Survey

The purpose of the survey was to evaluate

- Users' experiences compared to users' expectations
- What can be done in addition to the existing assistance to enable, support, or even simplify users' daily documentation of lab work

Compilation of survey

For the survey different predefined publically questionnaires were verified:

- User Experience Questionnaires (UEQ)
- Customer Satisfaction Survey (CSS)
- System Usability Scale (SUS)

All of these predefined questionnaires are quite superficial and generalizing, without taking into account any characteristics of laboratory notebooks and the specific practices of scientific lab workers.

The number of question was restricted between 30 and 40 plus a small number of additional free-text questions. The expectation was, that the limited time required to answer about 40 questions would increase the acceptance of the test procedure. As the overall number of users is small (< 80), a return rate of 2/3 was estimated to be essential for meaningful results.

A modified SUS extended by ELN specific questions was finally pre-tested and accepted by non-project lab workers using an identical ELN version and implementation (SaaS).

Next step was the evaluation of different online survey tools. Finally, the decision was taken for SoSci Survey (https://www.soscisurvey.de/) due to high security standards and full integrated questionnaire preparation and testing facilities. For an overview of the questions arranged in the online survey tool see Attachment 1

The survey started on 26.04.2015 and finished 7 weeks later on 14.06.2015. Overall, 77 users (26 PIs and 51 normal users) from 18 academic and SME organisations were invited to take part in the survey.

- Reminders were sent out every 7 to 10 days
- after 5 weeks the return rate was still below 50%
- Reminder send out by project lead increased the return rate to ~80%
- 2 users rejected -> no longer members of the project
- Two questionnaires were rejected due to insufficient no of answers (only 2 out of 9 pages were completed)

Only three types of questions were applied - ordinal scaled, selection and free-text questions.

- For ordinal scaled question the grading ranged from "No/I disagree" via "Neutral" to "Yes/I agree" (Scores =1, 2, 3, respectively vice versa for negative (reversed) questions). This schema means that a high score represents always a positive answer
- For answer "NA/Don't know" the score = -1
- If a question was not answered the score = -9
- For the evaluation "NA/Don't know" answers were treated as "not answered"
- For selection questions (e.g. Please indicate how often you use the ELN: Rarely, Sometimes, Frequently) the corresponding score is 1, 2, 3 or -9 for not answered questions. The score could be directly linked to the answer. Mean or median values are not appropriate. These type of questions are used to group user answers (see below)
- Free-text questions were grouped by the general implication of the answers

As usual, positive and negative questions were mixed for later improvement of the evaluation based on consistent answers. The survey was evaluated with KNIME version 2.12.0 (Build July 13, 2015). The workflow including data is attached as supplement.

Results of the survey

Interpretation of the results:

- For getting an impression about the homogeneity of the answer the confidence limit ($p=0.05$) was calculated based on the standard deviation of the scores and the number of answers given. For a defined confidence limit < 0.225 the answers were assumed to be homogeneous, for all others the answers were inhomogeneous. This confidence limit of 0.225 is based on 25% opposite answers out of 58, the maximum number of answers in this survey per question.
  - if CL is small and overall score of a question is high, a positive user acceptance can be postulated
  - If CL is small and overall score is small action should be taken asap
  - If CL is high a more detailed evaluation e.g. split by frequency of usage or OS was applied to find out if there is a specific constellation which caused the resulting answers

In the end, the return rate of completed surveys was higher than expected and most of the users also added free-text to the appropriate questions.

The time spent on the questionnaire (Table 1) was moderate with a median of about 6 minutes for answering the full questionnaire including free-text answers. Only 7 users spent less than 4 minutes on the questionnaire and even some of them answered free-text questions.

The incidence of OS (Table 2) used was as expected with 37 Windows and 21 UNIX users (Mac OS and Linux). Compared to the Desktop OS Market Share (https://www.netmarketshare.com/operating-system-market-share.aspx?qprid=10&qpcustomd=0&qpcustomb= accessed 04.08.2015) the incidence of the

UNIX based systems are quite higher while the relative number of Mac OS/Linux is comparable. This may be originated by the huge number of users preparing in silico studies.

Typically, the ELN is used rarely or sometimes (Table 3) with less than 1h per session (53%). Only 9% of users spent more than 1 or 2 h per session on a more frequent basis. Even so, 16% of the users operated the ELN frequently with less than 1h per session. Nobody used the system frequently for more than 2 h. This implies that either most of the users are doing infrequent experimental work or that even users doing frequent work document their work on an irregular basis. This coincidence with the number of experiments created per month (see Figure 2)

Split by OS (Table 4) it is obvious that UNIX users are using the ELN less frequently and for short sessions only in contrast to Windows users. Finally it would have been very interesting how many different combinations of OS, browsers and office version within the consortium were in production, but this information was not queried.

In Table 5 the most frequent answers to the questions are listed together with estimations if the answers are more uniquely or irregularly distributed. The columns in the table are

- Count = number of answers given to the specific question
- Mode = most frequently given answer
- CL = confidence limit calculated on the standard deviation of the scores and the number of answers given
- Uniformity of answer = "uniform" if CL is < 0.225, "inconsistent" if CL >=0.225

The order of the questions is changed compared to the questionnaire (attachment) as here questions with same meaning are grouped together. As mentioned above, some of the questions are asked twice, once in a positive way, next as a reversed question (e.g. "The speed of this software is fast enough" and "This software responds too slowly to inputs"). Some of these pairs of questions were answered contradictory, but in any of these cases (e.g. for both questions "I can understand and act on the information provided by this software" and "I sometimes don't know what to do next with this software") most users answered with "Yes" for both questions, but for the second question the answers were not as unique as for the first one (see CL)). This inconsistency might be related to some unclear formulation of the questions, but could also be influenced by some "rushing" through the questionnaire which is also supported by some low (25% of users <5 minutes) times spent on the survey (see Table 1).

Due to this fact a more detailed analysis was applied by grouping answers according to OS or frequencies using the ELN. Table 6 groups the results based on the OS used by the operator of the ELN. Positive answers are marked green, negative are marked red, based on the type of question (reversed or not).

Summarized result based on the answers grouped by OS:

- Windows users mainly prepare wet lab work while UNIX user prepare in silico work

- Only Windows users using group templates, maybe group size is larger or groups are doing similar work
- Windows users find the software too slow (two answers) and to labour-intensive
- Windows users know the functionality of the ELN, as they are also using the system more frequently (Table 4)
- Mac and Linux users are more comfortable with the software, but they would not use or recommend this software again (two answers), this may be related to the specific in silico work which might not be supported by the ELN sufficiently
- Linux users feel more controlled than e.g. Mac users – this may be an issue of a single working group

The following Table 7 groups all questions according to the frequency of usage. Again, answers are marked green if the overall result is positive or red if the result is negative, based on the type of question (reversed or not).

Summarized results based on frequency of usage:

- In silico users using the ELN less frequent, which is apparent as computational experiments generally run for a longer period of time than wet lab experiments
- More frequently users operate the ELN online during their lab work
- Frequent users would like to have higher performance (two answers) this might be related to Windows (see Table 4)
- More frequently usage of the ELN increased the quality of the documentation (tendency!)
- Frequent users are not disrupted by documenting their work in the ELN, they like the software and would use an ELN in future
- Frequent users of an ELN realize a positive effect on the way documentation is prepared
- More frequent users like the software and feel lucky about using the software (tendency!) while rarely users find the ELN complex and are frustrated about functionality
- Rarely users are disappointed about searching - this might also be a training effect.

Summarized, based on OS and frequency: Windows users are unhappy about the performance of the system. This may be related to the fact that lab staff often has to use outdated operating systems (XP) running on old hardware. Instruments used in the lab are connected to hardware which was bought together with the instrument. As this special software was developed specifically for this instrument, updates or upgrades to the software frequently are only applied during the first years until a new instrument is on the market. Most vendors do not migrate software to a new version of the OS, particularly, if there are dependencies on other hardware (e.g. interface-cards) and/or specific drivers. Thus, instruments are used for years without support for the newest (and most secure) OS version. A lot of instruments are still running on Windows XP although the official support for this OS is expired. And frequently,

lab works run other supportive software like office software and ELNs on these types of systems.

In addition, Windows systems are more frequently manipulated by malware than other systems therefore administrators are more restrictive with user rights. Users are not allowed to install or update software, these out-dated systems are not connected to the internet, which is a prerequisite for a SaaS based solution, or other software (e.g. office packages) could not be updated to a supported version due to the old OS and/or hardware. All of these problems were encountered during the project.

Beside these ordinal scaled questions users were asked for comments based on their experience with the ELN. These free text questions are summarized in Table 8 together with an overall rating on the user feedback. Listed are only user replies with at least one comment.

In general, based on the free text answers, most users (~40%) are not satisfied with the selected ELN solution (Table 9). Only 23% of the users feel comfortable with the system.

A quite interesting answer to the question "What do you think needs most improvement, and why?" is "It require a new way of documentation, this is unusual at Universities" and the same user mentioned that "we need to search how to integrate the ELN into the daily documentation" as suggestions for improvement. This answer shows that there are also other issues which influence the usage of the ELN. Most other users complained to specific functionalities, the user interface or specific personal demands.

As can be seen from the answers the last update was not satisfying. Users adapt very quickly to a GUI and are confused when changes happen. This is a potential problem of the selected SaaS solution. This must be differentiated from general impacts by an ELN. The GUI and the changes to the GUI were questioned by a lot of users. This is, in contrast to the issue mentioned above, a specific problem of the selected ELN and not related to installation as a SaaS solution. Sharing data with other users and storing all data in one location seems to be the most important positive deliverable the ELN introduces to the project, with additional workload for the individual user. This should always be considered introducing an ELN solution for a project.

Conclusion survey
The main purpose of the survey was to understand the infrequent usage of the ELN and if this is dependent on the selected solution or influenced by other, non ELN related, factors.

Most users found the selected solution not being appropriate for their specific requirements. Either the solution doesn't support specific data sets or experiment types, or the solution doesn't respond fast enough to be used adequately. This indicates that the solution was not selected thoroughly. More individual user demands have to be considered. But this definitely needs additional resources in time and manpower than can be admitted in a public funded project. Especially time could be an issue as the work packages normally start experimental work within less than 6 month after the kick-off meeting and the documentation process should begin in parallel to the experimental initiation. Keeping in mind that every user needs

some time to get acquainted to a new system and that there are always initial 'pitfalls' to any newly introduced system an electronic laboratory notebook must be available within 4-5 month after kick-off having at least few weeks' time for an initial training of the users (not all users are available at the same time). About another month should be planned for the negotiation process for specific solutions with different vendors. This reduces the time frame for a systematically user requirement evaluation to less than 1 month closely to the kick-off meeting as another month or two are required for writing and launching the tender process. On the other hand, one month after the kick-off meeting not all types of experiments are fully agreed on and not all users are on board. Thus the selection process must be made on some assumptions as was done in the described PPP project.

The slow response of the selected system has quite different causes. It might be related to the bandwidth available at the location, but more frequently this is based on the hardware available. Basic functionality was tested on a slow line (2000 Kbit/s download, 200KBits/s upload) and on a fast speed line (23MBits/s download and 1.1MBits/s upload) both with actual hardware on all operating systems and different browsers. The performance was ok, even on the slow line, but the rendering was clearly dependent on the selected OS/browser combination. What we didn't test was old hardware. Throughout the last two years of support we realized that even computers with Windows XP, MS Office 2003 and Internet Explorer 8 are used especially in labs. This seems to be one of the bottle necks for the slow response of the ELN solution. Another one could be uploading huge data sets on slow Asymmetric Digital Subscriber Lines (ADSL). Typically, users mainly working on local file servers or only downloading data from the internet facing an unusual slow behaviour when uploading data to a web resource on an ADSL (Asymmetric Digital Subscriber Line), which is due to low upload speed. This is true for all centralized server infrastructure accessed by internet lines including SaaS and should be considered when discussing centralized solution hosting.

Finally, users demand same functionality as they have available on their daily working platform. This is an unsolved challenge as the heterogeneity of software used in life sciences from interactive GUI based office package to high sophisticated batch processing packages is tremendously. In future vendors might find a solution as more and more new ELNs are available on the market.

For the ongoing PPP project a more individualized user support might help to overcome some of the issues mentioned in the survey. An individual on-site training parallel to the experimental work could help understand the issues and give advice for solutions or workarounds. But this requires either additional travel costs for small group of super users or a training budget for a widely spread group of well-trained super users which always need to be informed about all actual issues and solutions.

Summarized results of the survey:

- ELN solution for sharing protocols and results must be carefully introduced and implemented
- There is no one simple solution to fit all different user expectations

- User expectations are quite different. Computer affine users (computational scientists) demand different functionalities than other users
- Wet lab workers require high performance and high accessibility to use the system online
- Sufficient hardware and OS support, especially for lab workers
- More flexibility is demanded by end users

SurveyFinalPrintVersion.pdf

Time spent on survey	Minutes
Minimum	2,7
Smallest	2,7
Lower Quartile	4,5
Median	5,7
Upper Quartile	7,3
Largest	11,1
Maximum	12,8

Table 1 Time spent on questionnaire

Which platform do you frequently use to access the ELN?	No of users	Percentage	Desktop Operating System Market Share
Mac	14	24%	5%
Windows	37	64%	90%
Linux	7	12%	2%

Table 2 Frequency of operating systems (OS)

Please indicate how often you use the ELN	Please indicate how long you use the ELN during a normal session	No of users	Percentage
Rarely	<1h	14	24%
Rarely	1-2h	5	9%
Sometimes	<1h	17	29%
Sometimes	1-2h	8	14%
Sometimes	>2h	1	2%
Frequently	<1h	9	16%
Frequently	1-2h	4	7%

Table 3 Frequency and Duration of usage of the ELN

Please indicate how often you use the ELN	Please indicate how long you use the ELN during a normal session	Which platform do you frequently use to access the ELN?	No of users	Percentage	Percentage/ OS
Rarely	<1h	Linux	2	3%	29%
Sometimes	<1h	Linux	5	9%	71%
Rarely	<1h	Mac	3	5%	21%
Rarely	1-2h	Mac	4	7%	29%
Sometimes	<1h	Mac	5	9%	36%
Frequently	<1h	Mac	2	3%	14%
Rarely	<1h	Windows	9	16%	24%
Rarely	1-2h	Windows	1	2%	3%

Please indicate how often you use the ELN	Please indicate how long you use the ELN during a normal session	Which platform do you frequently use to access the ELN?	No of users	Percentage	Percentage/OS
Sometimes	<1h	Windows	7	12%	19%
Sometimes	1-2h	Windows	8	14%	22%
Sometimes	>2h	Windows	1	2%	3%
Frequently	<1h	Windows	7	12%	19%
Frequently	1-2h	Windows	4	7%	11%

Table 4 Frequency and Duration of usage per OS

Count	Mode	CL	Question	Answer	Uniformity of answer
58	1	0,160	I never used an ELN before the TRANSLOCATION project (reversed)	Yes/ agree	uniform
55	3	0,249	I prepare wet lab work	Yes/ agree	inconsistent
53	3	0,258	I prepare in-silico work	Yes/ agree	inconsistent
51	1	0,172	I use the chemical structure option	No/ disagree	uniform
57	1	0,180	I use a paper lab book in addition to the ELN (reversed)	Yes/ agree	uniform
56	1	0,225	I use the ELN online during my lab work	No/ disagree	uniform
48	1	0,257	Our group uses group templates	No/ disagree	inconsistent
54	3	0,241	I'm using personal templates for my experiments	Yes/ agree	inconsistent
53	3	0,222	The speed of this software is fast enough	Yes/ agree	uniform
51	2	0,223	This software responds too slowly to inputs (reversed)	Neutral	uniform
52	2	0,211	The ELN helps me in understanding the results from other co-workers	Neutral	uniform
40	1	0,181	The ELN has increased group productivity	No/ disagree	uniform
53	1	0,228	The ELN increased the quality of documentation	No/ disagree	inconsistent
51	1	0,225	The ELN has freed up some time	No/ disagree	inconsistent
51	3	0,214	The ELN has decreased my personal productivity (reversed)	No/ disagree	uniform
53	1	0,227	I would recommend this software to my colleagues	No/ disagree	inconsistent
50	1	0,248	If I could decide, I would NOT use an ELN again (reversed)	Yes/ agree	inconsistent
52	1	0,222	The way I'm documenting my lab work has positively changed using an ELN	No/ disagree	uniform

Count	Mode	CL	Question	Answer	Uniformity of answer
52	1	0,228	This software seems to disrupt the way I normally like to arrange my work (reversed)	Yes/ agree	inconsistent
56	2	0,208	The ELN is easy to use	Neutral	uniform
49	1	0,235	I sometimes wonder if I am using the right function (reversed)	Yes/ agree	inconsistent
42	2	0,206	It is obvious that user needs have been fully taken into consideration	Neutral	uniform
55	3	0,216	The ELN is too complex to be used sufficiently (reversed)	No/ disagree	uniform
51	3	0,235	The user interface of the ELN is simple enough to be used online in the lab	Yes/ agree	inconsistent
53	1	0,220	The software hasn't always done what I was expecting (reversed)	Yes/ agree	uniform
54	3	0,198	I can understand and act on the information provided by this software	Yes/ agree	uniform
52	1	0,231	I sometimes don't know what to do next with this software (reversed)	Yes/ agree	inconsistent
52	3	0,173	The organisation of the menus seems quite logical	Yes/ agree	uniform
51	3	0,233	There are too many steps required to get something to work (reversed)	No/ disagree	inconsistent
55	2	0,193	Tasks can be performed in a straight forward manner using this software	Neutral	uniform
51	3	0,222	I will never learn to use all that is offered in this software (reversed)	No/ disagree	uniform
46	3	0,216	I have got sufficient support by my supervisor for working with the ELN	Yes/ agree	uniform
53	3	0,193	I don't know what to record in the ELN (reversed)	No/ disagree	uniform
37	3	0,246	The helpdesk support is satisfying	Yes/ agree	inconsistent
43	3	0,210	The training on the ELN was NOT adequate (reversed)	No/ disagree	uniform
51	2	0,215	Searching of information is straight forward within the ELN	Neutral	uniform
48	3	0,185	I never find information I'm searching in the ELN (reversed)	No/ disagree	uniform
47	2	0,227	I feel the ELN will be used to control my lab work (reversed)	Neutral	uniform
53	3	0,179	I use the ELN for controlling the work of my staff/colleagues (reversed)	No/ disagree	uniform

Table 5 Answers most frequently given to the questions incl. uniformity of answers

Question	Mac users	Windows users	Linux users
I never used an ELN before the TRANSLOCATION project (reversed)	Yes/ agree	Yes/ agree	Yes/ agree
I prepare wet lab work	No/ disagree	Yes/ agree	No/ disagree
I prepare in-silico work	Yes/ agree	No/ disagree	Yes/ agree
I use the chemical structure option	No/ disagree	No/ disagree	No/ disagree
I use a paper lab book in addition to the ELN (reversed)	Yes/ agree	Yes/ agree	Yes/ agree
I use the ELN online during my lab work	No/ disagree	No/ disagree	No/ disagree
Our group uses group templates	No/ disagree	Yes/ agree	No/ disagree
I'm using personal templates for my experiments	Yes/ agree	Yes/ agree	Yes/ agree
The speed of this software is fast enough	Yes/ agree	No/ disagree	Yes/ agree
This software responds too slowly to inputs (reversed)	No/ disagree	Yes/ agree	No/ disagree
The ELN helps me in understanding the results from other co-workers	Yes/ agree	Neutral	Neutral
The ELN has increased group productivity	No/ disagree	No/ disagree	No/ disagree
The ELN increased the quality of documentation	No/ disagree	No/ disagree	Yes/ agree
The ELN has freed up some time	No/ disagree	No/ disagree	No/ disagree
The ELN has decreased my personal productivity (reversed)	No/ disagree	No/ disagree	No/ disagree
I would recommend this software to my colleagues	No/ disagree	Neutral	No/ disagree
If I could decide, I would NOT use an ELN again (reversed)	Yes/ agree	No/ disagree	Yes/ agree
The way I'm documenting my lab work has positively changed using an ELN	No/ disagree	No/ disagree	Neutral

Question	Mac users	Windows users	Linux users
This software seems to disrupt the way I normally like to arrange my work (reversed)	Yes/ agree	Yes/ agree	Neutral
The ELN is easy to use	Neutral	Yes/ agree	Yes/ agree
I sometimes wonder if I am using the right function (reversed)	No/ disagree	Yes/ agree	No/ disagree
It is obvious that user needs have been fully taken into consideration	Neutral	Neutral	Yes/ agree
The ELN is too complex to be used sufficiently (reversed)	No/ disagree	No/ disagree	Neutral
The user interface of the ELN is simple enough to be used online in the lab	Yes/ agree	Yes/ agree	Yes/ agree
The software hasn't always done what I was expecting (reversed)	Neutral	Yes/ agree	No/ disagree
I can understand and act on the information provided by this software	Yes/ agree	Yes/ agree	Yes/ agree
I sometimes don't know what to do next with this software (reversed)	No/ disagree	Yes/ agree	Yes/ agree
The organisation of the menus seems quite logical	Neutral	Neutral	Yes/ agree
There are too many steps required to get something to work (reversed)	No/ disagree	Yes/ agree	Neutral
Tasks can be performed in a straight forward manner using this software	Neutral	Neutral	Yes/ agree
I will never learn to use all that is offered in this software (reversed)	Neutral	No/ disagree	Neutral
I have got sufficient support by my supervisor for working with the ELN	Yes/ agree	Yes/ agree	Yes/ agree
I don't know what to record in the ELN (reversed)	No/ disagree	No/ disagree	Neutral
The helpdesk support is satisfying	Yes/ agree	Yes/ agree	Yes/ agree
The training on the ELN was NOT adequate (reversed)	No/ disagree	No/ disagree	No/ disagree
Searching of information is straight forward within the ELN	Neutral	Neutral	Neutral
I never find information I'm searching in the ELN (reversed)	No/ disagree	No/ disagree	Neutral
I feel the ELN will be used to control my lab work (reversed)	No/ disagree	Neutral	Yes/ agree

Question	Mac users	Windows users	Linux users
I use the ELN for controlling the work of my staff/colleagues (reversed)	No/ disagree	No/ disagree	No/ disagree
Positive answered questions	10	6	10
Negative answered questions	2	6	4

Table 6 Answers grouped by OS; questions answered similar by all OS users are greyed

Question	Rarely	Sometimes	Frequent
I never used an ELN before the TRANSLOCATION project (reversed)	Yes/ agree	Yes/ agree	Yes/ agree
I prepare wet lab work	Yes/ agree	Yes/ agree	Yes/ agree
I prepare in-silico work	Yes/ agree	Yes/ agree	No/ disagree
I use the chemical structure option	No/ disagree	No/ disagree	No/ disagree
I use a paper lab book in addition to the ELN (reversed)	Yes/ agree	Yes/ agree	Yes/ agree
I use the ELN online during my lab work	No/ disagree	No/ disagree	Yes/ agree
Our group uses group templates	No/ disagree	No/ disagree	No/ disagree
I'm using personal templates for my experiments	Yes/ agree	Yes/ agree	Yes/ agree
The speed of this software is fast enough	Yes/ agree	Yes/ agree	No/ disagree
This software responds too slowly to inputs (reversed)	Neutral	Yes/ agree	Yes/ agree
The ELN helps me in understanding the results from other co-workers	No/ disagree	Neutral	Neutral
The ELN has increased group productivity	No/ disagree	No/ disagree	Neutral
The ELN increased the quality of documentation	No/ disagree	Neutral	Yes/ agree
The ELN has freed up some time	No/ disagree	No/ disagree	No/ disagree
The ELN has decreased my personal productivity (reversed)	Neutral	No/ disagree	No/ disagree

Question	Rarely	Sometimes	Frequent
I would recommend this software to my colleagues	No/ disagree	Yes/ agree	Yes/ agree
If I could decide, I would NOT use an ELN again (reversed)	Yes/ agree	No/ disagree	No/ disagree
The way I'm documenting my lab work has positively changed using an ELN	No/ disagree	No/ disagree	Yes/ agree
This software seems to disrupt the way I normally like to arrange my work (reversed)	Yes/ agree	No/ disagree	No/ disagree
The ELN is easy to use	Neutral	Yes/ agree	Yes/ agree
I sometimes wonder if I am using the right function (reversed)	Yes/ agree	No/ disagree	No/ disagree
It is obvious that user needs have been fully taken into consideration	Neutral	Neutral	Neutral
The ELN is too complex to be used sufficiently (reversed)	Yes/ agree	No/ disagree	No/ disagree
The user interface of the ELN is simple enough to be used online in the lab	No/ disagree	Yes/ agree	Neutral
The software hasn't always done what I was expecting (reversed)	Yes/ agree	No/ disagree	Yes/ agree
I can understand and act on the information provided by this software	Neutral	Yes/ agree	Yes/ agree
I sometimes don't know what to do next with this software (reversed)	Yes/ agree	No/ disagree	No/ disagree
The organisation of the menus seems quite logical	Neutral	Yes/ agree	Neutral
There are too many steps required to get something to work (reversed)	Yes/ agree	No/ disagree	No/ disagree
Tasks can be performed in a straight forward manner using this software	Neutral	Neutral	Yes/ agree
I will never learn to use all that is offered in this software (reversed)	Yes/ agree	Neutral	No/ disagree
I have got sufficient support by my supervisor for working with the ELN	Yes/ agree	Yes/ agree	Yes/ agree
I don't know what to record in the ELN (reversed)	No/ disagree	No/ disagree	No/ disagree
The helpdesk support is satisfying	Yes/ agree	Yes/ agree	Yes/ agree
The training on the ELN was NOT adequate (reversed)	No/ disagree	No/ disagree	No/ disagree
Searching of information is straight forward within the ELN	No/ disagree	Neutral	Neutral

Question	Rarely	Sometimes	Frequent
I never find information I'm searching in the ELN (reversed)	Neutral	No/ disagree	No/ disagree
I feel the ELN will be used to control my lab work (reversed)	No/ disagree	Yes/ agree	Neutral
I use the ELN for controlling the work of my staff/colleagues (reversed)	No/ disagree	No/ disagree	No/ disagree
Positive answered questions	3	16	16
Negative answered questions	16	5	4

Table 7 Answers grouped by frequency of ELN usage; questions answered similar by all users are greyed

What do you think is the best aspect of this software, and why?	What do you think needs most improvement, and why?	Do you have any other suggestions?	User Experience
Automatically stay updated on colleagues' progress.	Every second I spend clicking buttons and finding my way around different features is a second I could spend doing something more productive. I just need something simple and straight forward to type into, like Notepad. Also, it's quite obvious that this software is more geared towards the experimental crowd.		**bad**
there is no good aspect	speed, GUI, accessibility ... in 2015, this software is kind of a no-go ... it feels like being back into the 90s, where you have your first Windows installation and the sandclock turning around and you keep waiting and waiting and waiting until something happens .. haven't seen such a bad program in years	ever heart of drag-and-drop recently? ... Safari compatibility is bad ... many lab-computers do not have admin rights; so installing new plugins is of course problematic ... the Microsoft plugin is very bad ... and so on...	**bad**

What do you think is the best aspect of this software, and why?	What do you think needs most improvement, and why?	Do you have any other suggestions?	User Experience
	There must be functionality to to do copy paste directly from other documents. Retyping takes too much time as the documents we make includes lots of special characters.		**need improvement**
	Hard to find data in input from other labs.		**need improvement**
Classification of information for sharing	Ease of use, number of steps		**need improvement**
	improve the comfort , make easier		**need improvement**
Easy to use and fast input response.	The privileges for reading and modifying the experiments should be more clearly discernible by the user and, if possible, the user should be able to manage this aspect for its own documents.		**need improvement**
Keep record of experiments in a readable manner, requires that user makes some effort to present data in a comprehensible fashion, safe storage of information	more user friendly		**need improvement**
Traceability	Use		**need improvement**
To share results with other groups	Overview of the content of documented results with respect to topics	No	**need improvement**
None	Speed		**need improvement**

What do you think is the best aspect of this software, and why?	What do you think needs most improvement, and why?	Do you have any other suggestions?	User Experience
	Encouraging people to fill in. Better interface that will show everything that you loaded in your experiment, for example not only the first pages of a pdf.		**need improvement**
Easy to handle, can be accessed from any part of this world, documentation can be preserved and is transparent	pictorial representations and other sophisticated tools	Not really	**need improvement**
	ELN is not geared to our sort of data generation. A useful ELN would allow access to original raw data linking various aspects of interpretation to the actual raw data. At the moment it is not very productive copy and paste of processed data.	An ELN needs to be designed with the requirements of the users in mind or be flexible enough to allow working with the individual data formats of the research groups (In our case LC-MS data). We tried to find a suitable system in other projects but were not very successful (or the providing companies inflexible).	**need improvement**
	Speed		**need improvement**
Online documentation of the work	Organizing folders by user which is not included	I think it would be nice if one can organize their data in respective folder it is highly confusing to retrieve the data	**need improvement**
The best aspect of ELN is that the data are on-line available	The handling of ELN is often cumbersome	The handling of ELN should be improved	**need improvement**
nothing, just annoying	it doubles the workload of documentation. the network performance is way too low		**need improvement**

What do you think is the best aspect of this software, and why?	What do you think needs most improvement, and why?	Do you have any other suggestions?	User Experience
	File uploading process should be improved. Option for copying text should be available.	The interface can be improved by including some frequently used commands like degree centigrade etc.. rather than making many categories, I think frequently used commands and options should be kept in open.	**need improvement**
My data are always available, anywhere where I have access to a computer. I have my office and my lab in different buildings, so for me the ELN is better than carrying around a paper lab book.	It would be great to have the possible to make sub-folders in my profile (similar to the folders on my computer).		**need improvement**
The transparency in the group work and data/results, or between different groups, is a really good feature	I think the project-folder organization, lost with the last update, should be regained.		**need improvement**
The best aspect is, that I can access my data files from anywhere, I don't need to carry all my data with me, I can just open my account and every experiment I did is right there	if there could be an option that with whom I want to share the experiment. I think it would be nice if we had a option to make a specific experiment visible to some specific people.		**need improvement**
Easy to use interface is quite nice	Speed and user control		**need improvement**

What do you think is the best aspect of this software, and why?	What do you think needs most improvement, and why?	Do you have any other suggestions?	User Experience
About ELN in general: importing plots, data etc from other software.	Response time to notebook updates are sluggish, at best (before the recent ELN update, I had no problems).	Column headers can't be resized (before it was possible). Although the search function has been greatly improved, I miss the possibility of having my experiments grouped by year, and also sorting them by crating date.	**need improvement**
In a group only if everybody use it that's a good instruments, because we can check the work of other people	Because I am from a simulations group we have large images that sometimes are difficult to insert and visualize	No	**ok**
The ease of use and the appearance are pleasing in addition to the numerous options available to choose from for the right work.	The ease of revoking a submitted document before countersign could help if any such document was submitted by mistake or need some revision.	NA	**ok**
		The last update makes the organisation of the ELN more complex.	**ok**
	do not know	no	**ok**
I allows to track what each worker is doing in the working time	Writing down each experiment, arranging pictures and figures takes too much time. In my opinion keeping a well done electronic lab book takes simply too much time, time that you are no using to do research.	Maybe the design of specific hardware could make it easier. Something like a personal tablet where you can take pictures, edit then in a fast way and upload the results in the electronic book.	**ok**
can present the work in most concise way, helpful in a network of researchers to know about everybody's work.	can't think any.	no	**good**

What do you think is the best aspect of this software, and why?	What do you think needs most improvement, and why?	Do you have any other suggestions?	User Experience
Record	none	No	**good**
I think that for lab work it is easy to trace the ongoing experiments. Additionally, I think that it is very useful to have a common procedure to save the information. probably, for some researches (theory, for example) it is not as important as for experimental groups.			**good**
Structured documentation and search function	It require a new way of documentation, this is unusual at Universities	we need to search how to integrate the ELN into the daily documentation	**good**
Easy sharing of information			**good**
easy to use			**good**
to centralize data		no	**good**
Easy to handle	nothing	no	**good**

Table 8 Free text answers categorized to "generally bad", "software needs some improvements", "ok", "good"; 21 users didn't add any free text

User Experience	No	Percentage
Bad	2	3%
Need Improvement	22	38%
Not answered	21	36%
Ok	5	9%
Good	8	14%

Table 9 Summarized user experience based on free text answers

Table 10: Overview of all questions from survey with both numbers and relative figures regarding given answer.

	NA/ Don't know		Neutral		No/ disagree		Yes/ agree	
	n	%	n	%	n	%	n	%
Part1: I don't know what to record in the ELN (reversed)	5	9%	7	12%	39	67%	7	12%
Part1: I never used an ELN before the TRANSLOCATION project (reversed)		0%	1	2%	6	10%	51	88%
Part1: I prepare in-silico work	5	9%	5	9%	23	40%	25	43%
Part1: I prepare wet lab work	3	5%	1	2%	18	31%	36	62%
Part1: I use a paper lab book in addition to the ELN (reversed)	1	2%	6	10%	7	12%	44	76%
Part1: I use the chemical structure option	7	12%	3	5%	43	74%	5	9%
Part1: I use the ELN online during my lab work	2	3%	9	16%	33	57%	14	24%
Part1: I'm using personal templates for my experiments	4	7%	6	10%	16	28%	32	55%
Part1: Our group uses group templates	10	17%	8	14%	24	41%	16	28%
Part2: I can understand and act on the information provided by this software	4	7%	14	24%	8	14%	32	55%
Part2: I will never learn to use all that is offered in this software (reversed)	7	12%	16	28%	23	40%	12	21%
Part2: Tasks can be performed in a straight forward manner using this software	3	5%	26	45%	16	28%	13	22%
Part2: The ELN is too complex to be used sufficiently (reversed)	3	5%	17	29%	24	41%	14	24%
Part2: The training on the ELN was NOT adequate (reversed)	15	26%	11	19%	27	47%	5	9%
Part2: The user interface of the ELN is simple enough to be used online in the lab	7	12%	12	21%	14	24%	25	43%
Part3: I have got sufficient support by my supervisor for working with the ELN	12	21%	13	22%	7	12%	26	45%
Part3: I sometimes don't know what to do next with this software (reversed)	6	10%	15	26%	17	29%	20	34%
Part3: Searching of information is straight forward within the ELN	7	12%	20	34%	14	24%	17	29%
Part3: The helpdesk support is satisfying	21	36%	10	17%	6	10%	21	36%
Part3: The way I'm documenting my lab work has positively changed using an ELN	6	10%	16	28%	23	40%	13	22%
Part3: There are too many steps required to get something to work (reversed)	7	12%	15	26%	19	33%	17	29%
Part4: I never find information I'm searching in the ELN (reversed)	10	17%	16	28%	28	48%	4	7%
Part4: I sometimes wonder if I am using the right function (reversed)	9	16%	15	26%	16	28%	18	31%
Part4: The ELN has increased group productivity	18	31%	11	19%	27	47%	2	3%

	NA/ Don't know		Neutral		No/ disagree		Yes/ agree	
	n	%	n	%	n	%	n	%
Part4: The organisation of the menus seems quite logical	6	10%	22	38%	4	7%	26	45%
Part4: The software hasn't always done what I was expecting (reversed)	5	9%	18	31%	16	28%	19	33%
Part4: The speed of this software is fast enough	5	9%	17	29%	15	26%	21	36%
Part5: I feel the ELN will be used to control my lab work (reversed)	11	19%	18	31%	14	24%	15	26%
Part5: I would recommend this software to my colleagues	5	9%	16	28%	19	33%	18	31%
Part5: It is obvious that user needs have been fully taken into consideration	16	28%	21	36%	6	10%	15	26%
Part5: The ELN has freed up some time	7	12%	11	19%	29	50%	11	19%
Part5: The ELN increased the quality of documentation	5	9%	15	26%	22	38%	16	28%
Part5: This software responds too slowly to inputs (reversed)	7	12%	18	31%	16	28%	17	29%
Part6: I use the ELN for controlling the work of my staff/colleagues (reversed)	5	9%	12	21%	36	62%	5	9%
Part6: If I could decide, I would NOT use an ELN again (reversed)	8	14%	10	17%	17	29%	23	40%
Part6: The ELN has decreased my personal productivity (reversed)	7	12%	12	21%	30	52%	9	16%
Part6: The ELN helps me in understanding the results from other co-workers	6	10%	21	36%	17	29%	14	24%
Part6: The ELN is easy to use	2	3%	21	36%	15	26%	20	34%
Part6: This software seems to disrupt the way I normally like to arrange my work (reversed)	6	10%	16	28%	17	29%	19	33%

Korrekturfahne

Die Korrekturfahne zeigt alle Seiten des Fragebogens als Übersicht im gewählten Layout. Wie im Debug-Modus sind die Kennungen der Fragen eingeblendet.

Bitte beachten Sie folgende Unterschiede zum tatsächlichen Fragebogen:

- Filter können prinzipbedingt nicht funktionieren,
- Fragen im PHP-Code werden <u>nur</u> angezeigt, wenn die Kennung statisch vorliegt,
- die Anzeige der Fragen kann abweichen, weil die Frage-Kennungen eingeblendet werden, und
- Platzhalter und andere dynamische Elemente können prinzipbedingt nicht dargestellt werden.

▶ Druckansicht   **▶ Variablenansicht**   **▶ PHP-Code ausblenden**

Seite 01

This is the survey on the ELN we announced a few weeks ago in our Newsletter.

- We are interested in your experiences compared to your expectations
- We would like to know what can be done to enable, support, or even simplify your daily documentation of lab work
- The survey will be anonymous. We even don't record the IP address of your computer.
- The only data we track in addition to your answer is the time you need to give your vote
- To fill out the survey will take normally less than 10 min
- The survey will be closed on 14.06.2015 EOB

The results of the survey will be presented during the Bremen meeting and you will have the opportunity to comment on them. Finally, we plan to publish the outcome of the survey in a journal to inform the scientific community about drawbacks and best practices when setting up an ELN solution for an international consortium.

Your collaboration is very much appreciated!

Seite 02

1. Please rank the statements below [A101]

If the statement is not appropriate for your work or you don't want to answer use the option not applicable NA/Don't know

	No/ disagree	Yes/ agree	NA/ Don't know
I never used an ELN before the TRANSLOCATION project	⊙	⊙	⊙	⊙
I prepare wet lab work	⊙	⊙	⊙	⊙
I prepare in-silico work	⊙	⊙	⊙	⊙
I use the chemical structure option	⊙	⊙	⊙	⊙
I use the ELN online during my lab work	⊙	⊙	⊙	⊙
I use a paper lab book in addition to the ELN	⊙	⊙	⊙	⊙
Our group uses group templates	⊙	⊙	⊙	⊙
I'm using personal templates for my experiments	⊙	⊙	⊙	⊙
I don't know what to record in the ELN	⊙	⊙	⊙	⊙

2. Please rank the statements below [A102]

If the statement is not appropriate for your work or you don't want to answer use the option not applicable NA/Don't know

	No/ disagree		Yes/ agree	NA/ Don't know
The ELN is too complex to be used sufficiently	○	○	○	○
Tasks can be performed in a straight forward manner using this software	○	○	○	○
I will never learn to use all that is offered in this software	○	○	○	○
The training on the ELN was NOT adequate	○	○	○	○
The user interface of the ELN is simple enough to be used online in the lab	○	○	○	○
I can understand and act on the information provided by this software	○	○	○	○

Seite 04

3. Please rank the statements below [A103]

If the statement is not appropriate for your work or you don't want to answer use the option not applicable NA/Don't know

	No/ disagree		Yes/ agree	NA/ Don't know
The helpdesk support is satisfying	○	○	○	○
The way I'm documenting my lab work has positively changed using an ELN	○	○	○	○
I have got sufficient support by my supervisor for working with the ELN	○	○	○	○
There are too many steps required to get something to work	○	○	○	○
Searching of information is straight forward within the ELN	○	○	○	○
I sometimes don't know what to do next with this software	○	○	○	○

Seite 05

4. Please rank the statements below [A104]

If the statement is not appropriate for your work or you don't want to answer use the option not applicable NA/Don't know

	No/ disagree		Yes/ agree	NA/ Don't know
The speed of this software is fast enough	○	○	○	○
I never find information I'm searching in the ELN	○	○	○	○
The organisation of the menus seems quite logical	○	○	○	○
The software hasn't always done what I was expecting	○	○	○	○
The ELN has increased group productivity	○	○	○	○
I sometimes wonder if I am using the right function	○	○	○	○

5. Please rank the statements below [A105]

If the statement is not appropriate for your work or you don't want to answer use the option not applicable NA/Don't know

	No/ disagree		Yes/ agree	NA/ Don't know
The ELN has freed up some time	○	○	○	○
This software responds too slowly to inputs	○	○	○	○
The ELN increased the quality of documentation	○	○	○	○
It is obvious that user needs have been fully taken into consideration	○	○	○	○
I feel the ELN will be used to control my lab work	○	○	○	○
I would recommend this software to my colleagues	○	○	○	○

6. Please rank the statements below [A106]

If the statement is not appropriate for your work or you don't want to answer use the option not applicable NA/Don't know

	No/ disagree		Yes/ agree	NA/ Don't know
This software seems to disrupt the way I normally like to arrange my work	○	○	○	○
The ELN is easy to use	○	○	○	○
I use the ELN for controlling the work of my staff/colleagues	○	○	○	○
The ELN helps me in understanding the results from other co-workers	○	○	○	○
The ELN has decreased my personal productivity	○	○	○	○
If I could decide, I would NOT use an ELN again	○	○	○	○

7. Please indicate how often you use the ELN [A107]

- ○ Rarely
- ○ Sometimes
- ○ Frequently

8. Please indicate how long you use the ELN during a normal session [A108]

- ○ <1h
- ○ 1-2h
- ○ >2h

9. Which platform do you frequently use to access the ELN? [A109]

- ○ Mac

- Windows
- Linux

Seite 09

10. Based on your experience [A110]

What do you think is
the best aspect of this
software, and why?

What do you think
needs most
improvement, and
why?

Do you have any other
suggestions?

Letzte Seite

Thanks a lot for your cooperation!

The results will be made available soon.

Your answers were transmitted, you may close the browser window or tab now.

Responsible for the survey: Manfred Kohler
Fraunhofer IME ScreeningPort – 2015