Electronic laboratory notekeeping at the Göttingen Campus

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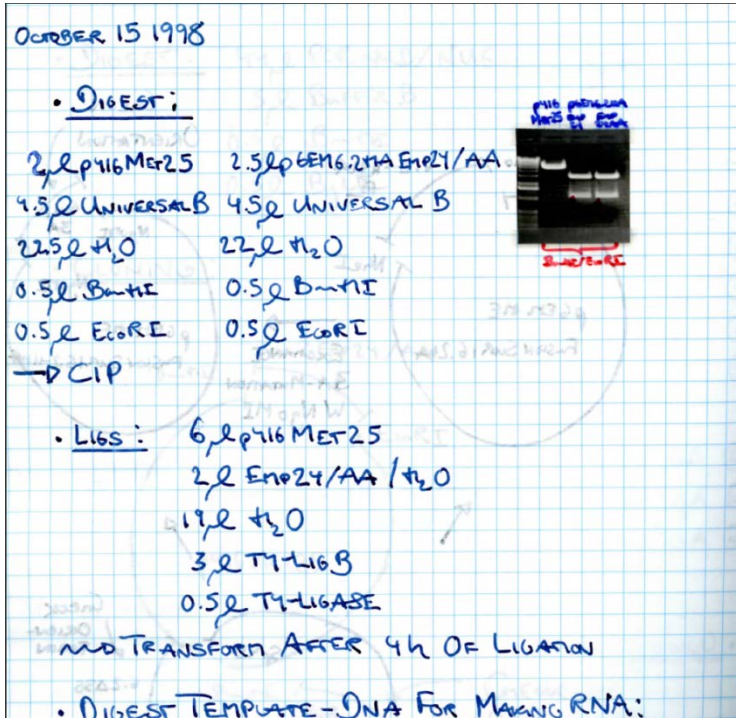
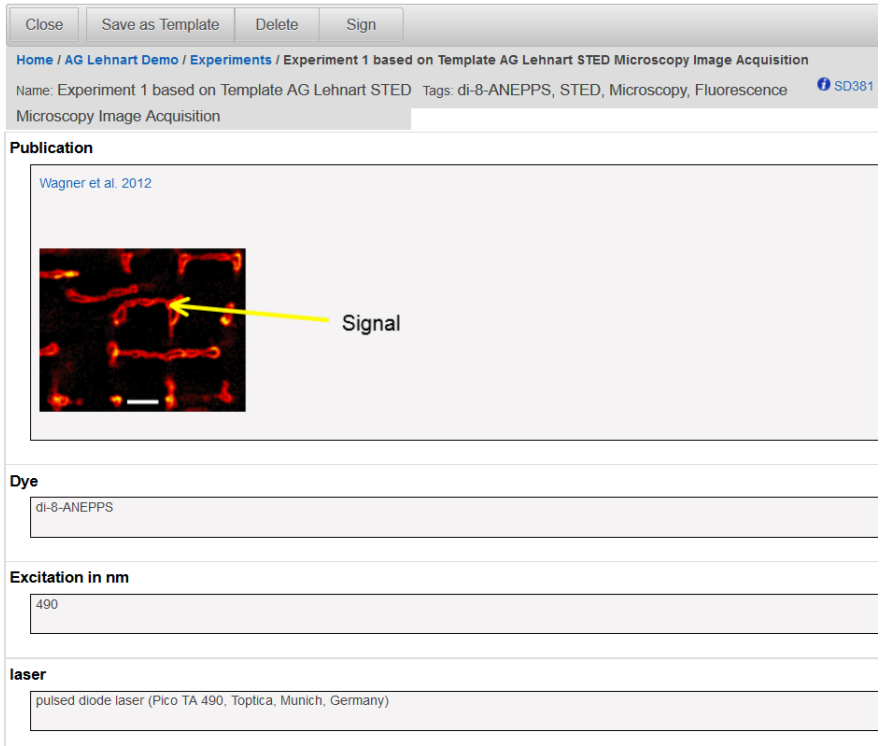
Electronic laboratory notekeeping

What is an ELN?

Paper laboratory notebook



Electronic laboratory notebook (ELN)



Challenges

Introduction of an ELN in academic research environments

- No routine workflows (basic research)
- Dynamic working structures (heterogeneous methodology)
- High dynamics of interdisciplinary team composition
- Data management/access policies rarely defined

Experimental documentation

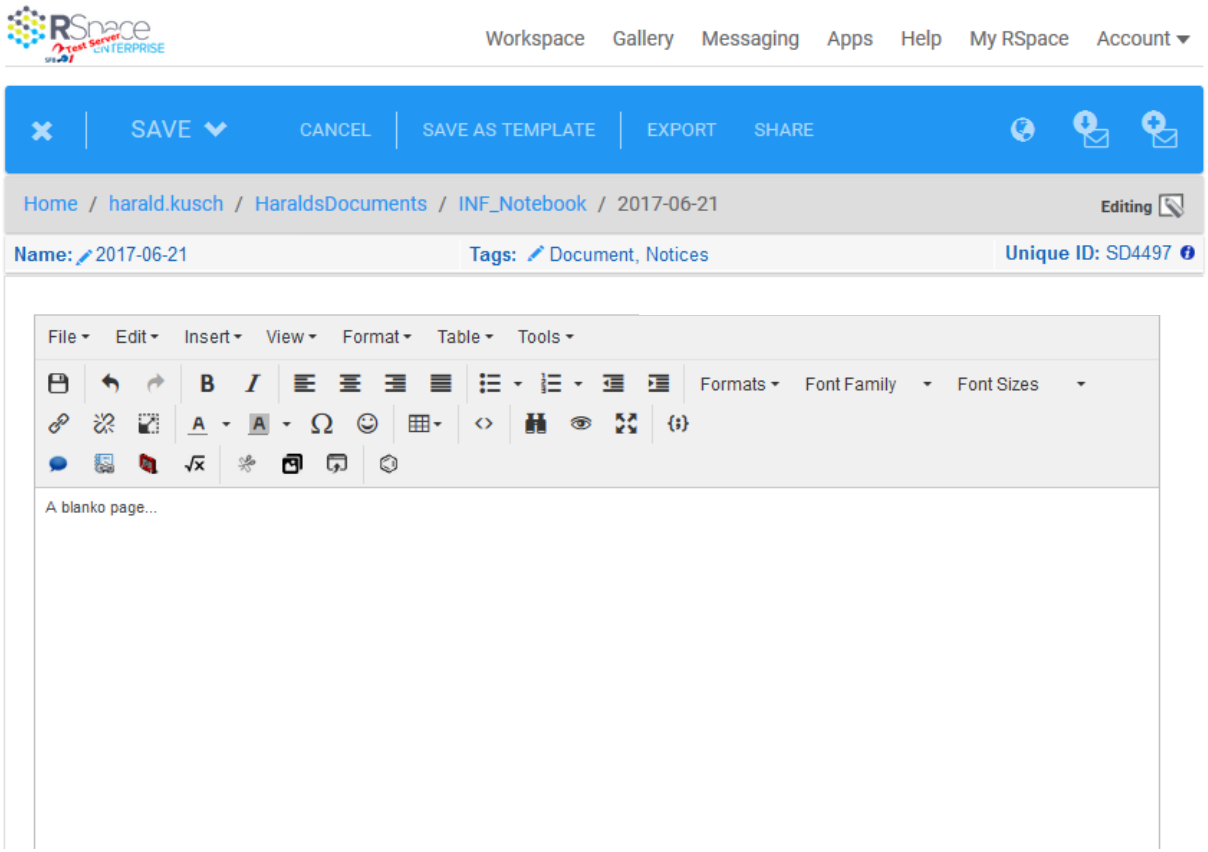
Heterogeneous aims

- Daily lab/field work
- Authority reporting
- Research group internal management
- Research Consortium internal management
- FAIR/Open Science approaches

ELN

Unstructured documentation

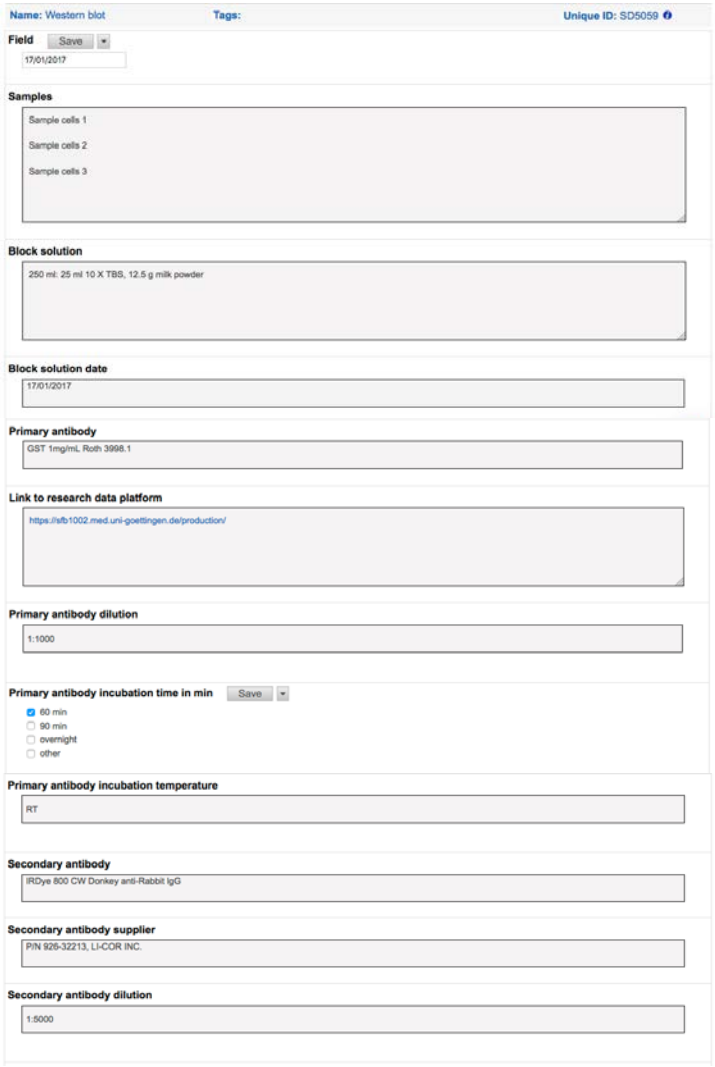
- New methods
- Room for “creativity”



ELN

Structured documentation

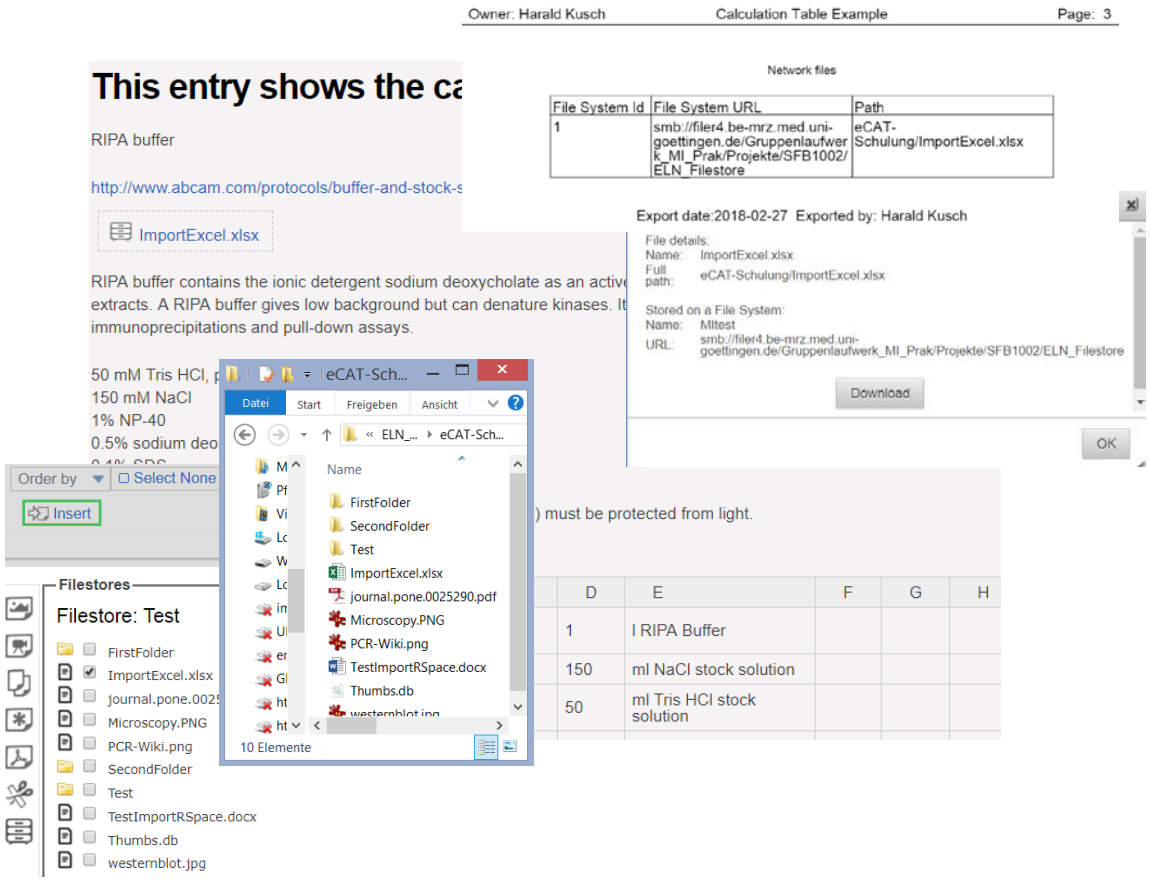
- **Centralized protocols**
- **Learning tool**
- **Quickly shared**
- **Metadata recording facilitated**



ELN: cross-linking

Institutional filestore connectivity

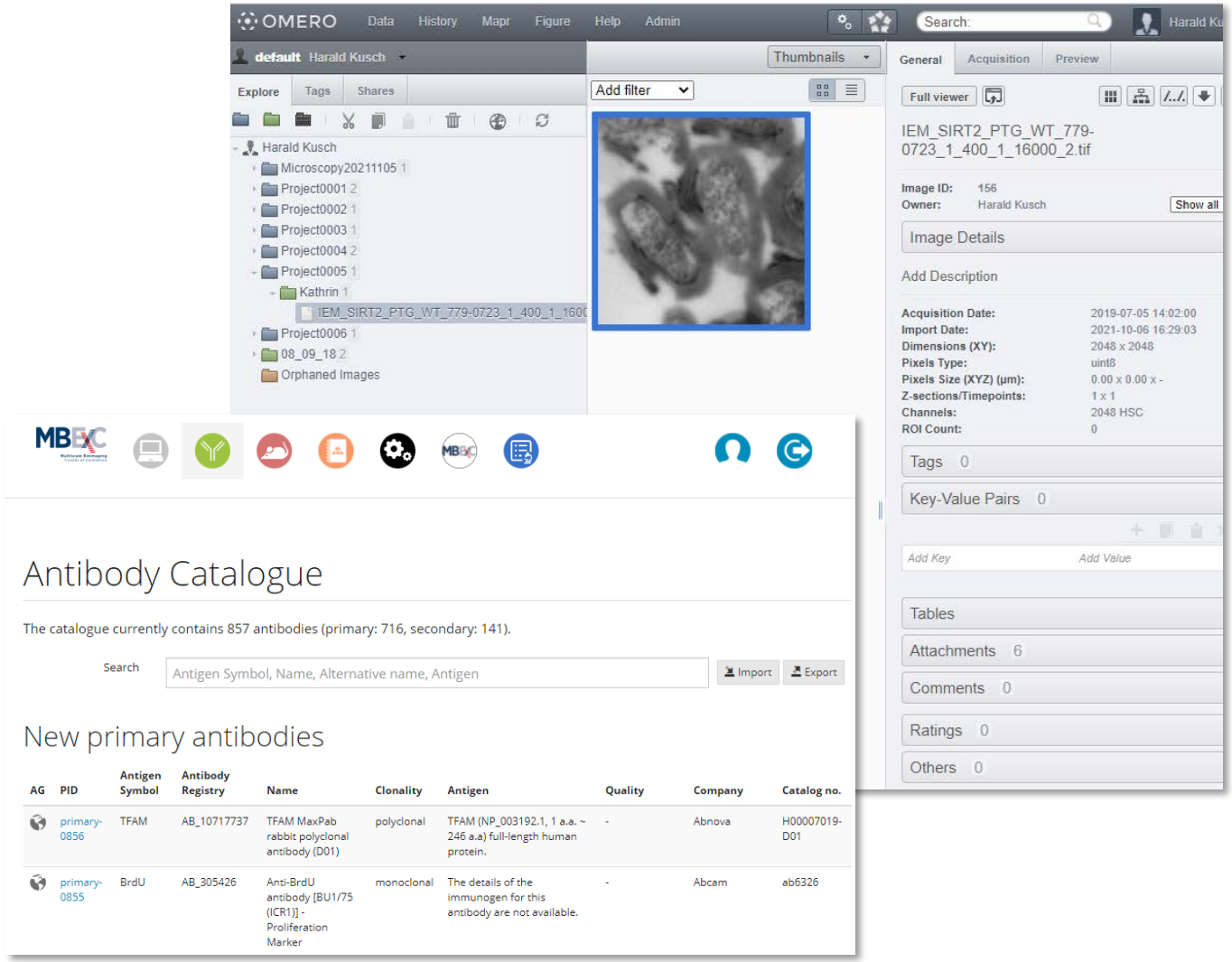
- Cross-linking of primary research data
- Enables remote access to lab data
- Exports contain selected primary data and automatic lists of cross-linked data



ELN: cross-linking local RDM web services

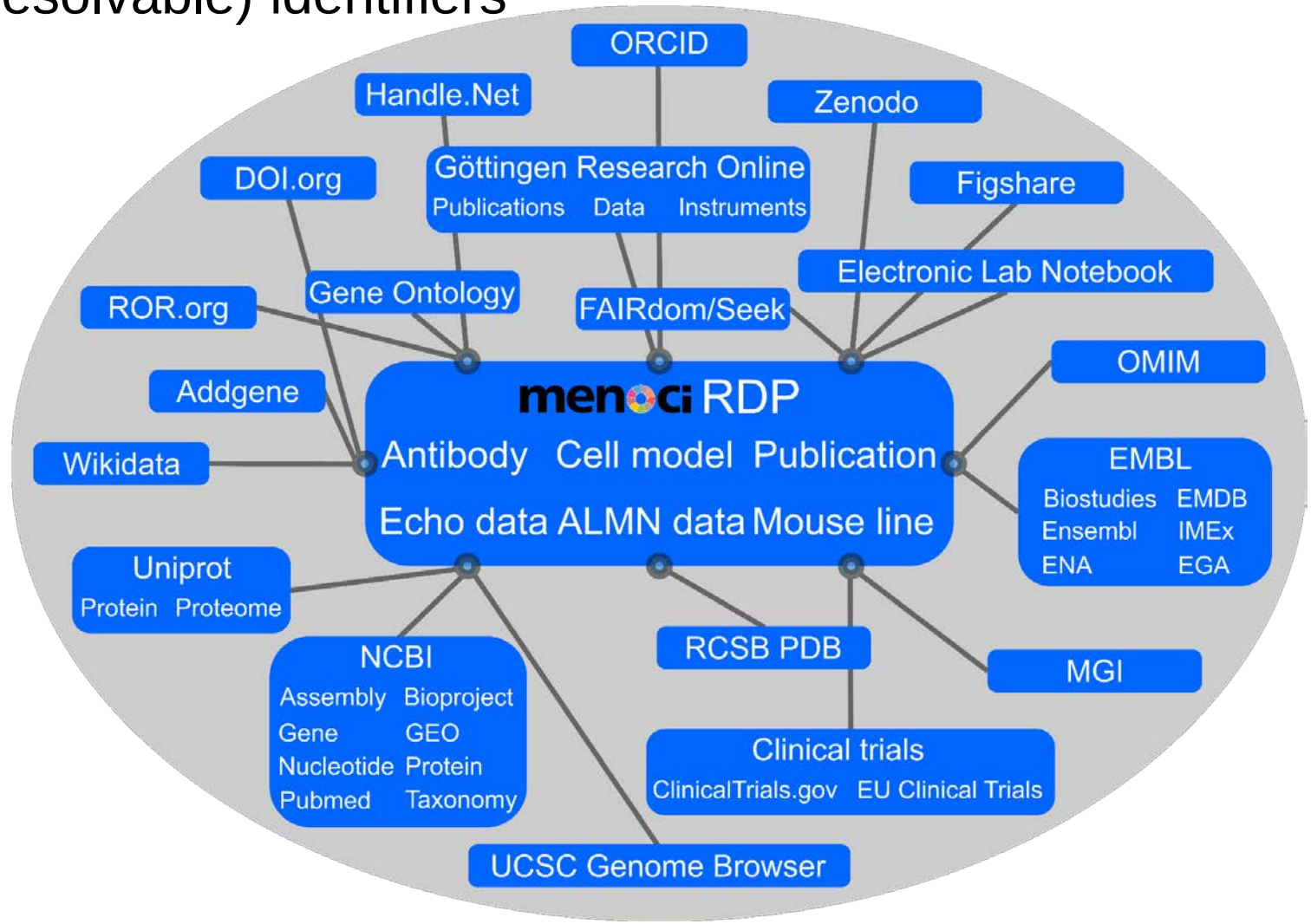
e.g.:

- menoci.io
- Omero
- Jupyter
- Gitlab
- …



ELN: cross-linking “Knowledge Graph“

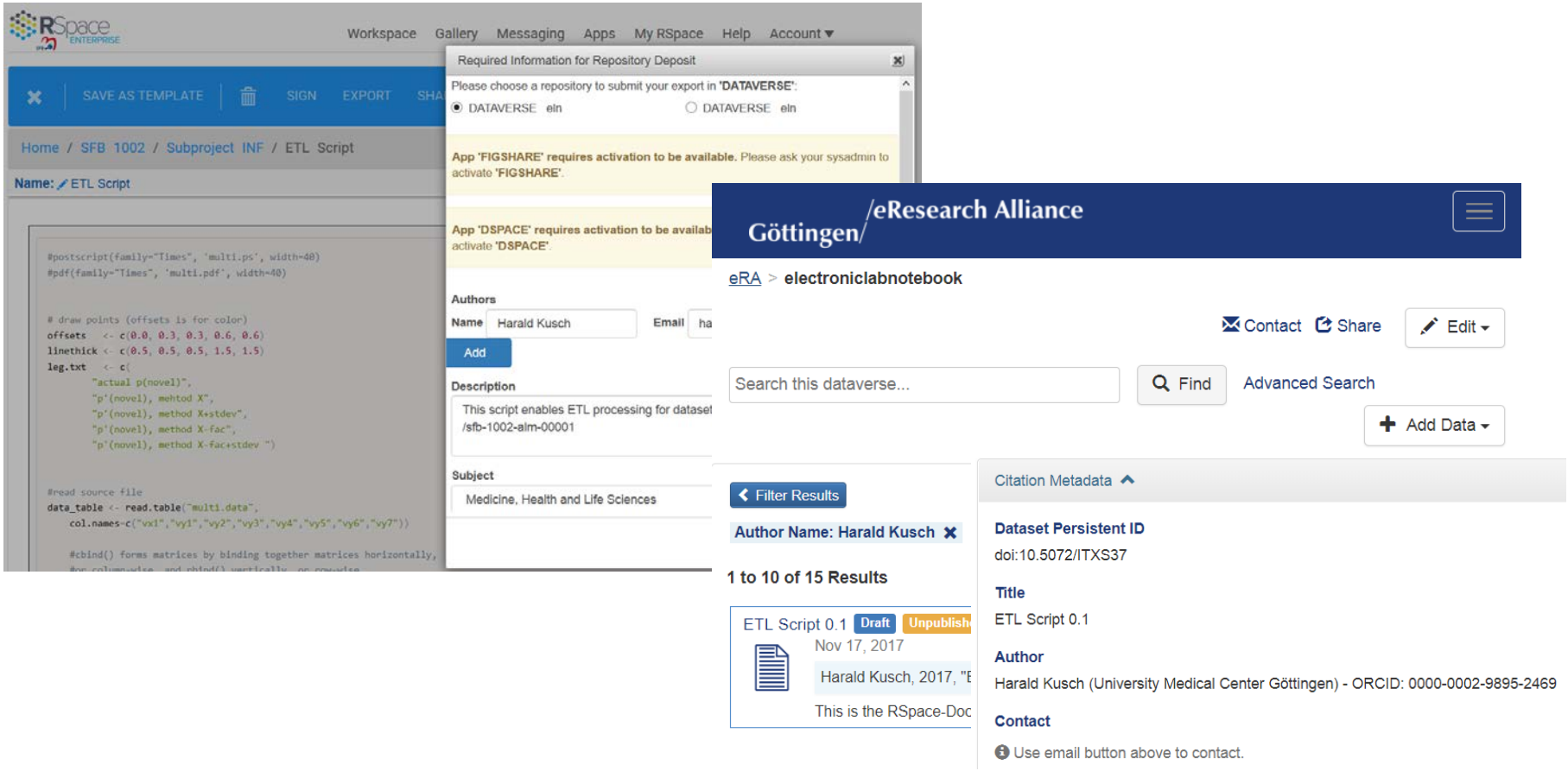
Persistent (resolvable) identifiers
+
Metadata



ELN: data publishing

automatic integration with campus repository

Persistent identification via DOI and ORCID integration



ELN: implementations Göttingen

One ELN fits all?

- Heterogeneous applications (examples, not complete!)
  - Life sciences: RSpace, Labfolder, eLabFTW, Jupyter, Redcap, self developments
  - Chemistry: Rspace, self developments
  - Physics: Confluence, self developments
- A variety of research groups plans/wants to change from paper to digital

ELN: implementations Göttingen

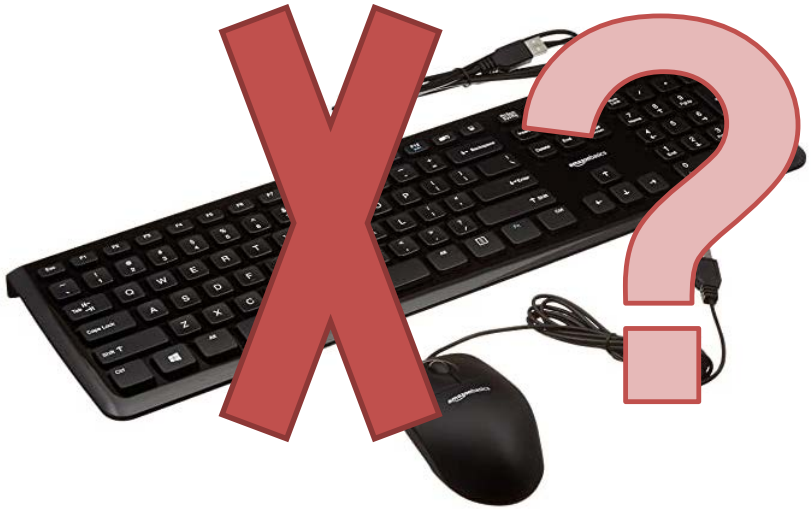
- No or only basic institutional support!
  - License fees or other technical costs often financed via project funding
  - Persons („Admins“) often not officially available
- Open source vs. proprietary
  - Current open source solutions (e.g. eLabFTW) are too rudimentary developed for several user groups
  - Adaptions to current needs require costly (unavailable?) personal resources

ELNs: recent changes = new challenges

- ELNs get „normal“: Scientists more and more work (daily) with ELNs
- When scientist move they want to migrate their ELNs to new locations
- Large consortia: different ELNs need to be integrated
- “Source data”: increasingly life science journals require (meta)datasets for each figure in an article
- Long term archiving: What (exactly) to do with alumni ELN data sets?

ELNs: The (near?) future

- Alternative input methods: Voice recognitio
  - Labtwin.com
  - Labvoice.ai

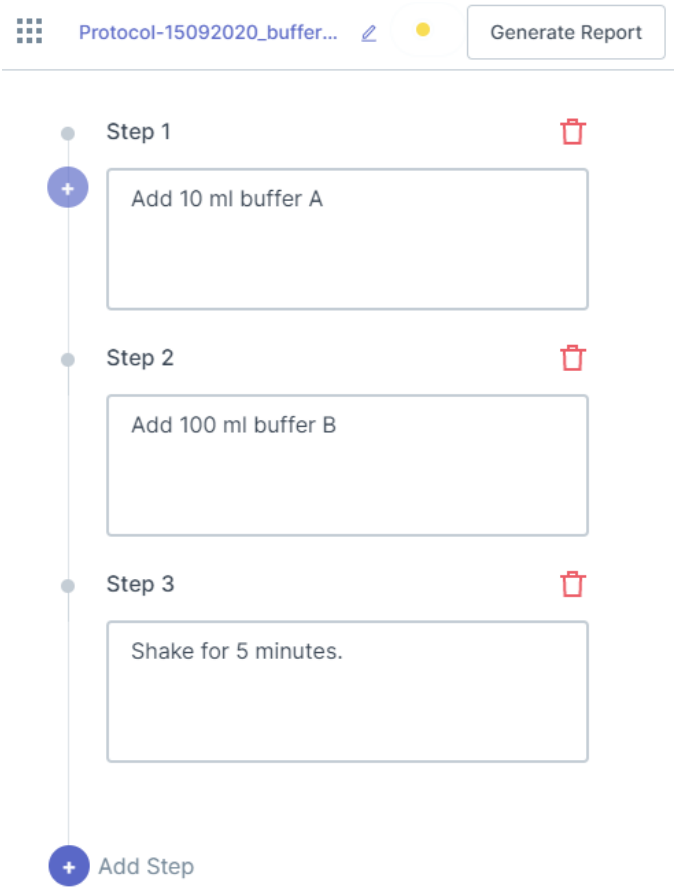


- Interfacing
  - application programming interface (API)
  - Standard development (e.g. REST)

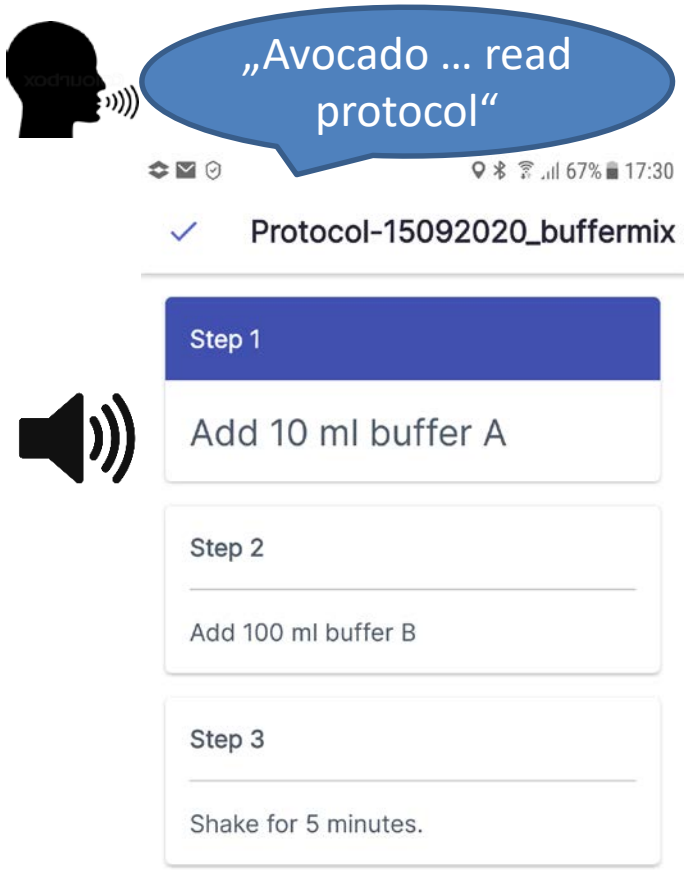
- Offline documentation (synchronization)???

ELNs: The (near?) future – voice commands

1. Design of protocol in browser app



2. Application of protocol in mobile app



Summary

- Many benefits by introducing ELN documentation
- Familiarize: Ideal versus real software
- Interfaces to connect heterogeneous applications at a large Campus
- Increasing routine ELN usage evokes new challenges

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