

INTERIM REPORT

Project title	Laboratory Notebook & Database Extensions (LabNDB-Ext)
Project leader	M. Krüger, G. A. Holzapfel
Project team members	Jakob Harden (Project manager), Selda Sherifova, Mathias Eisner, Barbara Schmid, Philipp Knabl
Reporting period	01.04.2022 – 30.09.2022
Institute	Institut für Materialprüfung und Baustofftechnologie [2060] Institut für Biomechanik [7190]
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Please note: length approx. 4 – 5 pages

1. Goals and results

- Have the objectives defined in the proposal been (partly) achieved? Are these objectives still valid or realistic?
- Compare the objectives with the results achieved.
- Describe the “highlights” and problems that occurred in achieving the objectives.

Most of the objectives can be achieved as proposed.

Table 1: Work packages

No.	Proposed objectives	Achieved results
1	Rawdata preview	Basis that allows to preview rawdata from devices is implemented.
2	Booking devices and sections	Fully implemented and tested.
3	User authentication - permissions - roles	Security measures for the user authentication were fully implemented and tested. Role systems and roles were defined (management roles, QM-roles).
4	SQL look-ups for inventory - devices - rooms	Import of CSV-files from TUG-Online for devices and rooms is fully implemented and tested.
5	End-user tests and documentation	A demo version is available and used by the end-users for testing purposes but also for showcases. Workgroups to gather information regarding usability and requirements were established. Several workgroup meetings have already taken place.
6	Code documentation	Vast majority of the code is well documented. Further steps are: review, completion, html-based document (sphinx)
7	Exporting data and metadata to the TUG repository and CyVerse	Prototype that allows for data and metadata export to the repository (invenioRDM) is implemented and tested.
8	Message board & notification	Fully implemented and tested.

There are some “highlights” in the development process worth to be mentioned.

The continued cooperation between the institutes IMBT/TVFA [2020] and BioMech [7190] is still the source of many good ideas and a fruitful development process. In addition to the planned cooperations, further cooperation with RDM biomECh vol 2. was established under implementation of workflows.

In July 2022, we also began to cooperate with the RDM marketplace project “LabLog 2.0” from FELMI-ZFE. The contributions from their project team members (A. Zankel, F. Rasras) represent a valuable source of feedback and return useful information regarding the usability of our solution.

To our surprise, we were able to almost completely implement the message board at a very early stage. It is now being extended and tested. This feature is one of the core tools of communication and process management.

Because of the change in the funded project costs, it was necessary to declare the connection to the

RDM - Marketplace

repository as an optional component. We found out that communicating with the restAPI of the repository server is not very complicated and implemented a working prototype. This feature will definitely be part of the final solution and is intended to support best practices in research data management.

2. Work packages, milestones and current progress

2.1 Overview tables

- Explanatory notes:
 - Scheduled date: date according to the proposal plan.
 - Current date: date according to the plan valid at the time of reporting.

Table 2: Work packages

WP No.	Work package title	Stage of completion (in %)	Scheduled date		Current date	
			Start	End	Start	End
1	Project management	100	01.04.2022	15.04.2022	01.04.2022	22.04.2022
2	Concepts (gathering information)	100	15.04.2022	29.04.2022	23.04.2022	07.07.2022
3	Implementation phase I	100	29.04.2022	01.07.2022	08.07.2022	23.08.2022
4	Implementation phase II	50	01.07.2022	21.10.2022	24.08.2022	17.10.2022
5	Implementation phase III	0	21.10.2022	21.01.2023	18.10.2022	22.12.2022
6	Close-down (project closing, documentation)	0	21.01.2023	31.03.2023	23.12.2022	31.03.2023

Table 3: Milestones

Milestone No.	Milestone Title	Scheduled date	Current date	Milestone achieved on
0	Project start	01.04.2022	01.04.2022	01.04.2022
1	Project kickoff workshop	---	22.04.2022	22.04.2022
2	Concepts end (gathering information end)	29.04.2022	15.06.2022	07.07.2022
3	Implementation I	01.07.2022	23.08.2022	23.08.2022
4	Implementation II	07.10.2022	17.10.2022	---
5	Implementation III	13.01.2023	22.12.2022	---
6	Project end	31.03.2023	31.03.2023	---

2.2 Description of the work carried out during the reporting period

- Describe the work carried out during the reporting period based on the work packages.
- Describe any deviations in the work plan.
 - The description should also include changes in the methodology.
- Describe any changes and/or adjustments in the work plan and their effects on the completion of the project.

Work carried out so far:

- WP 1: Project kickoff workshop, project planning, basis for the project handbook
- WP 1: Project handbook that contains all information about the project (included: general information, objective and performance planning, task scheduling and cost planning, project context relationship tools, project organization and culture design, project proposal, flipchart protocol of the project kickoff workshop)

RDM - Marketplace

- WP 1: Initialization of topic-related workgroups (used to integrate end-users into the development process)
- WP 1: Developer workshop (gather information for further development, feature definitions, data-structure design, user-interface design)
- WP 1: Project presentation, RDM marketplace kickoff meeting
- WP 1: Project presentation, RDM marketplace barcamp
- WP 1: Project presentation, Institute meeting at IMBT/TVFA
- WP 2: Workgroup meetings (about 10 meetings yet), meeting protocols
- WP 2: Adaptation of deployment scripts and deployment documentation
- WP 2, 3: Several deployments of test releases on the project test server
- WP 2, 3: Feature implementation, booking calendar, device and workbench booking, finished
- WP 2: Feature implementation, CSV-import from TUG-Online for devices and rooms, finished
- WP 3: Feature implementation, redesign of code used to integrate manual measurement data into process workflows (datastructure and user-interface)
- WP 2, 3, 4: Feature implementation, test workflows for BioMech
- WP 2, 3, 4: Feature implementation, test workflows for IMBT/TVFA
- WP 4: Feature implementation, test workflows for FELMI-ZFE
- WP 5: Feature implementation, message-Board, finished

Work, not defined in the workpackages:

- Meeting with the data security committee and the workers' committee to evaluate requirements regarding data security and to avoid spying on employees
- First draft of data security plan (included: data security concept, general security measures), information from ZID already acquired, a talk with D. Camhy (SWW) to acquire additional information is planned
- Several talks with project owner of "LabLog 2.0" (FELMI-ZFE) in order to establish the cooperation with this project
- Established an additional test instance for FELMI-ZFE on the test server
- Feature implementation, export of data and metadata to the repository of TU-Graz (invenioRDM, restAPI), prototype finished, under testing, will be completed soon

Deviations in the work plan:

A minor deviation in the project was the renaming of the project phases "Gathering information" to "Concepts" and "Project closing" to "Close-down". However, the content has not changed.

There are three major deviations in the work plan. Those deviations are related to the objectives "rawdata preview" (1), "end-user tests and documentation" (4), and "SQL look-ups for inventory - devices - rooms" (5).

Deviation 1, rawdata preview: In several meetings and discussions we found out that the preview of device data is very time consuming and can only be achieved for certain file formats (the Messphysik format or simple CSV-files). Additionally, the file formats are related to devices and one device can produce files of different format. Therefore, we decided to implement the software infrastructure to handle devices and their respective file formats and a set of file parsers first. The implementation of graphical representations of the device data is postponed to a later point in time. Here it is to mention that a working prototype of a file parser and a graphical preview for the Messphysik format already exists.

Since this objective is closely related to the implementation of test work flows (laboratory tests) we decided to include the implementation of that workflows in this objective. It is planned to implement workflows often used in the laboratories of IMBT/TVFA, BioMech and FELMI-ZFE. At the day of reporting, most of them are implemented.

Deviation 2, end-user tests and documentation: In the beginning of this project we found out that it would be a good idea to integrate the end-users not only for testing purposes but also into the design of the

RDM - Marketplace

solution. The design of that integration is based on the ideas of “agile project management”. In order to achieve that, we established five workgroups (WG Authorization & Permissions, WG Materials & Samples, WG Processes & tests, WG data export, WG Laboratory facilities). Each workgroup works on a certain topic. Workgroups consist of project team members and stakeholders (administrative staff, scientific staff, laboratory staff) of three different institutes of three different faculties. As mentioned before, the workflow is based on agile project management.

Therefore, we designed the workflow for the workgroups as follows:

- Evaluation (project team members present the current solution, acquire feedback, gather information and requirements)
- Implementation (adapt solution, implement required features, perform developer tests, deploy solution)
- Testing (end-users are allowed to try out the solution and are encouraged to submit feedback to the developers)

This is an iterative process that will be repeated at least two times over the course of the project (workpackages 4 to 6) .

Originally, it was planned to provide the end-user documentation separately from the software. The outcome of several discussions was that it would be much more useful to include the entire documentation in the solution.

The advantages are:

- the documentation is available where it is needed
- it is easier to maintain and update the documentation in the course of further development
- documentation updates are deployed side-by-side with new or updated features
- web-based documentation supports features not available in file-based documentation (videos, animations, ...)

Deviation 3, SQL look-ups for inventory - devices - rooms: First we thought it would be a good idea to update inventory, device and room information from the database of TUG-Online directly using SQL look-ups. It turned out that the required information can only be obtained in form of tables in CSV format. Therefore, we implemented a feature that allows for regular updates using CSV-files. Here it is to mention that items already existing in the database are updated, new ones are added. Additionally, the feature is very simple to use.

Changes in the work plan

The initial phase of the project took longer than expected. This is because we had to define and establish the workgroups first. Furthermore, we had to ask all stakeholders about their participation in the workgroups and explain the workflow to them. This deviation has since been compensated for. At the time of reporting, the project is back on schedule.

3. Project team, cooperation and sustainability

- Have there been major changes in the project team?
- If some work is done together with other projects (RDM Marketplace or other): describe the cooperation between the projects.
- Are the current results visible at your research group/institute/faculty? Any opportunity to present your results?
- Are there any indications/potentials to sustain the achieved results?

Changes in the project team: P. Knabl was a project team member and developer in the former project “LabNDB”. Since he finished his studies abroad, he is part of the project team again.

Cooperations: As mentioned before, we established a cooperation with the RDM Marketplace pilot project “LabLOG 2.0” (FELMI-ZFE). Several meetings with the project team members and the project owner of “LabLOG 2.0” have already taken place. Furthermore, a separate test instance of LabNDB was deployed for them. Our first impression is that this cooperation will be beneficial for both projects and we are looking

RDM - Marketplace

forward to the next steps to come. Team members of RDM biomECh vol.2 contributed to the testing workflow implementation as a case study within that project.

Visible results: We continuously deploy a test version of our solution on our test server. That allows all members of the workgroups to test the solution and to become familiar with the look and feel and the workflows. The test version is available within the network of TU-Graz. As mentioned before, we also deployed a separate test instance for “LabLOG 2.0”.

Sustainability: The plan is to continue development in the next years on our institutes. We are also reaching out to our collaborators at different universities to evaluate their needs and to investigate how we can collaborate on further development. One of the next steps is to submit a project proposal to acquire additional funding for the implementation of the outcomes of this project in the laboratories of IMBT/TVFA, BioMech and FELMI-ZFE, and we are currently investigating suitable funding opportunities. The proposal will include activities regarding staff training, end-user documentation, transformation of existing working processes, change-management and the implementation of required features. We plan to keep end-users (customers) integrated in the development process, since such an approach contributes to sustainable RDM practices.

4. Project costs

- [Provide a brief overview of the current project costs.](#)
- [Are there any deviations from the cost plan?](#)

Table 4: Project costs

Funded	Spent
€ 15,000.00	Approx. € 10,500.00

The costs are related to the fee of the three developers (M. Eisner, B. Schmid, P. Knabl) employed for that project. Other contributions are institute in-kind and therefore not part of the costs shown above. Up to this date no money was spent on hard- or software.

At this point we do not expect any major deviations in the proposed cost plan.

It should be mentioned here that the in-kind performance of J. Harden and S. Sherifova is in the range of approx. 260 working hours (approx. € 9,000.00). Additional costs for hiring our developers that go beyond the project funding are paid by IMBT/TVFA.