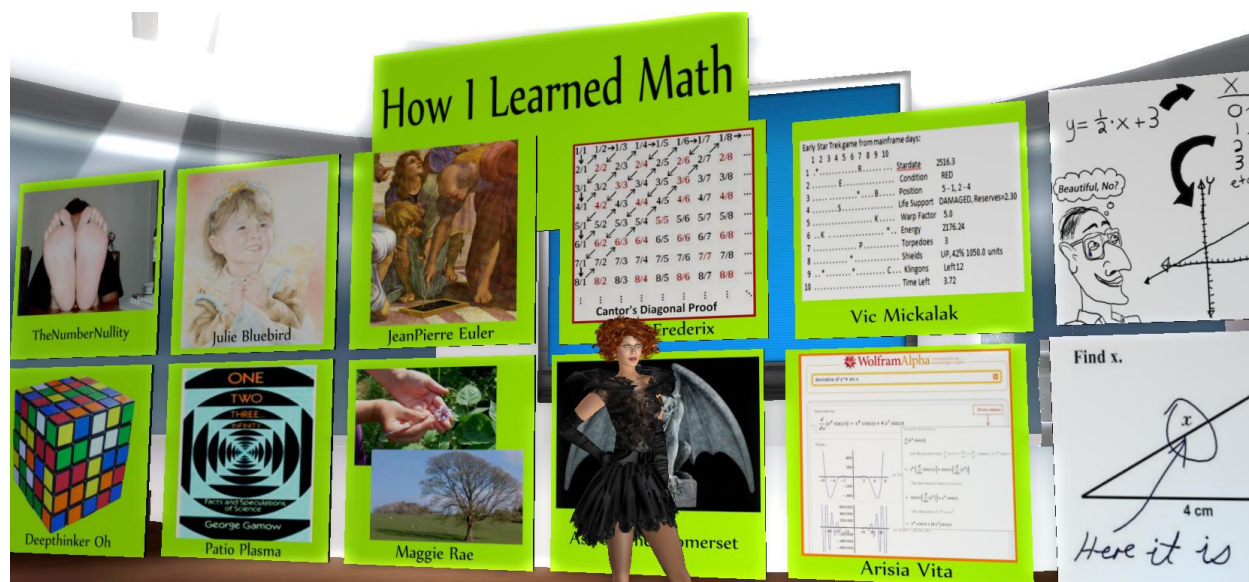


Why Is Teaching Mathematics So Hard?

by Deepthinker Oh
September 6, 2011



Deepthinker Oh: Well it's 11:30 AM SLT so we'll begin

Rhiannon Dragoone: Hi everyone!

quaezar Agnomen: Yes under the circumstances I may not complain..

Rhiannon Dragoone: Is this in voice or text?

Deepthinker Oh: This is in text.

Thank you for coming today.

itsme Frederix: In the beginning was the word, and the word was written.

Deepthinker Oh: Please take a notecard from the checkerboard box on the floor. I'll give you time to read it.

The thing there at the stairs is Chebyshev's walking machine from the 1878 Paris World Expo. JeanPierre says it illustrates mathematical principles related to the problem of conversion between mechanical movements. he will explain more later.

Those so inclined can sit in it and walk around while we are reading the notecard. Try not to run over anyone.

Hello dali

Rhiannon Dragoone: My notecard isn't rezzing

Deepthinker Oh: Please take a notecard from the checkerboard box on the floor. I'll give you time to read it.

Oh foo

Nymf Hathaway: welcome Dali

Astronomer Somerset: mine is fine

Nymf Hathaway: Indeed Deep notecards may not load for people due to the restart LL just did ;(

Dali Waverider: Hi nymf, Deep, and all

Kos Hallard: Perhaps give her yours

Rhiannon Dragoone: Thanks Deep, that one rezzed immediately

Deepthinker Oh: Chan or I will drop you a copy if need be, just sing out

Nymf Hathaway: Yup 😊

Deepthinker Oh: Any brave soul wanna play with the walker thing?

Vic Michalak: Sure!!

Templeton Tigerpaw: I think it would get my tail caught

Lolli Bluebird: whimper ;-/

Deepthinker Oh: Just don't run us over too badly

Nymf Hathaway: Take the backseat Vic

quaezar Agnomen: Great work JP made!! 😊

Astronomer Somerset: trust the boys to play with the toys

Lolli Bluebird: Cool!

Nymf Hathaway: Welcome Delenn 😊

quaezar Agnomen: beware you stay on equal ground Vic 😊 .. or we fall 2500m

Vic Michalak: Even got around Deep without mowing her down...

Delenn Daines: Hi Chantal, thanks for the tp, I crashed

Deepthinker Oh: Please take a notecard from the checkerboard box on the floor. I'll give you time to read it.

Astronomer Somerset: nobody here an arachnaphobic i hope

Nymf Hathaway: Blame LL Delenn it has been troubled inworld ;(

JeanPierre Euler: sad I can't see it

Templeton Tigerpaw: Wemight christen it Daddy Longlegs...

Nymf Hathaway: JP Arisia will take pictures today

Deepthinker Oh: Please is everyone reviewing the notecard?

Rhiannon Dragoone: I'm on story 9

Deepthinker Oh: Please take a notecard from the checkerboard box on the floor. I'll give you time to read it.

Nymf Hathaway: already did 😊

Deepthinker Oh: As you read, please begin to think about how people's stories of learning math may influence the teaching of math.

Hello itsme

itsme Frederix: Hi Deep

Astronomer Somerset: hi itsme

Deepthinker Oh: To begin. . .

I asked people to send me stories of their experiences in learning math and to include a picture.

Nymf Hathaway: Welcome Maria 😊

Deepthinker Oh: The stories are abstracted in the notecard and the pictures are behind me.

itsme Frederix: Hi all, if I' acting strange, trying out FireStorm viewer - so don't blame me to hard

Deepthinker Oh: Firestorm is a very clever viewer

itsme Frederix: I do not see pictures

quaezar Agnomen: Nice stories Deep 😊

Dali Waverider: 13 Dali Waverider

One problem is that math is taught (at least through undergrad) as if it is a single subject, which must be approached as an accumulation of knowledge with a preconcieved linear time frame, where each subject requires a mastery of all previous subjects. In fact math is a diverse collection of subjects, each requiring its own skills. In my case I hit a brick wall in Calc 3, perhaps because I didn't have the time to put into it...perhaps because I simply don't have the talent. But later I took stat classes I found to be easy, and Linear Algebra that was easier than slicing soft butter.

Deepthinker Oh: I did edit people's stories and I apologize if I managed to lose your point due to over zealous editing.

Nymf Hathaway: Welcome Earthchild 😊

Rhiannon Dragoone: You're a red cloud to me itsme, i'm on firestorm too.

maria24 Murfin: hi ;-)

Deepthinker Oh: Hi maria

Astronomer Somerset: hi maria

itsme Frederix: hmm changing viewer, please let my seat for me

Deepthinker Oh: If you are here, I'm going to ask you to explain your picture and briefly tell your story.

Nymf Hathaway: Protects Its seat 😊

Kos Hallard: One problem is that math is taught (at least through undergrad) as if it is a single subject, I disagree completely

Deepthinker Oh: We will go in order from top left

Kos Hallard: It is taught as a number of varied subjects

Vic Michalak: Math can be "edited" but there is not nearly so much problem with misinterpretation for that language because it is precise...

Deepthinker Oh: I do want to review the stories before discussing the how

Nymf Hathaway: Welcome back Its 😊

itsme Frederix: there they are the pictures

Deepthinker Oh: JP you are the first one moving from the left who is here

Nymf Hathaway: Welcome Chyna 😊

Deepthinker Oh: Now everyone has read your story but can you add a little?

Perhaps explain how the Wlaker fits in?

Vic Michalak: [Moving the walker a bit out of the way]

itsme Frederix: thx Vic

Deepthinker Oh: The two posters on the right are from Leandra Kohnke. Also, Dawn Rhiannyr send in some ideas for discussion.

Nymf Hathaway: Welcome Milly 😊

Deepthinker Oh: When we have gone over all the posters, anyone who did not submit a story will have an opportunity to share their story.

JeanPierre Euler: so my story is simple

Deepthinker Oh: JP is on a text viewer and let's give him a moment to reply

Vic Michalak: Ack!

The walker disassembled!

Nymf Hathaway: Q can rezz a new one Vic..... Q?

quaezar Agnomen: ok..

Astronomer Somerset: oh vic killed the spider

JeanPierre Euler: I come to math with lucid elements

Vic Michalak: ;{

JeanPierre Euler: euclid

Vic Michalak: lucid euclid

itsme Frederix: disassembling is the way I did Rubric's Cube

Deepthinker Oh: everyone give JP the floor

Paolo Rousselot leans over to pick up a piece of tile for JP...

quaezar Agnomen: 😊

millysue Resident: sorry all is grey atm

JeanPierre Euler: so it comes with a notion of proof as a game. for me it was the best way to math

Vic Michalak: Trouble with other languages are that they can be ambiguous (like the floor example)

JeanPierre Euler: I'm very uncmfortable with typing here sorry

Depthinker Oh: That's ok we can move on

quaezar Agnomen: Take your time JP

Vic Michalak: Where would you like to type? 😊

Astronomer Somerset: jp can you voice

Vic Michalak: [Another example of ambiguity that math tries to amelioriate...]

Nymf Hathaway: welcome Talise 😊

Depthinker Oh: Let's move on. Itsme what can you add to your story of learning math?

JeanPierre Euler: no I have a weak cellphone signal

Rhiannon Dragoone: JP, oh, I hate those; makes things laggy

itsme Frederix: Me, oh uh

Rhiannon Dragoone: And my fingers are too big for the virtual keyboard; makes for interesting autofill
So take you time

itsme Frederix: Well I like the paradoxes of set theory. I like it that are that much whole numbers as there are rationals.

Rhiannon Dragoone: Paradoxes of set theory are cool, but they freak out students

itsme Frederix: That there are as much even numbers as there are even & odd together, thats just great.
And the prove is so genius, elementary

Depthinker Oh: Everyone hold on and let's get thru peoples stories

Rhiannon Dragoone: I was teaching pre-algebra, which is the "fill in the gaps and overcome the difficulties" course and people just wanted to learn the practicalities

Vic Michalak: Yes, often people just want to learn what numbers they plug in when....

Depthinker Oh: Itsme - any thing more?

Vic Michalak: ...and teachers often do not know much more than that (alas).

Talise Leodhais: ups

itsme Frederix: Deep no let them write their comments, I know that this is just beauty.

Depthinker Oh: OK Vic what do you want to add to your story of how I learned?

Vic Michalak: Well, as I mentioned, many math teachers are just like teachers of other subjects....
They can interpret the textbook somewhat...

..but they really do not know the subject.

Nymf Hathaway: Welcome Betz 😊

Betz Darwinian: thank you

itsme Frederix: I guess thats speaking based on experience, limmitted not endless experience

Vic Michalak: So they just give examples (often irrelevant ones, like the trains leaving the station, that sort of thing)

And how it works for everything we do in our lives!

To teach math you have to have a passion for it!

I did not really get interested in it until I learned that....

Depthinker Oh: coool!

Astronomer Somerset: that counts for any subject vic not just maths

Vic Michalak: ...and experimented with it myself.

Such as changing the value of equations and graphing them just to see what changed and what it looked like...

Oh, yes, any subject...

(the value of variables that is)

itsme Frederix: how many subjects are there?

Vic Michalak: Once I found that math had power to describe and predict, I really liked it!

And it was precise...

Deepthinker Oh: anything more about learning yourself Vic?

Vic Michalak: Yes, I think my real "aha" moment was when I learned about relativity and quantum chemistry...

Rhiannon Dragoone: It was by teaching math that I ended up learning math.

itsme Frederix: math does not predict! its is the interpretation that predicts , the model

Vic Michalak: ..and how math could describe the exact wavelength of hydrogen light...

itsme Frederix: math = math

Vic Michalak: ...and the universe of relativity that does not make sense in our limited world.

Nymf Hathaway: JP will agree on that 😊

at Its that was

Vic Michalak: Its... yes, math is a tool... but so is a computer... it is what you do with it.

Rhiannon Dragoone: Well, I've read a journal article where dance was used to teach math, and with success; and in my group IM, people are discussing music as a means.

itsme Frederix: math is not a tool, math is abstraction in itself, it exist before you know it

Deepthinker Oh: ok lets' not develop the discussion yet. stories first

Vic Michalak: Almost everything can be used to teach math because math is involved in describing almost anything....

...at least in the non-philosophical world.

That's all I have for now.

Deepthinker Oh: thanks

my turn

quaezar Agnomen: 😊

itsme Frederix: topological thing

Deepthinker Oh: It was matrix algebra that I first really understood and that Rubix cube is supposed to be a matrix

I was a math dunce, but learning how to program and applying that to programming statistical procedures really opened up understanding for me.

I want us to review the stories and then we will have an open discussion about how these stories of how people learned math can be used to improve instruction in mathematics.

Oops ignore that last sentence

Vic Michalak: [copying can be like sending an email to "all"]

Nymf Hathaway: right

Deepthinker Oh: Matrix algebra was so cool a way to do regression

that it made me excited about math

Slipping over a few posters we come to Astro who has a less than happy story

Astronomer Somerset: yes

Deepthinker Oh: Astro want to add anything to your story?

Astronomer Somerset: yes please

Nymf Hathaway: YAY for Gilles... welcome dear 😊

quaezar Agnomen: Hi Gilles 😊

Rhiannon Dragoone: Hi Gilles

Gilles Kuhn: sorry sl was not cooperative

hello all

Astronomer Somerset: for me maths = a nightmare of being bullied and ridiculed and made to feel like a stupid idiot

Deepthinker Oh: np. We are listening to peoples stories

Talise Leodhais: aww astro

Vic Michalak: Poor teachers can beat you over the head with their subject as well.

Astronomer Somerset: hence the gargoyle he represents the person who was paid and taught how to teach supposedly but decided i wasn't worth teaching

Deepthinker Oh: aw squared

Vic Michalak: That person was not a "teacher"...

Nymf Hathaway: I so agree Vic

Rhiannon Dragoone: I have a student who is stuck going for his GED because he still hears the voice of his early teacher telling him he sucks at math

Most of my private students have had similar experiences to Ast's.

Astronomer Somerset: i was trying to think of a way of explaining to you what dyscalculia is really like so i have come up with a little example

Deepthinker Oh: cool

Astronomer Somerset: ok think cat dog house computer planet

Deepthinker Oh: yes

Astronomer Somerset: when we hear words we see images of those words in our head

Nymf Hathaway: (Dali... could you get out of edit-mode... we see red coming from you 😊)

Deepthinker Oh: right

Astronomer Somerset: ok now think about 10 7 2000 150 7/16 and what do you see i see nothing just meaningless words that i cannot make a picture of that what dyscalculia is like blindness of numbers

Deepthinker Oh: wow

Vic Michalak: Maybe a visual depiction of math as objects might be clearer...

Rhiannon Dragoone: Your energies are unaligned, Ast, and no one has connected those expressions in a way that hooks them up for you.

Deepthinker Oh: hold off on suggestions

I want to get thru the stories

The last poster is from Ari. Ari, Anything to add?

Arisia Vita: yes....

The message of my poster is that increasingly sophisticated AI systems will soon (within a few years) be able to take any problem, arrive at the appropriate mathematical formulation, and solve it. Wolfram is one company working very hard toward this goal, and making great progress. So what we need to learn in math class is how to ask the right questions.

That says it for me...

Astronomer Somerset: likewise square and root mean a 4 sided figure or the root of a tree that's all i understand

Deepthinker Oh: I'm sorry Astro to run over you.

Gilles Kuhn: Ari do you think those AI could demonstrate Godel incompleteness theorems?

Astronomer Somerset: no that's fine im done

Arisia Vita: yes, and I don't even know what those are... ;)

Nymf Hathaway: Wonders if JP heard something today which makes a difference?

Deepthinker Oh: Anyone have a new story to add? I know several of you might.

Arisia Vita: but the AI will

Gilles Kuhn: well justly i think they would be very problematic for an AI

Rhiannon Dragoone: I'd like to add my story; how through martial arts and then teaching I learned math Or learned how to teach math, which for me was the same thing

itsme Frederix: $\neg \forall$ can be solved Gilles

Deepthinker Oh: please go ahead

Nymf Hathaway: sounds interesting Rhi 😊

Gilles Kuhn: i have doubt about an ai able to re create godel demonstration and if it can i would certainly consider it for a turing test

Rhiannon Dragoone: Well, when I first started martial arts, I wasn't very good at it; i was pretty unccordinated and couldn't learn basic stuff. But I had an instructor, an ex-Special Forces instructor, who drew me diagrams and showed me the trigonometiic relationships in the moves and I was able to learn. I suddenly realised that if you teadh to a person's modalities, you can teach anything.

So I learned math through martial arts and how to teach it; although some people are very hard to teach, which is why i'm here, to help me teach them.

Deepthinker Oh: Super

Does anyone else have a story to share?

Dali Waverider: I do.

Deepthinker Oh: Pleas dali

Dali Waverider: One problem is in the USA that math is largely taught (particularly through high school, and to some degree undergrad) under the single mantle of "mathematics", which must be approached as an accumulation of knowledge with a preconceived linear time frame, where each subject requires a mastery of all previous subjects. In fact math is a diverse collection of subjects, each requiring its own skills. In my case I hit a brick wall in Calc 3, perhaps because I didn't have the time to put into it...perhaps because I simply don't have the talent. But later I took stat classes I found to be easy, and Linear Algebra that was easier than slicing soft butter.

Kos objected, so maybe I can clarify.

In US secondary school, algebra usually precedes geometry, which peripherally might use only the most simple algebra. But many students get stuck on algebra, and never take the geometry course, because they are psychologically done with "math".
done.

Deepthinker Oh: yes

Templeton Tigerpaw: I had tried to point out that giving math a more human face might help. It might helpt to point out how long and hard won much of the progress was and to know the stories of the personal failures alongside with the triumphs of mathematicians.

Deepthinker Oh: Any final stories?

Now, based on all the stories, what inferences can be drawn from how we learned to affect how we teach?

Gilles Kuhn: well i could but its quite mainstream i think

Deepthinker Oh: So the floor is open

Rhiannon Dragoone: Templeton, I liked that ver much; if people think math is for "gods," they will never learn it. My Sp Forces instructor said, and I repeat it to my students, "If something is worth doing, it's worth doing badly at first."

Deepthinker Oh: hehehe

Vic Michalak: I have done a lot of things badly at first... then I got over it...

Gilles Kuhn: tks heaven they are cadaver for apprentice surgeons...

Rhiannon Dragoone: yeah, but that ties in with the stories--you don't humiliate someone who fucks up at what you are trying to teach him.

You make it into a game, as someone said.

Vic Michalak: No, that is not teaching.... that is a power game.

millysue Resident: humour helps

Deepthinker Oh: yes

Rhiannon Dragoone: oh, yeah, and your own stories of how you were bad and now you're not.

Vic Michalak: If you cannot teach your subject to anyone, you cannot teach (provided they want to learn).

Nymf Hathaway: I appreciated Temples story in the notecard... he is so right about the great minds of the past

Rhiannon Dragoone: Yes, I resonated both with Templeton and with Astronomer

Deepthinker Oh: Does anyone see a recurring theme in how we learned?

itsme Frederix: Vic, as long as you get them to wonder they want to learn here you are

Nymf Hathaway: welcome back Kos 😊

Rhiannon Dragoone: WB Hoot

Vic Michalak: Yes, I agree, Its... (though "wonder" is often bred out of people early in school)

Rhiannon Dragoone: That's where making it a game comes in; I wrote that down for my next remedial class.

itsme Frederix: wel it is bare english I use, not sophisticated math to expres myself

Deepthinker Oh: I do want to say that when I tried to teach students in the way I learned it (by programming things) I generally was greeted with less than overwealming enthausiam. So what worked for one does not work for all.

Vic Michalak: Math can often be expressed in bare English, if you understand it, and if you take it in sections...

Deepthinker Oh: Yes and several people cited that

Rhiannon Dragoone: For a lot of people, it's not translating math into English, it's translating it into a feeling

Vic Michalak: I am introducing statistics to a class tomorrow night..... and I started with the equations but had to break those down to something they could all understand.

Astronomer Somerset: i disagree its trying to visualise to picture a meaning rhi

Deepthinker Oh: I could never solve equations but I coupd program a computer to do so and then I both had a tool and some understanding

Rhiannon Dragoone: Vic, I find it helps to break it down to something they understand.

For you, Ast, yes. I'm not generaliiing

I used the Math and Physics Teacher in the Faculty Lounge story to introduce that.

Astronomer Somerset: but thats how we learn by putting pictures to words

Vic Michalak: Or vice versa

Rhiannon Dragoone: Ast, that's how *you* learn; for some people it's putting feelings to words (or vice versa)

itsme Frederix: Vic, scan the Black Swan for some statistic examples -- they will love it.

Astronomer Somerset: language is a collection of visual symbols

Rhiannon Dragoone: Ast, again for you. There are three (or four) modalities, a bunch of submodalities; each person is different.

Deepthinker Oh: language is also abstractions with no visual counterpart

Rhiannon Dragoone: And the trouble is hooking up the person with math symbols through his modalitiy

itsme Frederix: But we are made of the same premisses

Vic Michalak: Language is an abstraction of the physical world.... and, by extension, our ideas and thoughts.

Math is as well...

Rhiannon Dragoone: Well, I'm seeing a microcosm of the problem. Several people here are thinking in their own modalities and would teach in that way.

Paolo Rousselot keeps wondering much much typology has to do with learning various subjects

Deepthinker Oh: good point

We have reached 12;30 pm slt and it is time to wrap up our discussion

Rhiannon Dragoone: Thank you for presenting this, Deepthinker!

Deepthinker Oh: Chantal will post a transcript of this discussion on the Science Circle web site.

Thnak you

Rhiannon Dragoone: oh, that's great.

Paolo Rousselot: thanks Ms. Oh!

Gilles Kuhn: i have two friends who see math as poesy well both are uni prof of math

Deepthinker Oh: Thank you all for coming and participating.

Vic Michalak: This is a great subject because it is a mystery to many and it is germane to so many fields of study.

Nymf Hathaway: YAY for Deepthinker... always comes up with the most wonderful subjects!!!!

Rhiannon Dragoone: APPLAUSE!

Vic Michalak: Yaay, Deep! Thanks! 😊

Deepthinker Oh curtsies

Nymf Hathaway: Not professional at all but Hugs Deep 😊

Astronomer Somerset: thank you deep

quaezar Agnomen: 😊 Gracias Deep

Vic Michalak: Great way to talk about math to everyone without having to go into math!

millysue Resident: Thankyou

Dali Waverider: Thanks Deep. Food for thought.

Nymf Hathaway: agree Vic 😊

Gilles Kuhn: well done deep a shame sl put me at bay the first 30 minute

itsme Frederix: Deep, its not only you & your subject it is what you get out of the students (good theaching!)

maria24 Murfin: ty deep ;-)

Deepthinker Oh: Thanks

Lolli Bluebird: Thank you Deep ;)

Vic Michalak: Nice to see the photos.... a good way to get to know math first experiences.. the "aha" moments...