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Response to Gary Farlow

Anne Dalke

Bryn Mawr College, adalke@brynmawr.edu

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The Sustainability of Knowledge:
 Gary Farlow
 Presented to the Friends Association on Higher Education
 Wilmington College
 June, 2012

Costello: Well then who's on first?	Abbott: Yes.
Costello: I mean the fellow's name.	Abbott: Who
Costello: The guy on first.	Abbott: Who!
Costello: The first baseman.	Abbott: WHO!.
Costello: The guy playing...	Abbott: 'Who' is on first!
Costello: I'm asking YOU who's on first.	Abbott: That's the man's name.

(<http://www.baseball-almanac.com/humor4.shtml>)

The comedy skit 'Who Is On First' is one of the classic examples of two people talking past each other. Why? Because they do not assign the same meaning to common words. It is funny because we, the audience, are aware of the double entendre and the resulting confusion. It is less funny to those involved. What does this have to do with the Sustainability of Knowledge? I have this antique notion that a significant part of imparting knowledge through teaching to the next generation presumes a common lexicon and common experience on which to build a common and, one hopes, extended understanding. For most of my career assumed common experience and a common lexicon. This is however no longer the case, at least not in Physics.

Vignette: A young student - not necessarily a freshman - is in physics lab. She/He is given a screw driver to turn up the voltage on a power supply whose adjustment knob is a slotted shaft. (Those of your over 35 have seen these.) The student picks up the screw driver and looks at it with a "What is this for?" expression. The problem here is we have old equipment and all the devices this student has seen are controlled by digital "push buttons". Knobs, much less knobs that have no obvious handle, are unfamiliar.

Vignette: An instructor is describing rotating objects and the fact the force of gravity will cause the axis of rotation of a spinning top to precess about the vertical. This is done complete WITH? color coded drawings of arrows representing the direction of the forces, the axis of rotation, the spin of the top, and the precession. The class looks completely blank. The instructor gets a sudden inspiration, "How many of you played with a top when you were little?". Slightly less than 1/3 of the class raises their hand. "How many of you know what a top is?" Slightly more than 1/2 of the class raises their hand. The problem here is obvious.

Question posed in a physics class: 'What is momentum?' Answer: 'It's what you have when you are going to win an election'. Aside from the obvious failure to have read the book where the term is defined as mass times velocity, the common usage of a term coined for Physics is now most commonly used in politics. It has only similar connotation in the two fields, that being 'something will naturally go on unless stopped'.

Challenge posed in a physics class: 'Give me some examples of energy'. Answers: 'gasoline, coal, solar, nuclear'. Here the answers not only belie [OMIT missing] the textbook definition, but show how common use of the term 'energy' has confused it with the media in which 'energy' is stored. The instructor cannot help but talk past a student when describing energy in a way that has no reference to any medium.

This works both ways. I was presenting a picture of an object flying through the air and was using a laser pointer to indicate the path. My students told me how to use a touch pen on the projector to draw the path onto the projected image. They practically rolled in the floor at my delight over this "cool" ability. In addition, I no longer try to write computer programs. I get a better product now by engaging a student to write it for me.

I invite the reader to make a short list of things which are assumed that "everybody" knows but which seem not to be the case for his or her own field. Also, make a list of things assumed are taught in secondary school but which may not be the case for his or her own field. Finally, make a list of skills one no longer needs to teach to advance in the reader's discipline. The author's lists are in the table below.

Common Experience	Assumed Commonly Taught in High School (or not)	Things I don't have to teach any more

use of screw drivers, hammers, pliers	Logarithms	arithmetic tricks.
rightly tightly - lefty loosey tops, gyroscopes	right triangle trigonometry	use of computers
swings and merry-go-rounds	use of the conditional mood and conjugation of verbs for this.	computer programming
Pendulum	ability of locate sources in a library (rather than internet)	visual critique
riding a bicycle	greek alphabet.	spelling
making a magnet	understanding that if submitted work is unreadable it does not matter if it is right.	graphing
how to whistle	homework might actually take a whole week.	
the build up of static electricity to make an arc	standard English meanings of common words	
suspending objects on oppositely oriented magnets		
paying attention to happenings going on around one		

This is not a new phenomenon. I have in my bag of tricks to interest prospective students some old toys mostly from the Appalachian mountain regions of NC and TN. One of these, a Gee Haw Whimmy Diddle, has confounded several full professors of Mechanical Engineering as well as Physics. I remember confounding my teachers by unconventional uses of "radical" and "evil" and "gross" as a student. The last caused particular problems in quantitative fields. It really is not apparent what 12 dozen has to do with describing something which is, in fact, grotesque.

I invite the reader now to make a short list of things which he or she feels obligated to add to his/her student's experience as part of their formal education. In particular, give thought to what criteria one should use in making this judgment. The author's list is in the table below.

I Feel Obligated to Include in a Student's Life Experience:
A minimum set of assumptions and skills used in my discipline,
Problem solving skills,
An attitude that I can learn anything and do anything, although not necessarily perfectly.
I can teach myself if I want to

This leads to asking what measures will help us talk to rather than past our students, and vice versa. I do not suggest railing against [SUBSTITUTE K-12] schools, particularly the secondary ones, for not preparing students properly. I worked on a STEM initiative with high school teachers some years ago. The curricular restrictions and requirements that these highly competent and motivated teachers work under cannot be imagined by anyone who has not been there. I would quit. So, it is up to us to take the students we get and take them where we think they should end up.

I do not have a tried and true method for achieving the end of connecting with modern students. There are things that I do try to do based on my objectives to avoid talking past students. These are based on my list above. I invite the reader to make his or her own list.

<p>1. I try to start every topic with "What do we mean by ...?" This can cause confusion. There is an innate tendency of the mind to try to draw correlations between the meaning of a term brought to class and the "special" one that I insist they use. This is an elementary exercise in the psychology of 'suspension of belief' that is particularly hard for students from rather limited backgrounds.</p>

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| 2. If I am going to use a particular example of a phenomenon, I try to ask "Do you know what this is?" I also try to have the actual thing or a video handy just in case it is needed. Many of my students are sufficiently jaded by graphic manipulations, however, that only "real" demonstrations have discernable impact. |
| 3. I have begun insisting that students write out the problem they are solving in their own words, just to make sure we are both solving the same problem. This often means two students' grades are not comparable when one does a trivial case and another does a more general case of what is ostensibly the same problem. |
| 4. If I assign a term paper, we have a whole class day that is devoted to going to the library and using the resources located there. Some of my seniors have never entered the library in four years of schooling. Almost none are aware of the massive collections of data and analysis available. They also find out how much there [MISSING CONCLUSION OF SENTENCE?] |
| 5. If I can't figure what a student is doing, I try call them in and have an extended discussion until both are clear about what the other means. We specifically discuss how to leave the readers of their work with no opportunity to misunderstand their intent. This quite frankly takes more time than I have and is actually done only as a last resort. |

I would like to tell you that I have documented improved outcomes from paying attention to making sure that I make intellectual contact with students. I don't. However, the effort to discern the mind of the student is like discerning the will of God, as represented in the play "Candle in the Straw":
James Naylor: It is not possible to discern the mind of God and be sure of it.
George Fox: But, It is absolutely necessary to do so.

Anne Dalke's response:

I attended--and enjoyed--Gary's talk @ FAHE in June, and have enjoyed re-reading it now. I heard it, both times, from my own orientation, that of an English professor, who starts from the presumption that there is *always* a gap between what is said and what is received. By my lights, Gary's story--of a new generation of students who play with different toys and tools, who have different experiences, and so do not share the lexicon of our own generation--is a particular, local, temporal example of a much larger, long-standing phenomenon: the inevitability of "misses" when we talk with one another. By my lights, Gary's final wish--that when a student has finished an extended discussion with him, they will have figured out "how to leave the readers of their work with *no opportunity to misunderstand their intent*"--is unrealizable.

When we try to communicate with one another, there will *always* be something that exceeds our intent. For me, this is less a problem than the source of great pleasure--and great productivity. Every story falls short, needing to be extended and exceeded by its interpretation. We make "meaning" as we try to bridge the gap between what we know and what we do not understand. Strikingly, this process is facilitated by the inexactness with which we hear one another's accounts.

Recognizing the productivity of our inability to hear exactly what each other says constitutes a fundamental revision of one of the primary Judeo-Christian myths about what is needed to facilitate human interaction. In the Genesis story of the building of the Tower of Babel, "the LORD said, Behold, the people is one, and they have all one language...and now nothing will be restrained from them, which they have imagined to do....let us go down, and there confound their language, that they may not understand one another's speech." In the Biblical version, the people are powerless to act without a common language, and so the building of the tower ceases.

But contemporary literary studies offers a counter-story: lacking a common language, we have a means of discovering things we don't know. Our gap in understanding is itself productive of new meaning. There are, of course "languages"--like those of mathematics and computer programming--that aim to be unambiguous, but ordinary "language" is invariably highly ambiguous, because its primary function is not "simply" to transmit information, but to do something more sophisticated and bidirectional: *elicit* information from-and-about the receiver, find out what is otherwise unknowable by the sender. An ambiguous transmission --if pursued with the right attitude!--can have the effect of linking the teller and her audience in a conversation--ideally, in a dialectic from which new things emerge.

The use-value of language emerges in these transitional moments or interstitial places where negotiation is necessary--and where (therefore) meanings need to be constructed. Each time a new story is told, at each of these levels, it identifies--in ways that are unpredictable beforehand--other tales not yet articulated. "Sustaining knowledge," as it is now understood by

literary critics like me, is a process in which both writer and reader, teller and hearer, alter--and are in turn altered by-- what they have to tell one another.

[I've written about these ideas more fully in "Where Words Arise and Wherefore: Literature and Literary Theory as Forms of Exploration." A Special Issue of *Soundings* on Emergence Theory. 90, 1-2 (Spring/Summer 2007), 65-75.]