

Brave New Lab World

Electronic Lab Books Digitise
Laboratory Documentation

Bert Zulauf, Nina Knipprath

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Heinrich Heine University Düsseldorf, Germany

Center for Information and Media Technology (ZIM)

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ELN – An introduction



RDM Competence Centre
Heinrich Heine University Düsseldorf

<https://fdm.hhu.de>*

- Merger of ZIM, University Library and Research Promotion/Transfer Department
 - Regular jour-fixe since 2021
- RDM Steering Committee
- RDM Council



*(in the course of the year there will be adapted English websites)

RDM Competence Centre



ELN – what is it?

- ELN = An electronic lab book (or electronic laboratory notebook (ELN)) is a digitally created and maintained lab book that claims to replace a handwritten or printed laboratory notebook.
- Planning → Implementation → Evaluation
(of scientific experiments)

ELN – what is it?

Simple systems, „blank sheet“	Developed systems	Laboratory information management systems
Text entries	Special input aids, e.g. structural form editor	Sample management
Add files to notes	Rights management	Connection of devices
Attachments, e.g. pictures	Audit trail	Automated processes
Search in Text entries	API	
Example: OneNote	Example: eLabFTW	Example: Limsophy

- Criteria
 - generic
 - web-based

ELN Guide of the ZBMED

<https://www.publisso.de/forschungsdatenmanagement/fd-dokumentieren/>

Source: <https://wiki.hhu.de/x/UYa2B> + inspired by: Ulrich Dirnagl, Ingo Przesdzing: A pocket guide to electronic laboratory notebooks in the academic life sciences, 2016

- Labfolder (commercial)
 - Since 2013
 - Chemistry/industry research project
- eLabFTW (open source)
 - Since 2018
 - Result from discussions with researchers
 - Use in chemistry, biology, physics & medicine



- eLabFTW (Open-Source)
 - Experiments
 - Freely definable status
 - Timestamp possible
 - Defining templates and steps
 - Database entries
 - Defining templates and subtypes
 - Usable for e.g. lab inventory, protocols
 - Definition bookable entries possible
 - Categorisation
 - Freely definable keywords (tags)
 - Defining dynamic fields
 - Booking of devices via integrated calendar



13:37

Experimente

< Zurück zur Übersicht

Erstellen

1 Besitzer ist Bert Zulauf

Running

Team Besitzer +


Admin(s)

Begonnen am 2021-04-12

Bananen mit Apfelgeschmack

$$K = \frac{[\text{Hg}^{2+}][\text{Hg}]}{[\text{Hg}_2^{2+}]}$$

To see how any formula was written in any question or answer, including this one, right-click on the expression it and choose "Show Math As > TeX Commands". (When you do this, the \$ will not display. Make sure you add these. See the next point.) For inline formulas, enclose the formula in \$ > \$. For displayed formulas, use

 eLabFTW


EXPERIMENTE


DATENBANK


TEAM

SUCHE

DOCUMENTATION







Experimente

Filterstatus ▾

Anordnen nach ▾

Sortieren ▾






















10 ▾

Schlagwörter ▾





Los

Erstellen

Alles ausklappen - Alle auswählen

Experiment 25.41	Nächster Schritt: Meet <input type="checkbox"/>   RUNNING	2022-07-29	★★★★★ Bert Zulauf	 Test
SAO Test	<input type="checkbox"/>   RUNNING	2022-02-16	Ben S	
Untitled	<input type="checkbox"/>   RUNNING	2022-01-24	Philipp R	
Diesisteeintest	<input type="checkbox"/>  RUNNING	2022-01-20	Henrik G	
Unbenannt	<input type="checkbox"/>  RUNNING	2022-01-20	Henrik G	
Vorbereiten der Laborausrüstung	<input type="checkbox"/>  RUNNING	2022-01-20	Henrik G	
Test	<input type="checkbox"/>   RUNNING	2022-01-18	Philipp R	
Azubis	<input type="checkbox"/>   RUNNING	2021-08-31	Christoph K	 Test
Zeichentools	Nächster Schritt: next step <input type="checkbox"/>   RUNNING	2021-04-27	  molekül	
Untitled	<input type="checkbox"/>   RUNNING	2021-04-12	Philipp R	

NÄCHSTE SEITE

    | SYSADMIN-KONTROLLZENTRUM | ADMIN-KONTROLLZENTRUM | BENUTZERSEITE

Bereitgestellt von eLabFTW 4.3.6
Seite generiert in 0.31758 Sekunden (18 SQL)
Speicherverbrauch: 1.33 MiB (1396560 Bytes)

Make or Buy?

Contract with Deltablot

- Server operation On-Premises
 - + Service provider/expert at the back of your hand
- Open source funding



<https://www.deltablot.com/>



Requirements for an ELN

- Technical requirements
 - User-friendliness
 - Support known file formats
 - Availability
 - Exit strategies
- Functional requirements
 - e.g. Molecule Editor
 - Interface to specific programme (Matlab)
- Regulatory requirements
 - Good scientific practice
 - Security, integrity
 - Findability

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„ Researchers must endeavour to carry out their investigations to the best of their knowledge and belief in accordance with the latest state of knowledge lege artis and to challenge all results with regard to plausibility.“

Extract from the "Regulations on the Principles for Ensuring Good Scientific Practice" (HHU)

Examples from research & teaching

User groups & practical examples

Teams: 89 – Researchers: 1373 – Experiments: 29.253 *

- Medicine: Preclinical
 - ELN as interface between QMS and digital storage of laboratory journals
 - Standard operating procedures (SOP) and managed biobank
- Physics: Medical Physics
 - Protocol management via database
 - Group planner for devices & rooms
- CRC1208: Membrane systems
 - Mandatory use
 - Automatic archiving in a repository via SOP structure
- Neurobiology: Teaching
 - Bachelor and Master course uses ELN
 - Creating tutorials together
 - Chemical database (400 entries)

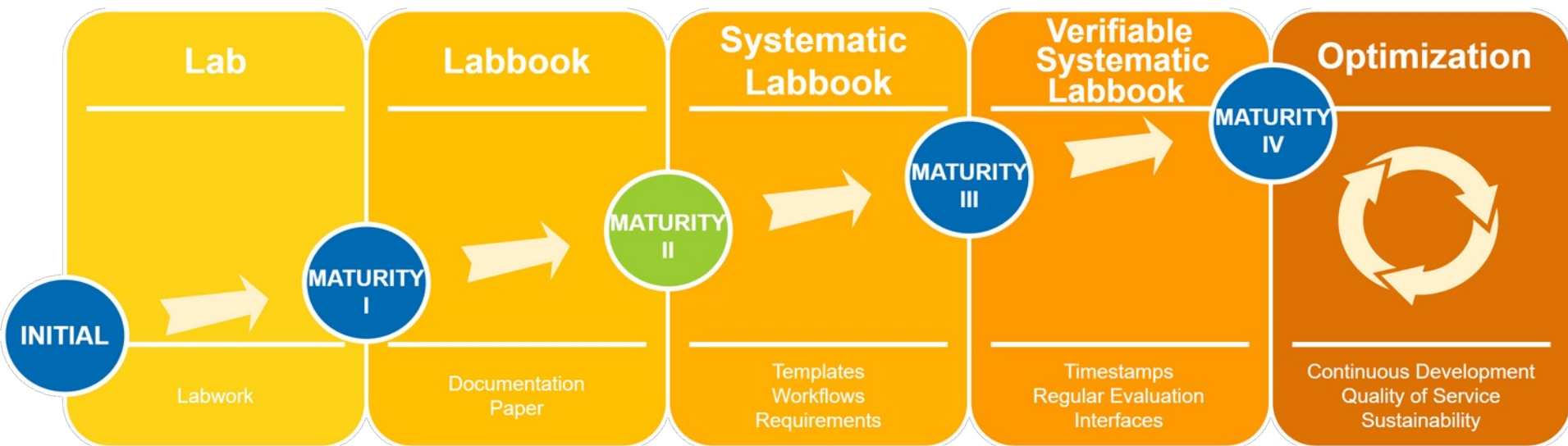
*the status is from 06.06.23

Neurobiology Master Course

- „Cellular and molecular analysis of brain function“
 - Working together on video tutorials (eLabFTW)
 - First steps in fluorometric imaging under laboratory conditions
 - Generate and evaluate data
 - Optimisation for teaching purposes
 - Students develop templates, meaningful tags...
- Early handling of ELN – faster and wider acceptance
- Potentials for independent learning in the laboratory

Integration into the curriculum

Maturity process



On-site support & Networking



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HHU internal

- Together with researchers
 - Collected usecases
 - Monthly meetings with CRC / Cluster of Excellence (CEPLAS)
 - eLabFTW Usergroup 2020
 - Virtual event with >100 participants
 - Instance for teaching
 - Deletion of entries possible
 - Key figures for the use of eLabFTW
 - District government / genetic engineering documentation obligations

On-site support

Key figures on the use of services

- User eLabFTW
- Status is from 21.11.2022

Faculty	Employees	Students
Arts and Humanities	1	
Business Administration and Economics		
Law		
Mathematics & Natural Sciences	399	154
Medicine	236	50

Advanced electronic signature - Form-Z

- Genetic Engineering Recording Ordinance (GenTAufzV)
 - Document the path of genetically modified organism (GVO)
- Instructions for LTV Certificates
 - Checking a digital signature in a PDF
 - Signing a PDF in Adobe Acrobat
 - Must be Possible to verify signature at any time in the future – Long-Term Validation

Formblatt Z

11. Bezeichnung und für die Sicherheitsbeurteilung bedeutsame Merkmale einschließlich Verwendung der GVO
(Ausfüllhilfe beachten)

Nr.	Spender		Empfänger		Vektor		Modifikation		Insertionsort	übertragene Nukleinsäuren einschließlich Vektoranteile	GVO			
	Bezeichnung	RG	Bezeichnung	RG	Bezeichnung	Knochen-ent	Knochen-ten	Strangem			Bezeichn ung	RG	erzeugt ¹ oder erhalten ² am	entsorgt am
1														
2														
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11														
12														
13														
14														
15														

Anlage: Formblätter der Anmelde- und Genehmigungsunterlagen und Vektorkarten für ausführliche Darstellung und Darlegungen

12. Unterschrift des Betreibers oder Projektleiters oder einer von diesen bestimmten Person:

Ort und Datum	Name, Funktion	Unterschrift
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Research data management in cooperation

- Project phase 2017-2019
 - HHU: Many conversations with researchers
- Cooperation Düsseldorf – Wuppertal – Siegen
- Simultaneous FDM.nrw networking



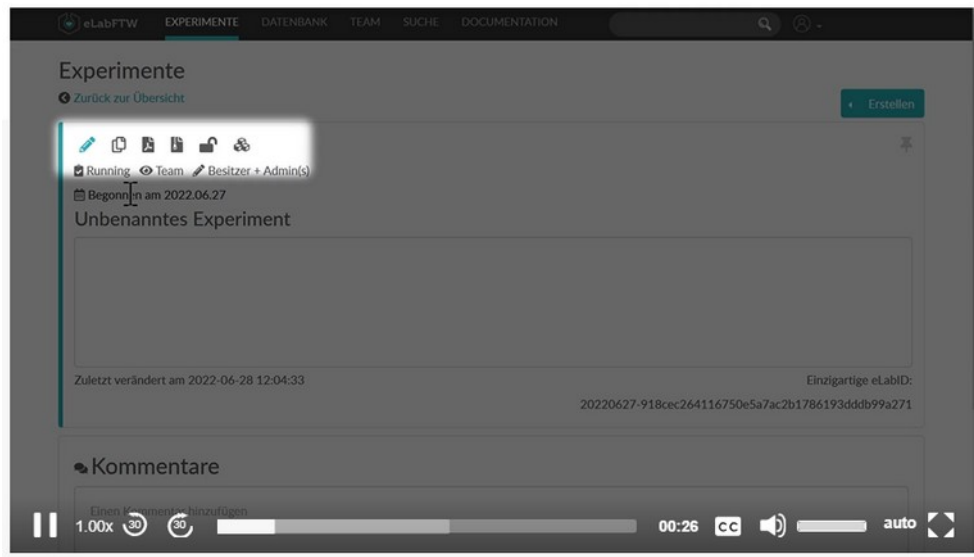
FDM.nrw Networking

- Working group for ELN (in NRW) founded – 2019
- Almost 40 different HEIs
- Topics among others:
 - Central authentication method
 - Use in teaching
 - IT security concept
 - GDPR
 - Staff council participation
 - Technical sub-working group (with exchange via chat)



OER.Digichem.nrw

- Video tutorials for
 - Students in self-study
 - Lectures as part of teaching
- Identify digital needs
- Creation of target group specific video tutorials (in LMS)



Conclusion & Outlook

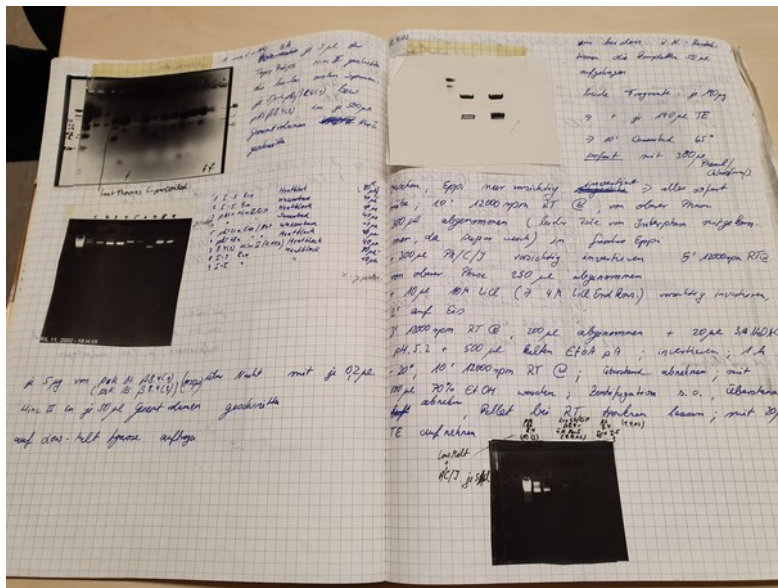
eLabFTW at HHU

- Flexible application
 - Teaching, with many students
 - Individual requirements in research
 - Increased use of application interfaces
- Platform approach: still monolithic?
 - Synergies in overarching projects
 - Mandatory common (system) requirements
- Usergroup HHU
 - Intra-university exchange
 - Pick up/convince newcomers

Outlook

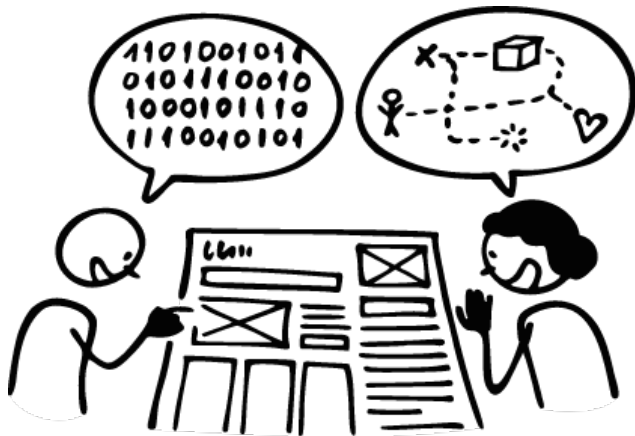
Filing cabinet with laboratory book archive

- How does that look digitised?



Project together with CRC1208 on archiving

- Division of labour between faculty and ZIM
- **Researcher** creates tool to automatically generate relevant metadata from eLabFTW entry (LISTER*)
- **ZIM** is developing a solution to supplement this metadata
 - Adaption of a DSpace instance (improved search option)
 - Transfer to S3 storage with additional metadata
- Laboratory book platform is relieved
- Good scientific practice





*<https://doi.org/10.1101/2023.02.20.529231>

Contact & Information





Bert Zulauf
bert.zulauf@hhu.de

 orcid.org/0000-0002-5747-7892
 twitter.com/hhu_zim



Nina Knipprath
knipprath@hhu.de

 orcid.org/0000-0001-6568-1167
 twitter.com/hhu_fdm

Thank you
for the attention