



ELN Activation Energy: The Top 10 Reasons Users Won't Use an ELN & How to Overcome Them

It is human nature to resist change. Even if we know the change is for the better, we still resist it. And if we *don't* know for certain that the change is going to make our lives better, our food tastier, the wine more robust, why should *we* bother putting all the time and effort into changing the way we do things?

When an organization adopts an ELN, it is making a long-term commitment and a serious investment of time and effort. The organization will place its trust in whatever system it ultimately implements with its life's blood, the end result of millions, potentially billions, of dollars of R&D money. The last thing that is needed is to discover that the fancy, expensive new system that was purchased to store everyone's data isn't being used, or is being used inconsistently, by the very scientists that an ELN will help.

The purpose of this article isn't to discuss how or why to choose an ELN (although your choice of ELN will certainly affect the severity of barriers to adoption). Rather, it points out the top 10 barriers to ELN adoption and describes strategies for overcoming them. Whether or not you recognize these issues as problems in your organization, this article should provide some useful advice on converting even the most recalcitrant, die-hard, paper-notebook user to an ELN user.

10. *"I don't always have a computer in front of me."*

One of the most common complaints is that users still have to use paper for those times when they don't have a computer in front of them. Today, with laptops and tablet computers, it's possible to always have your computer with you. And with the price of desktop computers falling, even the hot room can be equipped with a resident computer. In fact, you *can* always have a computer with you, or at least present in the same room with you.

Alternately, many scientists don't actually write directly in their notebooks all the time. How many times have you seen someone jot notes down on scrap paper, a paper towel, whatever is handy, only to sit down later at their desk to organize, rewrite, and present their notes in a more formal way? Those who do use their notebook in this fashion don't *need* a computer in front of them all the time.

9. *"What happens if I'm not always online?"*

Most ELNs require an Internet connection for the full functionality of the system. But even without a direct connection to the ELN server, users can often edit and create content and place it into the application when the user is back online (or the user can save files locally and add them later to the application). It's true that the time-date stamps are not applied until the content is actually added to the system but this is *still* better than the "wait until next month's signing party" method of validating your experiment's time and date stamp. And the pervasiveness of the Internet is only going to get *better*. When you add to all of these suggestions the possibility of accessing an ELN (albeit in a limited fashion) via a "smart phone," this complaint really isn't justified.

8. *"I don't even use a computer."*

It's difficult to understand how anyone can do scientific research these days *without* using a computer. Twenty years ago scientists still scanned large bound volumes of journal abstracts on a weekly basis, trying to find any new content that was relevant to their research. These bound volumes were soon obsolete – and rightly so! Today a single keyword search finds information from thousands of sources and delivers the results right to your desk, in seconds.

If you run into someone who says they don't even use a computer for their research, don't bother buying a license of the ELN for them – just buy licenses for everyone else. Eventually the “old guard” will adapt or move on.

7. “We’re worried about whether or not electronic records will stand up in court.”

It's ironic that one of the best features of a well-designed ELN is its ability to automate (and enforce) adherence to the rules and regulations required to insure that data and intellectual property in general are in compliance and protected – and at the same time there has not (yet) been a single instance of an ELN being used to defend those records in court. That day will come, and when it does, the side that brings their ELN records to court, with their full (and automatically generated) audit trail for all of the data and documents, their time/date/user-stamped record of all research entries, will have a clear advantage.

There have already been court cases discussing the *use of* electronic records - notably the *In Re Vee Vinhnee* Appellate Court's discussion on the preservation and validity of records (2005, see <http://www.lctjournal.washington.edu/Vol4/a06Offenbecher.html>), as well as *Lorraine et al v. Markel* where Judge Paul Grimm encouraged rigorous authentication means be applied to such records (2007, see http://www.lexisnexis.com/applieddiscovery/LawLibrary/whitePapers/ADI_WP_LorraineVMarkel.pdf). Note that none of these cases exclude the use of electronic records, but rather encourage proper use of them.

Records, whether paper or electronic, are only as reliable and valid as the means used to produce them – and given the clear advantages ELNs have for automated documentation, encryption, and security, the days of paper records are numbered.

6. “The ELN is too limiting – it won't take my type of data, or freehand drawings, or...”

Not long ago, ELNs *were* limited. Many were simply rebranded offshoots of chemistry ELNs or were poorly designed.

A modern, well-designed ELN will take *any* data format –any file type – and if the ELN doesn't know how to render that data, it will rely on whatever existing tools *you* have. Sometimes these tools are embedded, sometimes opened in a separate window, but *always* working with *your* data, *your* way – dynamic and interactive, for both you *and* your collaborators.

Not all ELNs are well designed, so if you're not seeing what is described here, shop around.

5. “That won't work for us because we need it to run under OS X/Windows/Ubuntu”

There are plenty of ELNs for the life sciences, some are cross-platform and some aren't. The trick is finding one that meets *all* the needs of the organization – features, functions, and platforms. But they *are* out there; ask questions and shop around.

4. *“I don’t mind seeing everyone else’s notebook, but I don’t want them to see mine.”*

Science, as Isaac Newton once said, is done by standing “on the shoulders of giants.” It’s collaborative, we build on the work of others – and the only way to do that is to let others see our work as well.

Everyone wants to receive due credit for their work. The Rescentris CERF ELN has an automatically generated time/date/user stamp that is applied to *everything* that anyone puts into the system; thus using this ELN is the *best possible* way of ensuring that you receive credit for your work.

But even sophisticated ELNs that allow privacy settings and user-controlled publishing of experiments (so that you can make data available only when you are satisfied it is ready) *must* allow for peer review, at least by the PI or supervisor. And the work belongs to the *organization*, which is why capture of the intellectual property is crucial.

The Rescentris ELN has the ability to control privacy and publication of data – but even in the Rescentris system the PI *always* has access to the data, even if it’s hidden from the other researchers in the lab.

3. *“We can’t afford an ELN”*

This is a common complaint, and it really only applies if you are still trying to convince your organization to purchase an ELN.

But the research you do involves paying for equipment, reagents, salary time – all those R&D dollars are being poured into the research funnel to produce data. That same data may exist in an ephemeral, single-instance object constructed from mashed tree pulp (i.e., paper). Does this seem safe? The only way to really protect your investment is to ensure that all data is placed into a system where it can easily be backed up – never lost.

And then there’s the problem of reinventing the wheel. Major pharmaceutical organizations may inadvertently duplicate a large proportion – as much as 2/3 – of their experiments. They are duplicating the science, not to validate it, but because *they don’t know they already have the answer*.

This can happen because it’s difficult to know whether someone else in an organization has already done an experiment or produced a protocol. But even worse than that, an organization may *know* they have the data, but they simply can’t find it. Try running a keyword search on a paper notebook! And with a paper notebook, you may know you have the data but be unable to read it even when you find it because of coffee stains or bad handwriting.

You can’t afford *not* to get an ELN.

2. *“An ELN won’t save me time, I can work just as fast on paper”*

This will be true at first. In fact, when users are making their initial transition to an ELN, chances are it will take them slightly *longer* to record their experiments than it did with paper (depending on the learning curve of the ELN).

But there are several ways in which the ELN will *always* be faster. For example, using protocols in the paper world usually involves (a) finding the protocols binder, (b) finding a working xerox machine, (c)

adding a xerox copy of the protocol into paper notebook, and (d) returning the protocols binder to the proper location.

Although this is how things have been done for a long time, there are better ways. A well-designed ELN allows you to store all of your resources in a built-in document management system, so your protocols are *always* available – whether you are in the lab, the office, or at home. You can easily drag and drop the protocol onto the experiment page to create a copy of it. And fast – 3 seconds instead of 10 minutes.

Drag and drop to create an entry, from existing content – text and images, graphs and peaks – from your scientific applications, so that your audience sees exactly what you see, and it takes *far* less time than printing and cutting and pasting with scissors. You can be more concise and accurate, linking to journal articles and datasets that you just wouldn't bother to use in a paper notebook. You can do this all in the 3 seconds it takes to drag and drop from one application to another.

Now add on the other more obvious time-saving benefits, like searching and legibility.

Can you keyword search your entire notebook today? Can you search the notebooks of everyone working in the lab, everyone in the whole organization, or everyone that has *ever* worked there? Imagine being able to find all notes, all protocols, all the information pertaining to your current work (or better yet – the work you were *about* to do, until you found out someone already did it, saving you the time and effort).

Now imagine that you can not only *find* all of that information, quickly and easily, from your desk – or your lab bench – or your backyard, but now imagine that even the notebooks written by that crazy white-haired guy down the hall are *completely legible* (even if they are still vaguely incomprehensible).

Do you still think paper is faster?

1. “*I just plain don't like change.*”

We've come full circle in our reasoning. For over 200 years, paper notebooks have done *just fine* – why change now?

The fact is that science has already changed – we *need* to collaborate, to be more effective and productive if we expect to succeed. But people fear that change – it's a different way of doing things, even if it is ultimately better. Scientists are, notoriously, rebels who prefer to do things their own way. ELNs are often seen as a means of standardization – a perceived way of causing conformity and taking away scientific freedom.

In truth, this isn't necessarily the case. Yes, there are ELNs out there that don't allow free-form entry – and in some areas this is totally appropriate. But there are other ELNs that allow total free-form entry of any content, while at the same time providing the ability to create templates from any user-generated content (as well as pre-generated forms).

There will *always* be change – anyone who is familiar with DNA sequencing technologies as recently as ten years ago knows that only the individuals and organizations that can readily embrace change and adapt will thrive and flourish.

About us: Rescentris, Inc. is the provider of CERF - enterprise software to help organizations protect their R&D investments and intellectual knowledge assets. CERF combines electronic lab notebook (ELN) and scientific content management to collect, secure, share, and leverage data and lab records in collaborative projects.