

WeGetletters

by Michael W Lucas



Dear Letter-Answering Entity,
**What the heck does “Research” mean anyway in an
 operating system?**
—Perplexed

Good day, Perplexed,

How are you? How’s the family? What’s it like, living a life where you can send random questions nobody else in the history of computing would bother themselves with off into the void with a complete disregard for the social niceties and expect someone you’ve never even met to spend their precious time answering?

Me and my stupid honor. Why did I agree to do this column again?

But to answer your question, let’s start with the Single Source of Truth for the English language, my 1933 *Oxford English Dictionary*, all our linguistic wisdom distilled into 13 weighty tomes that even carry the aroma of enlightenment, except, of course, for all words beginning with “Rz” because of the dire nature of those inimical vocables. Truly, we owe those exalted few who compiled the slender (and tightly secured) 14th volume a debt of honor we can never repay because they’ve all passed on. I’m not implying that Rz* dispassionately eradicated them in much the same way we might exterminate termites, of course. I would never say any such thing where they might possibly hear.

So, let’s look at the definition of research.

dial. form of Rice1.

No, wait. That’s “Ryze,” the last word in the Poy-Ry volume. How anyone can pick up a dictionary and view only one word completely baffles me. Such people are not to be trusted. Let’s try again. There are several definitions, but the one that seems most common is:

To search again and repeatedly.

We all do that! I’ve even gone searching for the solution to a technical problem and discovered a mailing list post from the decadent age of the last century where I declare that I’ve searched all over for a solution.

Nobody answered, of course. If they knew the answer, it would be in the archives. Younger Me never answered that message to explain what was going on. Jerk.

But a more interesting definition is:

A search or investigation directed to the discovery of some fact by careful consideration or study of a subject; a course of critical or scientific inquiry.

Many computer people think that they’re scientists when truly they’re science fans or, worse, disguise their biases and antipathies by loudly declaring them to be science. Did you do legitimate statistical analysis of your data from the last decade, including graphs and means and the population’s standard deviance of sample correlation? Did you even retain that data in the first place? If not, you’re no different from the dude watching American football who sprawls on his couch yelling at the television that he would have done a tackle on the last play to sink the eight ball past the other team’s wicket. Stop pretending that your weak-kneed

science fandom is on a level with people who earned doctorates and got grants and perform actual math-and-measuring science. That's as annoying as the kid who loves computers thinking his enthusiasm is as powerful as your hard-earned knowledge and sweat-drenched experience.

You can keep the lab coat. Nobody minds when fans cosplay.

Legit science isn't a result, or a paper, or using math. You can't disbelieve science or declare it's not relevant, because science is a process. Not believing in science is like not believing in walking. It exists. Science has four parts: observation, hypothesis, experiment, and results. In the 400 years this method has been used, we've gone from riding rivers to riding rockets, from burning wood to burning the whole planet. Real science is undeniably potent. It deserves your fandom.

So, you look at the world. You observe a bunch of details.

You make a guess as to why something happens the way it does. When you can state that guess clearly and succinctly, you get to call it a hypothesis.

You can't prove the hypothesis is correct, but you can prove it's wrong. You figure out a practical way to do so and perform the test.

If the test shows the hypothesis is wrong, great! You know a little more than you used to. If the test shows you might be right, that's nice too. Remember, it's not you that's wrong. It's the hypothesis. And hypotheses are intended to be spawned and discarded like processes. Getting emotionally involved with a hypothesis is like being attached to your web server running at PID 691. Even if you hard-code that process ID into the kernel, it'll distort everything around it and unnecessarily complicate your life.

Either way, write up your results and tell people about them. Yes, even when you're wrong.

Billions of iterations of this process gave us cat videos, effective cancer treatments, and no-stick cookware.

Computers can fit anywhere into this process. Maybe you're observing your computer and throwing a tantrum when it misbehaves. Perhaps you're using the computer to do some math to see if your first guess is even plausible. Computers make possible tests that our predecessors couldn't even imagine. And if nothing else, you'll probably use a computer to analyze and publish your results.

You need an operating system that works predictably and reliably. Something that you fully control, rather than relying on dubiously documented updates imposed by an OS manufacturer. You need an OS that you can customize to support your labors.

If you're reading this column, you know what I recommend.

But what I'll also recommend to you?

Science.

Don't just run computers or write code. Observe the results. Measure the impact of changes. When I started with Unix, we had DBX and shell scripts running ping(1) and were delighted beyond all reason to have them. Today we have more monitoring tools than you can charge a rhino at. Software like DTrace makes poking at system internals easier than ever. We use them, but only in a limited occasional way.

Track what your systems do.

See what wobbles.

Observe behavior changes when you apply patches, or install that new switch, or tweak that bit of kernel code.

Make a hypothesis.

Test the hypothesis.

Document the tests.

Working with the scientific method demands not only math, but (gasp) statistics. Statistics determine if your observations or results are meaningful.

Then document your results. Even if the results disprove your hypothesis. And you can apply this to the simplest parts of the computing profession.

- Observations: The server keeps rebooting unexpectedly. Armadillos are nesting in the server case.
- Hypothesis: The armadillos are rebooting the server.
- Test: If I remove the armadillos and the unexpected reboots continue, my hypothesis is proven false.
- Results: I removed the armadillos. The reboots continued. The hypothesis is false. Also, I developed leprosy.

This is research. This is science. I highly commend it to you.

Have a question for Michael?
Send it to letters@freebsdjournal.org



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