOPING THINKING DISPOSITIONS

The main goal of the Visible Thinking project was to develop students as thinkers and learners by cultivating their dispositions toward thinking. A disposition captures one's

personal patterns of interaction with the world. Our dispositions are a part of our character. Our thinking dispositions reflect who we are as thinkers and learners. Of course, a disposition goes beyond merely having the skill or ability – it implies that an individual also is *inclined* to use those abilities, is *aware* of and sensitive to occasions for the use of those abilities, and is *motivated* in the moment to deploy the skills (Ritchhart 2002). Thus ability, inclination, awareness, and motivation must all be present for us to say one has a particular disposition.

When teachers use thinking routines, they help students develop their ability to think, building up a repertoire of thinking moves. This process is further enhanced when we explicitly name the thinking and cue it up in our introduction of a routine as a thinking tool meant to serve a purpose. By having the Understanding Map (see Figure 2.1) posted in the classroom or in student notebooks for easy reference, students have a repertoire of thinking moves at their disposal. Fifth-grade teacher Sandra Hahn from the International School of Bangkok remarked, "My fifth graders became quite expert in identifying the thinking moves they used and describing how it was used to help them find a solution to our weekly maths problem. Some went even further to create a personal question prompt they could use in another situation to access that thinking move."

When we make thinking visible as a regular part of the classroom through our use of thinking routines, documentation, questioning, and listening, we send a message to students that thinking is valued. It is infused in everything we do and becomes part of the fabric of the classroom. Students come to see the value in their thinking and become more inclined toward thinking as an important part of their learning rather than as an occasional add-on. This changes who they are as learners.

Bemis Elementary in Troy, Michigan, has a long history of using MTV practices. They have embraced both the goal and the practices widely across the school. Over the years, fifth-grade teacher Kim Smiley has observed the difference this has made. "As students bring more years of thinking routine experience with them, they are internalizing these routines. As a result, the way they approach conversations, and the language they use has changed. They talk about their thinking easily and effortlessly." Similarly, Denise Coffin has seen how regular effort to make thinking visible changes her kindergarten students. "Over the years, I have noticed that my learners take all of this with them when they leave kindergarten. The thinking continues to deepen and the routine becomes an innate habit or disposition. I see my learners take this newly formed learning identity, routines and all, to other disciplines and even to interactions with their families."

When it comes to dispositional development, our research has shown that often the biggest impediment to realizing a disposition is the failure of individuals to spot

occasions for deploying their skills (Perkins et al. 2000). People often have the ability to think yet fail to identify those instances when they should deploy those abilities. In schools, the development of awareness can be problematic as teachers often tell students exactly when and where to deploy their skills. To develop awareness, teachers have to step back and allow students to step forward to make more of these decisions. Of course, if students fail to spot the opportunity, we can step in but doing so before students have had the chance to identify the occasion robs them of the opportunity for dispositional development.

University of Michigan lecturer Katrin Robertson began to see this awareness developing in her students. "Once students had internalized the structures of a variety of routines, they began suggesting which routine they wanted to use so that *their* thinking was the center of our learning and not mine. It was exciting to see them take the lead and make these choices for themselves rather than me being the one to plan all of the instruction." At the other end of the learning spectrum, kindergarten teacher Jennifer LaTarte from Bemis Elementary recognized that she needed to hand more control to her students to allow for their dispositional development. "By giving students a voice you send the message that their ideas and thinking are relevant to the learning that takes place and they begin to naturally take agency over their learning if we hand them the baton."

CONCLUSION

Based on the power of MTV practices we have articulated here, one might assume that we have identified a magic bullet to cure the ills of schools, lessen the burden of teachers, and dramatically increase students' learning. Sadly, this is not the case. What we have tried to do in this chapter is to show where the use of MTV practices might take you, your students, and your school. The six powers articulated here are based on our research in classrooms where teachers have been engaged deeply with MTV practices over time, in sustained ways, and with the support of their colleagues. It is only through such ongoing efforts that one is likely to realize any one of these powers, let alone all six. Teaching and learning are complex tasks and we must respect that complexity. There are no quick fixes in teaching, only meaningful efforts to create the conditions for learning. MTV practices exist as part of those important efforts.

Knowing what is possible and understanding the potential of MTV practices helps to avoid the biggest pitfall we have seen in the implementation of thinking routines: that they are just activities used to break up the monotony of school. As you read more about the practices in the coming chapters and work your way through the new thinking

routines we share in the upcoming chapters, remember the potential we have laid out here. As you integrate these practices into your teaching, think about these six powers as forming a theory of action by which you can judge your success (City et al. 2009). A theory of action ties together teaching actions with expected outcomes emerging from the actions. Having an articulated theory of action, either for oneself or as a whole school, helps us to avoid the implementation trap in which we merely implement a set of practices and hope for the best. Theories of action provide us with the touchstones we need to evaluate our efforts.

What might it mean to use the six powers articulated here as a theory of action? One possibility is: *If* I/we use MTV practices to actively engage our students with each other, with ideas, and in action, *then* student will experience deep learning, be more engaged in their learning, assume more active roles in their learning, develop as thinkers and learners, and improve in learning outcomes. At the same time, we as teachers will become better listeners, learn to encourage student initiative, and gain new insights into our students' learning that helps us to plan responsive instruction. A theory of action need not include all six powers as we have done here. You might want to focus on one or two of the powers specifically for a period and then expand. We encourage you to craft your theory of action, drawing on the six powers, and to revisit it often throughout your efforts to use the MTV practices shared here. If you are finding that over time your sustained efforts and actions aren't leading to the expected outcomes, reflect with colleagues about why this might be happening. You'll find helpful troubleshooting suggestions throughout the book both with regard to individual routines and more generally about MTV practices. Revisit these as you work with MTV practices to guide your reflections.