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TypeWell Conference 2013:
Getting Your Hands on Math Mode
By Sharon Allen Brown

Professor: I'm Sharon Allen Brown. This will be hands-on. My goal for the workshop is that as I am talking you'll be doing. Some stuff will be familiar to you. Play with whatever grabs your attention. I'll have the stuff up here and it's also on those hand-outs. There might not be enough for everybody. You can jot stuff on there. I'll be blasting a ton of stuff at you. Catch whatever fits at your current level and then a little more. My goal is to hit the whole range and have a lot of practice doing.

Look at this! I can scroll because it's just a text document.

I'm Sharon Allen Brown. I'm a coordinator at PCC. I've been transcribing since 2003 and then coordinating also. I have been an interpreter since 1982. I've been in the field for a super long time. That's me. How about you?

How long have you guys been transcribing? Has anyone been transcribing less than 1 year? 1-2? 2-4? 4-6? More than 6? Excellent. We have a great range. How many have done the Math Mode tutorial? Okay, that's helpful.

So we have transcribing experience, math mode, and then how much math have you studied? There are more chairs, and hopefully you can all plug in. How many of you have studied algebra? How about Geometry? Trig? Calc? Beyond Calc? What about science stuff? Chemistry? Physics? Others? Stuff like Econ? Accounting?

Of those things, what have you transcribed? [[Reading] [On screen.] People have skipped from algebra to calc. How about these others? [Reading] [On screen.]

Now here's the important thing. How was it for you? Was algebra awful? Did you struggle? Okay? Fine? Easy? Okay.

How about geometry? Awful?

Female Student: I can handle calculus but not geometry.

Professor: Okay. What about trig? [Transcriber's Summary: Audience rating their experience with the aforementioned math, science, and finance disciplines.]

Is everybody plugged in? Alright. I will go through the basics. For some of you, that will be your saturation point. That's fine. Hang on to whatever you can. Then I will move on. We will have practice going in and out of Math Mode and working inside the templates. And then we will have theory and best practice stuff. My goal is you will be typing away, practicing as we go. I will have you transcribe some lectures so you can have practice going in and out of math mode.

Here are some of the basics. If you want a handout, there are more here.

Using the mouse slows you down. I really push using key strokes. The Math Mode Tutorial is Alt + m, then a. Then you're right in it.

There are 1,000+ symbols in math mode. Some of these things you have to discover as you go.

Also, the blue color doesn't transfer to the student's screen.

Here are some symbols on home row. $p/$ is $+$ mn or mns is $-$ eq is $=$. For some like time, you can abbreviate as you usually would to get the symbol. You may have to comma cycle.

Divide can be div or dvd. Tell me if I'm going too fast. I figure most of this is review.

Some of the simple fractions, you can do abbreviations for, like half or quarter. Don't use Turbo abbreviations.

Female Student: Is it preferable to type half rather than $\frac{1}{2}$?

Professor: It just depends on what's easier for you. The cool thing about TypeWell is that there are multiple options. You can do what's easier for you.

Let's practice toggling in and out of math mode. Type these sentences. Someone says "half" of something, and it's written like this. $\frac{1}{2}$. $\frac{1}{2}$ of an apple plus $\frac{1}{4}$ of an apple is $\frac{3}{4}$ of an apple. If you divide $4 \div 2$ that is then $= 2$. $4 \times 3 = 12$. Sometimes it's just trusting that math mode will toggle when you do it.

[Presenter's note: On screen.]

A half of something is written like this. $\frac{1}{2}$

This symbol is pronounced either "one Fourth" or "a Quarter." $\frac{1}{4}$

$\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$ of an apple.

If you divide 4 by 2, you get $4 \div 2 = 2$

What would you get if you multiplied $3 \times 4 = 12$?

Sometimes you can use math abbreviations without going into Math Mode. You do so using CTRL. If someone says "today was supposed to be 75 degrees" you can use CTRL-space after degrees to turn it into the degree symbol. $^{\circ}$.

Euro can be awkward to get. Remember to hit space to go on with the sentence after that.

Female Student: e- works with the euro as well as e=.

Female Student: I don't get that.

Female Student: Really? Someone was playing in my PAL again.

Professor: That might be a good thing for PAL.

It always bugged me that there was no cents mark. But you can abbreviate that using CTRL-space as well. ¢ . Remember to put the space in there after so the next word is not smashed into it.

You can do $\frac{1}{2}$ and CTRL-space to get a cool $\frac{1}{2}$ symbol. Sometimes it's easier rather than going in and out of math mode to just use CTRL-space and get that one symbol.

If you hit comma cycle a couple times it might get you to what you want, or not. Using a period to keep something from expanding won't work in math mode, by the way.

It can be time consuming to go up to get the different levels of a fraction. You can do $\frac{5}{11}$ and it will automatically make it look mathy. But when they get a little longer it's hard to see as a fraction, especially when you have variables. CTRL-H goes high. Then CTRL-N. Then CTRL-L. If you have to think about it, it's really awkward.

Ctrl-n is for Normal. So when you do that over and over again and it's a groove, it's muscle memory. Make a fraction out of $2x^3 / Y-1$. You have to do it lower. It's not up here. So you have to do it lower to make it look like a fraction.

We will have more of them in the practice.

So otherwise this will be up. You have to make this smaller too. This is not a normal Y.

You end up with a gap here that looks funny. [On board.] These are tight, and if you space space it adds more.

OK. Alright. And now a word from our sponsors. "Formatting for ease of comprehension and readability."

So here are ways of doing the same thing. See what you think. Kind of breathe easier. The person is talking and writing this. I have five pieces and give four away and I have one left. Or, same words, and the math is below it.

Or; this shows (bullet C) the moment that was being said.

So five pieces, four away, not the whole thing like this, now here is the whole thing. Do you have thoughts about the readability? There is the payoff between what I'm doing and the person is seeing and how you time it. So what level of math is the person comfortable with. So after it's been introduced, they go more to be, and the thing. So they can go up and compare it. So yeah. Something to think about. Is it important that they know this ... what is that?

So that is $4/5$, that means this part of it. Are they just barely introducing it or is it something that will be there.

Sorry. Yeah.

Complex fractions. These are fun. If you type out FRAC or frc, and comma cycle, then of course you can see on yours, the cursor ends up here.

The cursor comes there. So you can use arrows up and down. You can type it in without arrowing down. It's set. So arrow keys are your best friends. So it's a fraction.

When you're on the bar, if you hit, either the end key, which is the one at the top corner and hard to find or control and the right, it'll zip you outside the bar, on the same line. So

you aren't below or above.

Female Student: Again? Can you go over the denominator?

Professor: In math mode, `frac` and the bar. You type X , it comes up below it. So it's already for you to type the denominator. If you arrow once, it's in the numerator spot.

So it types out this way.

Female Student: Mine doesn't work like that.

Professor: You're in the `frac` it should indent.

So `shift enter` is your best friend with math. You move it around inside of these templates and it takes you automatically to the very end of everything you typed, if you try to arrow down or over, you may miss it. You get the cursor to here, `enter enter`. There may be invisible things here. This takes you to the end that is there whether visible or not.

You have spaces here you won't see that you carry down with you if you go another way. This gets you to the last thing you typed.

Is there a question I missed? Did that not work? The thing about it.

Female Student: When I typed `frac`, it's the cursor is to the right then. And it starts to the right of the line underneath.

Professor: The cursor ends up here? Anybody else's?

Female Student: Mine doesn't work with the commands. The control ... the arrows?

Professor: So the cursor is down here. Arrow once, it's on the line, end ... so you see that x^2 on the line. The line. It's in the denominator.

Female Student: Is that supposed to be one hit?

Professor: No. Just one hit of `N`. You shouldn't have to tab over. If you tab it might carry that line longer.

It's not working for you? You can use the control and left arrow to get to the front of the line.

This is handy with fractions.

So if all you do is arrow over once, it's there. Then whatever you type will move that line. So you will be on the other side of the tab you can't see and type a couple things. If you type too much it overshoots the tab. So if you will type a bunch of stuff in front of it, you may have to move over three times. So you to type stuff without moving that.

Questions? Issues? Complaints?

OK; so sometimes you'll say, all over something or other else. If you started typing the stuff, $x^2 + xy$ and it's all over Y. So what do you do? You forgot. Now you have it type out. Highlight it quickly, and control X, to capture it, to cut. Then it's in your suitcase.

Female Student: Is this the $x^2 + xy^2$.

Professor: Yes. Then you are in the denominator spot. Arrow up, Velcro it in.

So you can ... highlight this again. Then control U and control V. Then the problem is that, it's shoved against the edge, and when you go down, it's underlining. So whatever you've typed is underlined. There are ways to un-underline. So you can get out by space, or control U again. 'Cause it's a toggle.

So you can get it un-underlined. It doesn't look mathy.

Female Student: Do you have to highlight it first?

Professor: Yes.

Female Student: How bad is it not to have it flush? The indenting takes time.

Professor: If you can do something easy. Like a template that indents, it's nice but time is limited.

Female Student: The dash next to zero underlines, so I would hold it down, and that was quicker.

Professor: Yeah. You can also do the tab, I think that is what I have next. You would underline a thing you have. Or control U, tab tab tab. You underline tabs, every five blank spaces.

So you add a few fractions, and complications. So this isn't super pretty. I should have

fixed this. But on this I used frac and went below. I underlined. So I started typing $3x^2$, it's harder than writing it, but you can make it look like what the math is.

Female Student: Does the formatting stay?

Professor: Yes.

Female Student: I don't get the tab thing.

Professor: Control U, then tab. Then underlining.

Another example.

A word from our sponsors. Transcribe the lecture, not the math.

Don't spend all the time typing what's on the board when the teacher is saying all this important stuff. You're hired because the student can't hear the lecture. The student has the responsibility to take notes of what's on the board. You have to get enough so that they can make sense of the transcript. When in doubt, type it out.

Math is a foreign, written language. We come up with ways to pronounce it so we can talk about it, but it's not a spoken language. How we pronounce it is a transliteration. Don't duplicate what's already there, but you have to have enough so they know for later what a piece of information is referring to.

Transcribe this short lecture.

Female Student: Are you a fast professor? [Class laughing.]

Professor: Can you tell? [Class laughing.]

Simplify the following.

[Mock lecture:

Simplify the following.

$$\frac{4x^2y + 2y^2}{6y^4}$$

We factor this out. So on the top we have $(2y(2x^2 + Y$ [On board.]

[End lecture.]

[Practicing math mode.]

You're still getting the math! How much of the English explanation did you get? I'd say the important message from the teacher is that you factor out $2y$ and they cancel. That is what you need to get spoken in English. The teacher thought they were really important to say.

Get enough so they know for a reference point did anyone use "on board"?

Female Student: I got the first one but not the second.

Professor: Perfect. "We're doing something; here's part of it, so put it in your notes."

Female Student: I wrote out the first and put for the second, "[On board.] [Second equation.]"

Professor: Right. Make sure they know which equation you are referring to.

There's a talk starting at 2:30. It's fine when you need to leave for that one. You have 10 minutes before it starts. But we're continuing.

Superscripts and subscripts. Some of them are automatic, like x^4 . If you comma cycle it will be subscript. If you have chemistry the letters with numbers after will automatically go subscript. H_4 .

Female Student: Can you shorten cubed?

Professor: Yes. Ta-da! [On screen.] sqrd is for squared. cbd is for cubed.

Female Student: But you can't hit .53 and comma cycle to cubed?

Professor: You can do it either way. 5^3

Female Student: And you can use sq for squared.

Professor: Yes.

For complex exponents, it's important what words are said. The pronunciation means something. You may have to use CTRL-H twice to move higher than the superscript. But

words aren't everything. If someone says x to the n squared minus m , you don't know if that looks like this, x^{n^2-m} or $x^{n^2}-m$.

You can do CTRL-H to get higher, and then CTRL-L to get it a level down. That doesn't add a space. And CTRL-N gets you to the main line. Space twice will move you down but also over 1.

Female Student: You are also able to backspace that way.

Professor: Yes. So you can correct your errors.

Here are the abbreviations for square root. [On screen.]

Remember, your best friend is *shift-enter*. Some of the stuff with templates still can have problems. You can't just do the root thing for something that is long. You need the bar to go over it.

Female Student: When you type square root and you get the radical, how come the cursor doesn't stay right next to the square root? Should I backspace?

Professor: No. Having that gap next to the radical is fine. But that does mean when you want to get outside the radical you have to arrow a couple times. You can use the abbreviation for 5 cubed if you want to get it under the radical. There is a lot of arrowing and spacing. It can be hard to get it to look right.

You can build these different ways--by the abbreviations of the words, what they look like, how they are written, etc. You have to do them in the order that you write them in math. Even if it's pronounced "not less than" you type the less than first. And when the "nots" you don't do a "t" for than. It's just greater or equal to.

Am I blitzing too fast? Here is some more.

Plus or minus, you can build it how it is or memorize the abbreviation in order to stay on home row.

These are cool: union or intersection can be union, or cup because it looks like a cup. Same with therefore: you can do the abbreviation, or you can do this .:

These are abbreviations for Greek letters. [Reading] [On screen.]

Male Student: psi, the Y thing, can be Y-CTRL-space. Ψ .

Professor: Yeah. Do you want to do a short-ish lecture and go on to more stuff, or a longer lecture? Shorter? Okay, cool.

What time does this end?

Female Student: 3:15.

Professor: We don't need a break, right? We're having fun. I am.

[Mock lecture:]

Hello class! You get the practice toggling in and out of math mode. We are going to do a volume of a cylinder. The formula is $\pi r^2 h$. The diameter for this cylinder is 6 inches. The height is 7 inches.

We have $\pi \times r^2$. The diameter is 6, so the radius is 3. Here is that step of the formula. [On board.] You have to also square the unit of measurement.

You have inches squared times inches, so that would make it cubic inches. You have $\pi \times 62 \text{in}^3$. The answer is 198 cubic inches.

How did that go?

Female Student: It was hard.

Professor: Did you get the relevant explanation? What do you think one of the driving, repeated points was? Units of measurement.

What errors did the instructor keep making and correcting? Squared and cubed. Those are options to include or not include. The main goal is to get the information. If you are bogged down and the instructor is correcting themselves, that's okay.

Did you show the variables? Did you do anything in math mode? Did you type out the diameter or the radius?

Female Student: I got caught up trying to type that.

Professor: When I said that the radius is half of the diameter, you don't have to use

math mode for that. What part of the math did you skip or condense?

Female Student: I skipped the third one.

Professor: How did you reference the drawing?

Female Student: I put on board.

Professor: Did you describe it at all? Sometimes the thing isn't even spoken so you have to describe what it is. In this case the professor said they were talking about the volume of a cylinder.

Female Student: When you want to include more information you have to back up to get inside the bracket, right?

Professor: You can type it inside the bracket. But if you are talking about a geometry class and they are describing many objects it helps to specify which object.

You can type [Diagram: cylinder.]

Male Student: Last semester I had a thermodynamics class that was really hard. I didn't know how to transcribe all of it, so I arranged with the student to have [equation 1] [equation 2] etc. and he would mark it in his notes.

Professor: In a calculus class I have had an instructor write in a specific area and I would note that when putting "[On board.] "

Female Student: I did a complex chemistry class where the balanced equations took up the whole board. I would put the beginning to help identify which equation they were working on, but I didn't even try to put the whole thing.

Professor: The point of what we're doing is to cue in the student.

Female Student: Sometimes I can finish it out, but sometimes I can't.

Professor: And when in doubt, leave it out and type it out. We're there for the audio. If they can see it why are we doing it again?

The main thing is having the transcript make sense. I didn't use complete sentences when I wrote this, but this is an outline not a transcript. Make sure you are accurate.

We have until a quarter after? Okay, let's move on. If we have time we will come back to the longer lecture.

Let's talk about the quadratic formula. Do you use that a fair amount? If you type quadratic it will come up magically.

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Let's plug in these values. Here is the equation. You have the quadratic formula on your screen. We can plug in $a = 2$ $b = -3$ and $c = -2$. Go ahead and do that.

Female Student: Can you explain that? I don't understand what we are doing.

Professor: Okay, so you have the quadratic formula on your screen right?

Female Student: Yes.

Professor: This is a thing they will do in math. They will ask the students to plug in the variables. Here you need to substitute 2 in for every place you see A. You will need parentheses here in order to make it clear.

Let me scroll down. Here is what it will look like.

This isn't perfect, but it is enough to be clear.

Female Student: What was C again?

Professor: C was -2.

Female Student: And all this needs to be in parentheses?

Professor: Yes. And at this level when the professor says "it's all over" referring to a fraction, don't worry about it. At this level the students understand what is happening.

When you are inside the radical you need to use control and left arrow. This shoots you to the beginning or the end of the line. This saves you hitting the arrow key repeatedly.

You can copy and paste in an equation to save time. Once you have the equation you want to

manipulate you can use the semicolon to highlight the whole equation. The trick is, when you highlight it will zip up where you don't want and you can hit tab to undo one of the highlights. Now hit control c to copy it and then control v to Velcro or copy.

Then you can go up when the teacher does the next step and adjust it instead of typing the whole darn thing again.

One thing I started doing that I like is if I am skipping steps I hit period and enter several times to show that I am skipping something.

Is this helpful? Eventually the plus or minus disappears because you break it into 2 answers.

Female Student: That was the quadriatic formula?

Professor: Quadratic.

Female Student: I can picture myself going back and changing those, but I am remote so I don't get to see those.

Professor: That's understandable.

Scientific notation has a super easy way to do it. You can either use e or hit x and 10. Kyp knows what you mean. This also applies to negative.

Shall we do more of these? This comes up a lot in physics when you are dealing with something really small or really big.

Female Student: Can you use CTRL-space?

Professor: Yes. CTRL-space works with most math mode stuff.

[Presenter's note: Here begins a discussion of the PAL.]

When you need something abbreviated in math mode what you do is highlight it, hit control-a, then type in the abbreviation you want for it, and to get out hit enter. If you made a mistake hit cancel and then enter.

Male Student: Or hit escape.

Professor: Escape also works if you don't have the expansion highlighted.

If you didn't highlight it brings up the list of all your expansions. Hit tab once and it goes down to "new" and you can hit enter to make a new abbreviation. Type in what you want and what you are abbreviated. Hit enter, and then you can hit esc or alt-q.

Tab is your best friend.

Male Student: CTRL-an will open your PAL to new already.

Professor: Okay. It's underlined, so then you don't have to tab through. Thank you.

Female Student: You can hit CTRL-a again to get out of the PAL when you're done.

Professor: Okay. Cool. If you want to delete something quickly, you can arrow down to that word and tab will move the cursor to delete, then enter. Ta-da!

Here are some things that have come up often. fx might be a good PAL entry for $f(x)$. What else would you use fx for?

Sometimes the formatting will go wrong when you put things in PAL. If you put a tab at the beginning of the expanded entry, it won't show up. I did period, tab, and it did show up.

For one class I needed to often put the limit of x , so I put $limx$. Lim in PAL, by default, goes to this. $lim_{t \rightarrow 0}$. So I put $limx$ in my PAL for limit of x . Now it's $lim_{x \rightarrow 0}$. And then if it's approaching something besides 0 I can go back and change that.

What do you do when you're in over your head? You don't do it. It's not your fault if you don't know, but you don't know what you don't know. It might fly by you and you don't even know what you missed. In a computer science class I had someone feed something to me that I literally did not hear because I had nothing to hook it to. If you have no framework, stuff will get lost. It's not your fault. You don't have a way of understanding it. Do you know the story about the Native Americans not seeing ships coming? It's just because they had no framework for something like that being out on the water. It's like it didn't exist.

This goes for any topic, not just math. You don't have a way of understanding it.

Given that, there are strategies. Acknowledge your limitations. Don't say "I'm a good transcriber so I can do javascript." You don't know the subject matter. Use your team. Use the board. Unfortunately for remote you don't have access to what's written.

Because math is a written language it's to our benefit. It's there. If you watch the board when these weird things come of their mouths, that will give you clues. It is probably not written how you think.

In these situations, the student knows more than you do. We make something auditory visible. The student gets more of it than we do. It's better to err on the side of having a more cryptic but accurate transcript than something rife with errors.

You don't have to be able to do the math in order to transcribe it. You don't need to know the psychological experiment in order to type it.

Female Student: I have a comment about making errors because of what you are trying to do. I was typing a musical theory class last semester, and I had a few different teams for this class. You put things the wrong way if you can't see it because you don't know how what the professor just verbalized is supposed to be written out. We ended up talking to the student after class in order to find out how to type certain things. We were putting slashes where there weren't supposed to be any etc. etc.

After a certain point there will be situations where you don't know. Sometimes the student asks us to write it out because the professors are using words and we can type those words rather than trying to use the symbols.

Professor: Exactly. Ultimately they have already seen the symbol stuff. The words are just auditory ways of conveying the symbols. You are much better off typing the words. Be careful if someone is comparing and contrasting a couple things and you accidentally reverse them. You won't realize it if you don't know the material.

Take yourself out of the symbols because this is an added layer of stuff that is hard and uses your brain power.

Just to piggy back on that, I had a student that wanted the pronunciation that the professor was using. This was a reminder to me that the access we are providing isn't only for the 15 minutes of class, it is about being able to talk to her peers and being able to talk with their group about it.

If people are talking about the inverse function they never say "f to the minus one."

Even if you can get the symbols, periodically typing the word is useful.

This is never pronounced cos. People always say cosine. If you always write "cos" the student might never know how to pronounce it.

Here are some more templates you can play around with. Σ didn't work out well.

I didn't have natural log on here. There is limit. It comes up with i .

If this is in a fraction with a big formula you can do lim or cycle again to make it a stand-alone.

If you use an integral it looks like \int . But if you comma cycle once it looks like this. \int^{∞} .
If you comma cycle twice you get this.

[Doesn't work on this mode.]

Male Student: Mine does do that.

Professor: Are you updated?

Male Student: Yes.

Professor: Strange.

Female Student: Mine works.

Professor: You can also make these symbols. ζ by typing c , comma cycle.

Is there anything else you want to review?

Female Student: Are there ways to make larger parentheses?

Professor: No.

Female Student: Can we change the font size?

Female Student: It won't go around the whole equation.

Female Student: If you type a bunch of stuff and hit control-h it will make it small.

Professor: If you type apprx you can get the approximately equal sign.

If you do the equals sign with a question mark you get $\stackrel{?}{=}$

I don't know a method of making parentheses around a large equation. Wait, I lied. You could. Get outside of it, make an enormous font and put parentheses on each side.

Female Student: I just tried it; it just does the one line. It doesn't work.

Professor: It won't look pretty but it could like this. [Demonstrating [On screen.]]

Female Student: You could use words to say "square the whole formula" or typing something in brackets like [square the whole formula.]

Female Student: Could you review some space comma comma? I missed something in that section.

Professor: This? [On screen - more templates.]

Female Student: I tried typing what you have there and it didn't work.

Professor: You tried typing SUM?

Female Student: No, the second one.

Female Student: Mine doesn't work either.

Female Student: Neither does mine.

Male Student: Neither does mine.

Female Student: I'm on .39D and it works.

Professor: Which one?

Female Student: This one right here? I tried the integral.

Male Student: For me I get E to get the little E and the second comma cycle doesn't work.

Female Student: Mine will do it, and yours does, and we have the exact same version.

Professor: That's weird. Check with Steve about that.

[Presenter's note: we discovered that some templates don't work as well in Windows 8.]

Female Student: I have another question. We have the quadratic formula abbreviation. Are there any for slope intercept?

Professor: No, but that is a great use for the PAL.

Let me find where I demonstrated this for PAL.

Female Student: There! [On screen.]

Professor: If you know you will use a formula often, you can type it into your PAL. You can label it however you want in your PAL. Do whatever makes the most sense to you.

Another thing that I have done in my regular pal that works just as well in the math pal. There are multiple entry points. Why not build those into your PAL? You can make up several things that expand to the same thing. One with a vowel and one without. This is a hint for something that you only use sporadically enough that you will forget your PAL entry for it.

Anything else?

We don't have time for that larger lecture. Shucks.

Female Student: You talk really fast!

Professor: Was there something I blazed through that I want to review?

Female Student: This was wonderful. I will review it more when I get home.

Professor: That was my plan. I didn't want to beat one thing to death; I wanted to have something for everyone.

Okay thanks! I have my email here at the end [[On screen. sjallen@pcc.edu] so you can get ahold of me if you want.

[End presentation.]