

The Problem Solving Problems

I am a ferocious problem-solver. I turn everything into a problem to be solved. I can systematically break that problem down and work at it for years, even decades.

Conversely, when I face a problem that I don't see a way into, I shut down. This is why, despite knowing lots about math and loving it, I shut down as soon as I read a word problem. I have the same response to "running out of time," "running out of money," and anything that does not readily lend itself to a problem solving mentality!

My shut-downs generate anxiety and depression in me that makes it hard for me to break the problem up and tackle it in pieces. Learning to solve the problem of solving problems has been my life's work.

Some problems I have solved

A great way to solve problems is to break them up into smaller, more manageable problems. In fact, the bigger problem becomes *exactly how to break them up*, into what size, what is a problem that is small enough to manage but big enough to engage you? No one wants to write a novel at the rate of one letter a day.

Three of the most difficult problems I've solved:

How to learn a second language
How to think about calculus
How to write orchestration

Language

After a lifetime of trying to learn a language, and a lifetime of failing, I have finally begun making progress in Italian...after just six years! The ice broke about a year ago, and was the result of lots of little steps. The next time I learn a language, I'll have a much better route.

I started off by throwing as much grammatical and vocabulary information at myself as possible in the space of a year. This created a problem of too much information that was not well connected. This points to a deeper problem.

Because of my fluency, even expertise, in writing English, my expectations were too high for another language. Not only was it intolerable for me to speak and write like a beginner, I didn't really ever have to overcome the same difficulties in English. Once I broke my tasks into manageable goals with distinct progress, I finally began integrating the information I had swallowed whole.

What is essential is to make connections between the information learned, to make what you learn useful and integrated, however rudimentary, and to continually build upon it. This is how successful language study courses go, and is much closer to the way we actually learn a language.

Mathematics

Despite loving math, I have always struggled with it. I spent 30 years slowly working through my math difficulties and paid careful attention to the ways in which I made progress. Over time, I've gotten better (but never great!) at Math.

One thing Math requires is a complete connection between all parts of an idea. Each sentence in a math textbook, each line of a proof or explanation, must be understood from the smallest detail up. Any confusion or break in the continuity of these ideas and the learner will be derailed.

We can be derailed in foreign languages with a word we don't recognize, but the syntax can save us. "I was too tired to vhglt to the store." You can probably guess or infer what the weird word is.

With Math, it's very much harder to infer a missing piece. Instead it must be understood as part of a complete picture. Often a problem relies on *every detail* in the explanation.

I had several barriers to overcome. The first was physical, an inability to scan freely with my eyes from left to right, making it hard just to read the complete sentences. Through the Feldenkrais Method I was able to correct this.

Once I improved my vision sufficiently, I had to learn how to coordinate details with the big picture. Reading a math explanation may require holding certain ideas in your head while receiving others, just like listening to any sentence. In the case of Math, the bar is higher and the need for focused, knowledgeable concentration is greater.

I began discovering what kinds of things I needed to hold in my head, what kinds of things were constant and what were changing. I learned to better transform words into ideas and pictures that moved around. In short, I learned how to connect the ideas into coherent wholes.

Orchestration

I used to get so frustrated trying to write for the orchestra. Whereas I could hear music in my head when I wanted to compose, I couldn't hear *orchestral music*! The basic ideas of orchestration seemed to elude me.

When I listened to orchestral pieces I felt like I didn't know what I was hearing. Does this sound familiar? It was the same problem I was having with foreign language.

When I studied orchestral scores, I didn't know what to look at. I lacked a schema for taking apart the notation to understand what I was seeing. This was the same problem I was having with math!

Over a long period of time I came to understand and integrate enough of the small details (just like language and math!) to be able to prioritize what was more important and what was less important on the page. Being able to prioritize the information made me a smarter viewer of the page which, to the uninitiated, is a wash. The better I got at seeing it, the better I got at

hearing it, because, surprisingly, my eyes are better at dissecting a visual mess than my ears an aural one.

Although I should point out, my ears are far better than most in this regard. And it's probably no coincidence that, having natural aural skills, I found it harder to do the necessary work to get good at an aural skill I wasn't already good at! Just like language, and probably math.

Summary of the problems

The problems I was having were

1. Difficulty knowing how much information to learn in order to gain mastery of a particular concept. I usually learned either too little or way too much.
2. Difficulty prioritizing the learning, knowing what was more important and what was less important.
3. Difficulty integrating the learning, connecting the information I had. This was a result of the last two problems!

All three of these scenarios, plus others like playing jazz, drawing, and writing novels, short stories and songs, all required the same sort of learning curve for me, and I put in the same thirty years for all of them! As a compulsive problem solver, I suspected that there was a constant running through all of these problems, and that, were I to solve one of them, I might be able to solve them all. What I didn't suspect was that the constant was deeper than I thought.

But I'll get to that in a while.

Connections Instead of Little Pieces

One of the best strategies for solving a problem is to break it up into smaller, more manageable problems.

Sometimes the issue is that the problem *can't be broken into pieces that are the right size*. You'd like to break the math problem up, but when you do, you're either dealing with information that, by itself, doesn't mean anything (let $x=7$. Too small) or you're dealing with a glut of things that you can't make sense of.

Elements needed to solve the problem are interrelated and shine light upon one another. All elements must be understood in order to make sense of any one of them. For example, a word cannot be made sense of by looking only at its letters. The combination of letters must be taken into account, as well as the context of the word.

The larger idea is called the unit of perception (Bamberger) and the smaller ideas are called the units of description (ibid). We get into trouble when we reach the limit of how far we can meaningfully break down a problem. How can we solve *this* problem?

Imagine you have a box of 2000 legos. Carrying the legos from one end of a stage to the other in a single trip is easy if they are in the box. If I take away the box, how can the legos be carried across the stage in a single trip?

The solution is obvious, though it may be elusive. The legos link together, and by linking them all, they can be carried in a single trip. They can be linked in many ways, some creating a more

efficient package than others (a single column of 2000 legos may be transportable, but it will be very fragile and unwieldy and may be too tall for the room its in).

A problem is often like those legos. The box is someone or something that contains the solution for us so we don't have to solve it. Removing the box puts us in the problem-solving/ learning space.

We can solve the problem by linking the legos, that is, linking the elements of the problem into a meaningful whole.

Legos are easy to connect. Elements of a problem are not always so easy. One of the difficulties of problem solving is that we don't understand how the elements fit together.

Here's an example.

If I showed you a slide of these numbers: 441, 484, 529, 576, 625, 676, 729, 784, 841 and 900 and I gave you ten seconds to memorize them before removing the slide, could you reproduce them five minutes later after I threw a bunch of other numbers at you to distract you? A few "memory experts" might be able to do it, but most people would give up before even trying. The problem seems too difficult.

But it isn't. Anyone could do it, if they know how to connect the numbers together. Can you figure it out?

In other words, if you know that these are the squares of the numbers 21-30, you don't have to memorize them. You just have to memorize 21-30, and then multiply each number by itself. Any child with a calculator can now solve the problem and recreate the numbers.

$$21 \times 21 = 441$$

$$22 \times 22 = 484$$

$$23 \times 23 = 529$$

etc.

Although the solution to this problem is trivial, the idea behind it is helpful. Any problem may be addressed by thinking of the elements not as individual units to be conquered, but as interrelated elements to be connected meaningfully. This is why it can be much easier to memorize more information than less information.

Want to learn the names of all your co-workers? Map out how they are related to one another socially and functionally, and sort them into age-groups, gender groups, zodiacs, or anything that's meaningful to you. Then you'll have a composite picture of all the people in your group rather than a collection of individuals.

Want to learn to orchestrate? Understand how the elements of the orchestra combine to solve the problem of enhancing (or creating) a piece of music. Then you move from arbitrary rules of instrumentation into a thought-process that is reasonable and replicable.

Want to learn math? Well, that's harder! But the solution is the same: understanding how many math "facts" connect through proofs, problems and applications illuminates all of them.

One of the miraculous things about certain problems is that the elements can be linked by something unrelated to the elements. In some cases, you may be able to solve a problem in an

unexpected way. Let's say the problem is making sure kids are ready to do math when they get to elementary school.

The typical approach to the problem is to foist math skills on poor little children who aren't developmentally ready for them. This is currently being done by well-meaning educators, legislators and parents, and what it really does is make children neurotic and rob them of the playtime they need to grow into competent learners. Check out this interesting solution:

There is a children's song called "Bye and Bye" which counts the numbers 1-9 in three groups of three. "Bye and Bye...stars shining number, number 1, number 2, number 3, Good Lord, bye and bye..." This verse is repeated twice more, with the numbers 4,5,6 and 7,8,9 substituted in.

What is remarkable is that a 3-year old child can learn a song like this. And because the child *must* subdivide the numbers 1-9 into three groups in order to sing the song correctly, they are in a sense solving a problem they could not solve on paper: Divide 9 by 3.

Similarly, the song "Bingo" incrementally replaces letters with claps, first replacing the "B," then "BI," until all letters have been replaced by claps. This can actually be represented by a series of algebra equations ($5=x+5$, $5=x+4$, $5=x+3$, $5=x+2$, $5=x+1$, $5=x+0$) where x equals the number of claps. Again, little children are solving these equations through music very successfully where they could not solve them on paper (even if they could write!)

Music is the unexpected connecting element here. It makes possible the solution to the problem by linking, however arbitrarily, all of the related aspects of the problem. This is why music and other related arts are vital to the education of the child.

By providing connections to certain problems, we introduce ideas into children's heads without stress, and those ideas can serve as the foundations to more difficult problems. Children may be able to divide and multiply better because they've had the physical and emotional experience of doing it in "Bye and Bye."

The children have also, without knowing it, gone through a problem-solving model where they've been shown a way to connect elements through an overarching scaffold. They will need this approach when they solve problems down the line.

The lego problem could have been solved with many trips. But that wouldn't solve the bigger problem, which is getting them across the stage in a single go. We needed connection to solve that problem.

I had trouble with jazz solos my whole life. Oct 29 of this year (2023) I finally managed to understand what the problem was. Not surprisingly, it resembled all the other problems.

I saw jazz solos as threading out ideas like pearls on a string. This worked as long as I kept it slow. When I went fast, it fell apart.

Instead, I discovered that jazz solos are made up of phrases, much like our language phrases, and the phraser must have some idea of the *whole* of the phrase, including the end, in order to make it fit with other phrases. The rationale for why one phrase will work and another will not is a matter of art, not science, and there are a lot of factors involved that can change the outcome. However, decisions must be made with a kind of knowledge and experience that, when lacking, will result in confusion and ineffective performance.

It took me so long because I was always trying to break the solo down into individual notes, and those notes didn't make sense by themselves. But I lacked the capacity to know exactly what size bites to break the problem into. Had I known, I'd have had something that would connect well to each phrase before and after, and to the music as a whole.

Understanding the Problem

Possibly the most profound means of addressing the problem came in my studies of The Feldenkrais Method. This somatic discipline provides us a means to examine how we function as humans by taking us through lessons designed to improve our awareness both of our physical positions in space, and our habitual responses to movements. The method of waking us up to the difference between what we desire to do and what we actually do involves this question of enacting our knowledge with a sufficiently effective problem.

In one form of the Method, Feldenkrais has created "Awareness Through Movement" lessons, or ATM's. There are hundreds of these lessons and while they vary greatly in the specific instructions, they share a larger structure. They are pre-thought-out "problems."

Typically the lessons focus on a function involving reaching, twisting or folding the body. There is usually an opportunity to assess one's functionality by doing what appears to be an arbitrary movement such as reaching across one's body with the hand to feel the ribs on the opposite side. Over the course of 45 minutes, the participant will have an opportunity to see if they have increased the extent or ease of this movement without making an additional effort.

The "magic result" of improvement seen at the end of these lessons may come about from the method of the lesson. The instructions ask us to enact our movement while constraining us in ways that prevent us from doing it in our habitual manner. For example, we may be asked to cross our left leg over our right before reaching across our body.

This contrived request may constrain our ability to rotate in the pelvic region. This presents us with a problem. If we are to reach our ribs, we will have to soften them enough that we can rotate from higher up than the pelvis. We may have to go very slowly and pay careful attention to ourselves before it occurs to us that our ribs can move.

In this way, though we deem ourselves experts at the use of our bodies, we come to discover that there are parts of us with which we are completely unfamiliar, perfectly functional muscles and bones that can move, but to which we have no connection in our minds. We gain access to these "little boxes" inside ourselves when we have to solve the problem of the lesson. We may need to spend considerable amount of time re-learning, or learning for the first time, the movement in these ribs which we might have suppressed for our entire lives, before we can adequately make use of it to turn without the assistance of the hips and pelvis.

Feldenkrais was very good at breaking a function up into pieces while maintaining the sense of connection through the whole body. At no point is a lesson ever divorced from the whole self. This is the difference between one of his lessons and one we might make up.

Once we finish the lesson and experience the sensation of increased freedom and comfort that ensues when formerly unidentified parts of ourselves are integrated into our self-image, we have another level to go. If we fail to make use of our improved function of turning, we will lose it. We must have a use for our restored talents in order to gain true expertise.

In my case, one of the best uses of my freedom is in the study of the piano. Like so many other areas, I found myself unable to become the pianist I thought I should be, or could be. I had little notion of what was different between myself, an inspired, curious music lover, and my friends who studied piano at the Oberlin Conservatory of Music.

Even with the assistance of *five* piano teachers (including the three Jazz teachers mentioned above), I found my progress to be fitful and far from satisfying. But then again, despite my instruction, I avoided actually performing, especially in my formative years.

This proved to be an important point. The Method, which I began studying in my late 20's, and piano lessons, which I took on and off until my late 30's, did not combine to meaningfully improve my playing. Only finding a suitable challenge did that.

One of the most effective challenges was working a church job! Forced to play new music every week, some of it considerably difficult, I quickly had to enact the skills I had cultivated but not organized. I saw my best improvement when I was working for a church as a professional accompanist.

Incorporating my Feldenkrais improvements proved more difficult and required an even greater challenge. That came about when I began teaching the piano. Having to guide my students through the same difficulties I experienced forced me to integrate my knowledge with my capability. The better my students got, the better I got, until at last I achieved what I considered to be a "normal" ability to perform.

Problems I haven't solved:

How to throw
How to draw clouds in pen and ink
How money works

Despite what I know, these problems still evade me. I am less anxious about them now, because I have learned the above ideas. I also recently had a revelation that proved very helpful, and I'd like to tell you the story now.

Solving the Me-Problem

Over the course of 54 years I've had every opportunity to heal from the things that harmed me. I've done talk therapy and completely processed the kinds of things that happened in my childhood. My work with the Feldenkrais Method and Intermittent Fasting has restored my body and my mind to a better, more functional state. And yet at 54 I was finding myself reaching a point of despair.

I was still having panic attacks, still unable to reach clarity in my thoughts, still finding myself moving along the same irrational paths where I would pursue too many things at once under the assumption that I could master them all given enough time and information. I continued to have flawed and confusing interactions with my wife and children where I would act or say hurtful things that, to me, hadn't seemed hurtful when I said them. Getting feedback on those interactions was like being blind and walking through a room where someone is moving the chairs around, or where you come back to your office and someone has moved everything around so that nothing's where you thought it was.

Yet I knew I was healed from my trauma. I knew it from the evidence of years of therapy, and I felt it in my heart. So why was I not “better?”

One day I had as a guest on my interview show a man named Sam Farmer. We’d gone to college together, and he’d discovered many years later, at age 40, that he was on the autism spectrum. Even though I knew I could never be diagnosed as on the spectrum myself, it was through our conversation that I began to accept the possibility that I am neurodivergent, with a brain that is wired differently than most people.

I began to look back on all the problems I’d had in my life, problems with friendships, problems with intimacy and relationships, problems with anxiety. Just like the legos, I found myself connecting all of these problems. Once I did that, I saw them as a single thing for the first time, and I could carry them.

Once I started thinking about the possibility that I was neurodivergent, all the cards fell into place. The troubles I’d had as a kid, the weirdness, the wonderfulness, the superpowers and superfails, all sounded very much like someone with a different neuropathy. Even better, it gave me a sense of how I might think of myself *now*.

As a neurodivergent person, I could recognize that there was nothing *wrong with me*, no damage to carry, nothing to fix. I was simply a person living in a world designed for minds that weren’t like mine. I was bound to have anxiety in that kind of world, and it would never completely go away.

The difference between thinking I should be anxiety free versus knowing that anxiety is part of my neuropathy changes me from feeling like a failure to feeling like a person who is different.

Furthermore it gives me the opportunity to directly address my difficulties. Up to now, I’ve been shooting at my anxiety and missing every time, because in effect the rifle-sites have been off. What I thought was a bullseye was a miss, every time!

Now I understand that knowing my triggers will help me *deal* with the anxiety, but that the triggers themselves are not symptoms or weaknesses. They are the result of my different brain colliding with the world. Instead of liabilities, the triggers are now friends who will help me move through the danger, recognize when I’m overwhelmed, and give me an opportunity to do the hard work I have to do to get through it.

That someone else doesn’t have to deal with these triggers is no longer a sign of my inferiority in society. Just a sign of my differences with other people. I get superpowers, and I get supertriggers, and, for better or worse, it’s all me.

When my wife lets me know that I am being hurtful or insensitive, or tells me that my experience of something like working with money could be different, I have the opportunity to recognize that I have a choice. She can help describe the connections that I, in my fractured mental state, may be missing. Rather than get defensive, I can trust her and others in my life, and begin to learn the things that other people know without trying.

It doesn’t bother me to have to learn them. I’ve found that being forced to learn things that other people do automatically gives me an insight into them that many people miss. For all the extra years I have to spend on something, at the end of the process I am not only an expert, but I can *teach it*.

This change in outlook gives me an opportunity to replace self-despite with self-love. It gives me the opportunity to fill the empty place inside myself where an identity could never be found. No longer do I have to seek ways to externalize my identity with creations so that I can feel safe. I have an identity. I am a person. My creations are the result of that person, and they look and sound like that person, with all his neurodivergence. If that makes it harder for me to connect with people, then this is a challenge and an opportunity.

The point is, now I know what that challenge and opportunity are.

Once I realized that, then I had a new problem to solve, which I'm in the middle of - what now connects all my little problems? What is the new big problem I want to solve? What can I do as the person I am?

Maybe I'll know more about that the next time I speak to you!

Summary

Essentially I've been trying to solve the "me" problem my whole life. Arguably, I chose my obsession with problems I couldn't solve in math, orchestration and language studies because, while "unsolvable," they were at least problems I recognized. They kept me distracted until I was finally able to see the "me" problem.

Working on those problems forced me eventually to see the similarities between them: that each one required an integration of units of description into something large enough for me to perceive, and the further connection of those elements with one another. Ultimately my ability to solve those problems made it possible for me to solve the "me" problem. When I finally solved the "me" problem, it was because I could see enough of me to register, and could connect the various aspects of myself into a unified whole.

I was asked to share a poem for this presentation. What follows is a poem I once heard on the radio and felt compelled to seek out. It is one of my favorite poems of all time.

I do not know what possessed me to choose it for this particular moment. Perhaps there's a deeper connection I haven't been able to articulate yet. It may be interesting for you to try to make the connection!

What He Thought
by Heather McHugh

for Fabbio Doplicher

We were supposed to do a job in Italy
and, full of our feeling for
ourselves (our sense of being
Poets from America) we went
from Rome to Fano, met
the Mayor, mulled
a couple matters over (what's
"cheap date" they asked us; what's
"flat drink?") Among Italian literati

we could recognize our counterparts:
the academic, the apologist,
the arrogant, the amorous,
the brazen and the glib--and there was one

administrator (the conservative), in suit
of regulation gray, who like a good tour guide
with measured pace and uninflected tone narrated
sights and histories the hired van hauled us past.
Of all, he was most politic--and least poetic,
so it seemed. Our last few days in Rome
(when all but three of the New World Bards had flown)
I found a book of poems this
unprepossessing one had written: it was there
in the *pensione* room (a room he'd recommended)
where it must have been abandoned by
the German visitor (was there a bus of them?)
to whom he had inscribed and dated it a month before.
I couldn't read Italian either, so I put the book
back in the wardrobe's dark. We last Americans
were due to leave tomorrow. For our parting evening then
our host chose something in a family restaurant, and there
we sat and chatted, sat and chewed,
till, sensible it was our last
big chance to be poetic, make
our mark, one of us asked

"What's poetry?
Is it the fruits and vegetables and
marketplace of Campo dei Fiori, or
the statue there?" Because I was

the glib one, I identified the answer
instantly, I didn't have to think-- "The truth
is both, it's both" I blurted out. But that
was easy. That was easiest to say. What followed
taught me something about difficulty,
for our underestimated host spoke out,

all of a sudden, with a rising passion, and he said:

The statue represents Giordano Bruno,
brought to be burned in the public square
because of his offense against
authority, which is to say
the Church. His crime was his belief
the universe does not revolve around
the human being: God is no
fixed point or central government, but rather is
poured in waves through all things. All things
move. "If God is not the soul itself, He is
the soul of the soul of the world." Such was
his heresy. The day they brought him
forth to die they feared he might
incite the crowd (the man was famous
for his eloquence). And so his captors
placed upon his face
an iron mask, in which
he could not speak. That's
how they burned him. That is how
he died: without a word, in front
of everyone.

And poetry--

(we'd all
put down our forks by now, to listen to
the man in gray; he went on
softly)--

poetry

is what
he thought, but did not say.

(used with permission of the poet)