

Background

Electronic Lab Notebooks (ELNs) were first developed for pharmacy and corporate research. Numerous ELNs were developed. These ELNs were complex and very expensive - \$40,000 to set up one lab and \$1000 per person per year to maintain. They were not appropriate for university research groups.

Eventually web- and cloud-based technology led to simpler and less expensive ELNs. These newer vendors did not always have a good business plan and understand the difference between corporate and university culture.

Atrium Research (Image below) has been following the progress of ELNs and maintains an ever expanding list of both corporate and academic friendly ELNs.

| SUPPLIER | ELN |
|---------------------------|--|
| Agram | LogLab |
| Agilab | ELN Biolab |
| Agilent | OpenLAB ELN |
| Amphora Research | PatentSafe |
| Arxspan | ArxLab |
| Ascope | E-Cat |
| Benchling | Benchling |
| BioData | Labguru |
| Biovia/Alcortys | Biovia Notebook, Biovia E Notebook, Biovia LES |
| Bio ITech | eLabJournal |
| Chembytes | Espresso ELN |
| ChemInnovation | CBIS |
| Distalsoft | DeltaBook |
| DocuLab | DocuLab |
| Dotmatics | Studies Notebook |
| Edge Software Consultancy | Bio Rails |
| eNovityx | ePro |



The Positives

Researchers travel and collaborate, across the hall and across the globe. ELNs provide a space for all to share, communicate and work together independent of location.

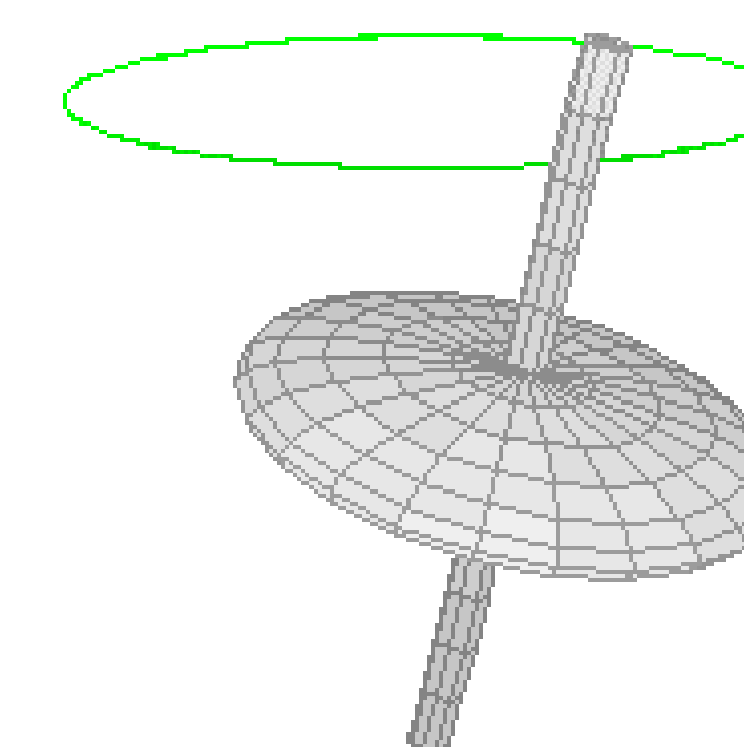
Collaborations can cause problems if the different groups do not initially work out how the data is collected, described and stored. ELNs may solve this problem since all will be working in the same space.

The fear of too many researchers is that the data will walk away with a grad student or postdoc. With an ELN, a copy of the data can leave, but not the original data.

ELNs can be included in the Data Management Plans now being required by granting agencies and foundations.

A site license provides server space to all researchers and, therefore, reduces the demand on institution servers.

Over the years notebooks and data pile up. With an ELN and good metadata, the content can be easily searched for the required experiment.



“Lab” oriented ELNs are not useful for programming or simulations. Dotmatics provides tools for simulations, but it has corporate pricing. VisTrails is an open source system designed for simulations, data exploration and visualization. GitHub is useful for coding.



REDCap is a robust, web based ELN developed at Vanderbilt and now used worldwide. It is specifically for clinical research, but has been used in other scenarios. Institutions provide the HIPAA and FERPA compliant servers.

Labguru was developed in Israel and has a sizeable market in Europe and the Middle East. LabArchives was developed in the U.S. and has been making in roads into the U.S. and Australia. At the University of Utah these and additional ELNs were reviewed and presented to faculty for their input. LabArchives is familiar with academia and this is reflected in their pricing for students, part-time workers and visiting scholars. LabArchives was selected for a year-long pilot study. Nine labs in multiple disciplines agreed to participate.



Paul Ehrlich at Rockefeller Institute



The Negatives

Older labs were not configured to accommodate computers, laptops, etc.. Campus Environmental Health & Safety offices frown on lab equipment leaving the lab. Additionally, some labs have environmental conditions in which operating electronics is not ideal (e.g. dust in concrete labs).

Campus Site License

- *Read the literature available and assess the ELNs available and your campus needs. Evaluate ELNs
- *Hold demos of ELNs and survey attendees for their opinions.
- *Select an ELN and contact the company.
- *Determine how campus supports site licenses, IT, VP for Research, and/or library.
- *Be aware of campus calendar for FY, changes in administration and researcher schedules.
- *Have conversations with key people and gain support for a pilot project. The pilot project includes interviews throughout the study to determine issues.
- *Campus IT will want to evaluate security issues.
- *Keep key people informed of he progress, including the ELN vendor, and start talking about funding and administration of the ELN.
- *Bring in vendor rep and start discussing the contract.

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REFERENCES

Atrium Research <http://www.atriumresearch.com/>
 Labguru <http://www.labguru.com>
 LabArchives <http://www.labarchives.com/>
 Paul Ehrlich at Rockefeller Institute <http://centennial.rucars.org/index.php?page=Chemotherapy>
 Dotmatics <http://www.dotmatics.com/>
 VisTrails <http://www.vistrails.org>
 GitHub <https://github.com/>
 REDCap <http://projectredcap.org/>

About LabArchives

Like most ELNs today LabArchives is cloud based. It replicates the print notebook, but includes features and widgets to assist with inputting, organizing and analyzing data. It tracks provenance (who did what, when, and how) so is FDA compliant.