RDM - Marketplace

INTERIM REPORT

Project title	Laboratory Notebook & Database - LabNDB
Project leader	Markus Krüger
Project team members	Jakob Harden, Lukas Briendl, Matthias Lenz, Mathias Eisner, Barbara Schmid
Reporting period	1.1.2021 – 30.6.2021
Institute	Institut für Materialprüfung und Baustofftechnologie [2060]
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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. Only the development of the data export and data anlysis tools will partially exceed the pilot phase of this project, but it is planned to develop at least working prototypes to show the principle functionality of that tools.

Table 1: Work packages

No.	Proposed objectives	Achieved results
1	workflows to gather data from laboratory processes	basic data structure established, webinterface design done, implementation partially finished
2	sample and material database	basic data structure established, webinterface design under construction
3	role based access permissions to the data	feature implemented but not fully tested yet
4	data export to CyVerse/iRODS (to support the research and publication process)	finished gathering required informations, working prototype planned
5	IT-infrastructure, deployment of the solution	server is ready for deployment, deployment of the solution prepared but not finished yet
6	data analysis tools	not achieved yet, working prototype planned

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

The cooperation between the two RDM Marketplace projects "LabNDB" and "RDM biomech" and the mass of upcoming ideas as a result. The opportunity to reflect and peer-review the suggested solutions along the devlopment process.

To gather the required information and to setup a working data structure took longer than expected. This is due to the reason that we had to establish the necessary communication channels between the two jointly developed projects and to restructure the proposed solution to the requirements of two different institutes.

The implementation of data access permissions and the integration of SI units for measurements is much easier then we thought. This is owed to the Django web-framework we use and the investigation on already existing features of our developers.

2. Work packages, milestones and current progress

2.1 Overview tables

➢ Explanatory notes:
   Scheduled date: date according to the proposal plan.

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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	Start phase	100	18.01.21	26.02.21	13.01.21	31.03.21
2	Implementation phase I	100	01.03.21	28.05.21	01.04.21	30.06.21
3	Implementation phase II	20	31.05.21	27.08.21	01.07.21	03.09.21
4	Final implementation phase	0	30.08.21	02.10.21	06.09.21	29.10.21
5	Final project phase	0	05.10.21	17.12.21	02.11.21	17.12.21

Table 3: Milestones

Milestone No.	Milestone Title	Scheduled date	Current date	Milestone achieved on
1	Project start	15.01.21	13.01.21	13.01.21
2	Implementation start	01.03.21	01.04.21	01.04.21
3	Evaluation of implementation phase I	31.05.21	01.07.21	02.07.21
4	Evaluation of implementation phase II	30.08.21	03.09.21	---
5	Evaluation of final implementation phase	05.10.21	29.10.21	---
6	Project end	17.12.21	17.12.21	---

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.

o 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:

- Gathering information on requirements of the solution
- Establishing a data model design (database design and integrity testing with pgModeler)
- Establishing a web interface design (graphical design with LibreOffice Impress)
- Establishing the necessary communication channels between the developer teams of the two jointly developed RDM Marketplace projects "LabNDB" and "RDM biomech" (bi-weekly SCRUM meetings, additional developer meetings, cooperation meetings between the project managers, Webex-Teams chat, MURAL Whiteboard)
- Continuous publication of the data model design and the webinterface design to the developer team (using MURAL Whiteboards)
- Building the basic data structure of the solution (data model with Django)
- Building an administrative web interface for the data structure (admin interface with Django)
- Start to build the user interface (web interface with Django)
- Prepare and give presentations about the project development process at RDM Marketplace Barcamps
- Preparing IT-infrastructure (VM server, web services, source code management in gitlab, prepare deployment)

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Deviations in the work plan:

At the beginning of this project we planned to enhance an already existing content management system (CMS) like eLabFTW or SENAITE. Investigations on eLabFTW turned out that a complete re-implementation of that solution would be necessary to satisfy our requirements, so we dropped this opportunity. SENAITE is a rich featured content management system mainly designed for chemistry laboratories. For the reason that SENAITE has a rather complex structure and many features not required in our solution an enhancement would have taken too much time (lots of investigations on the existing data structure an redesigning a complex webinterface). But the structure and design of SENAITE turned out to be a good starting point to develop our own solution. Gladly we found a rich featured, open source web-framework called "Django" that offers a yet simple to use and straight forward way to desgin a database based CMS to meet all of our requirements.

Changes in the work plan:

The initial phase of the project took longer than expected. This can be compensated at most in the following implementation phase II. The export tool (CyVerse/iRODS) and data analysis tools will be reduced to working prototypes to show the principle functionality. The necessary infrastructure for those tools will are developed anyway to support the sustainibility of the solution.

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: the initial project team constisting of Prof. M. Krüger, J. Harden, M. Lenz, L. Briendl still persists. Two develovers joined the team (01.04.2021: Mathias Eisner, 01.05.2021: Barbara Schmid, both master students of Biomedical Engineering) to carry out the major part of the implementation.

Cooperations: A cooperation with the RDM Marketplace project "RDM biomech" was introduced by the RDM team in March. This cooperation turned out to be very beneficial for both projects, specially in the initial project phase. This cooperation still persists and will continue at least until autumn, hopefully longer.

Visible results: There are no results visible to the research group, institute or faculty at the moment. But this will change in the next implementation phase II when the webinterface of the developed content management system is ready for testing. The results will then be discussed at our institute and the institute of the collaboration partner to gain more information about additional requirements and the usability of the solution.

Sustainability: The plan is to continue development in the next years on our institute. If we can manage to bring up the solution into a state of production, we hopefully can obtain interest and money from other stakeholders like other laboratories on this university, other RDM pilot projects of the RDM Marketplace, other universities but also external companies.

4. Project costs

- ➤ Provide a brief overview of the current project costs (as of 30.6.2021).
- ➤ Are there any deviations from the cost plan?

Table 4: Project costs

Funded	Spent
€ 22.500,00	€ 6.720,00

The costs are related to the fee of the two developers (M. Eisner, B. Schmid) employed for that project. Other contributions are institute-inkind and therefore not part of the costs shown above. Up to this date no

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money was spent on hard- or software.

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