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SQELT PROJECT

SUSTAINABLE QUALITY ENHANCEMENT IN HIGHER EDUCATION LEARNING AND TEACHING. Integrative Core Dataset and Performance Data Analytics



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Intellectual Output 07:

EVALUATION REPORT ON PERFORMANCE INDICATOR MODELS AND LEARNING ANALYTICS APPROACHES

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Introduction

This Evaluation Report on Performance Indicator Models and Learning Analytics Approaches records and documents assessments and recommendations from various events and data sources of the SQELT project (SQELT 2020): The report summarises for further use (“follow-up”) the evaluatory inputs from

- the Baseline Reports on the SQELT project partner HEIs’ performance data management models,
- a SQELT workshop at the EAIR Forum 2018 in Budapest (26-29 August 2018) and
- the SQELT International Evaluation Workshop (IEW) held at Danube University Krems (1-2 July 2019).

In addition, in Appendix 3 a survey is developed for various stakeholder groups to evaluate a subset of the comprehensive performance indicators set in higher education learning and teaching that is developed in the SQELT project (SQELT Intellectual Outputs O6/O9).¹

Insights from SQELT Baseline Reports

This chapter collects main insights that emerged from the six SQELT Baseline Reports (SQELT-BLR 2019) which were composed by the following SQELT strategic partnership universities: University of Aveiro, Birmingham City University, Ghent University, Jagiellonian University of Kraków, Danube University Krems and University of Milan. Accordingly, in the next six sections the summaries of these six Baseline Reports are reprinted.²

University of Aveiro: Baseline Report Summary

The empirical work conducted at the University of Aveiro (UA) to produce the Intellectual Output O3 in the SQELT project – Baseline Report on Project Partner HEIs’ Performance Data Management Models – allowed obtaining quite interesting results regarding the two main aspects under analysis³:

- how a set of university stakeholders assesses a list of possible core data (CD), performance indicators (PIs) and quality evaluation instruments (QEI), regarding their usefulness and degree of collection and application for learning and teaching (L&T) quality monitoring and improvement in the UA;
- the perceptions of different groups of stakeholders on how Learning Analytics (LA) is put into practice at the UA.

Overall the answers obtained to the questionnaire’s closed questions – given individually by all participants in the Baseline Report (SQELT Intellectual Output O3) – led to the calculation of medians and modes that allowed classifying the listed core data, PIs and quality evaluation instruments according to their usefulness for the UA and their degree of collection and application at the UA. All core data, PIs and quality evaluation instruments were considered indispensable or at least useful by the majority of the stakeholders. Regarding their degree of collection, the panorama is rather positive for core data, where from the 25 listed items only five are not collected (despite being considered as useful). On the contrary, for the PIs and quality evaluation instruments, a significant number of them was considered as not being collected or applied: 16 out of 31 PIs (five useful and eleven indispensable) and nine out of 15 quality evaluation instruments (eight useful and one indispensable). Furthermore, it must be noticed that at least for some of the items, the number of answers “Do not know” was quite significant in relation to the stakeholders’ views on the degree of collection by the UA. This result was somehow expected because not all the participants in the baseline study have management positions at the university, and therefore are not totally aware of the data and information the university collects, analyses and uses to support decision-making.

For all stakeholders’ groups Learning Analytics is put into practice in the university to a certain extent. The UA has a series of mechanisms and structures that allow a LA approach – most of them directly connected

¹ The survey is expected to be conducted in the context of O10.

² It is to be noted that these summaries are not revised or synthesized beyond the SQELT project members’ individual views. This implies that some of these summaries contain some statements that do not represent a compromise or consensus throughout the SQELT strategic partnership group.

³ This section is a reprint from (SQELT-BLR-UA 2019, pp. 47-49).

to its internal quality assurance (QA) system. Data and information on L&T are collected, treated and analysed and lead to concrete actions and decision-making. Nevertheless, the UA still needs to deepen its capacity of “optimising learning and the environment in which it occurs”; change needs to be clearly seen by all the university stakeholders.

A Learning Analytics approach, capable of effectively contributing to L&T quality improvement, has to be built with people; and people need to clearly understand their role and act with responsibility and in a proactive manner. Furthermore, existent data and information about students and their learning environment should be available to more actors, namely teachers. But this needs to be counterbalanced with the identification of the few core data, PIs and quality evaluation instruments that are important for L&T quality monitoring and improvement, otherwise there is a risk of information overload.

Based on the baseline study’s main results, it is possible to put forward some recommendations for the UA learning analytics approach:

- A deep look into the core data, PIs and quality evaluation instruments that were considered as not being collected despite their classification as indispensable for L&T quality monitoring and improvement should be undertaken: has the university the possibility to start collecting and using them on a regular basis?
- Better and updated information to all stakeholders about the importance and the consequences of the LA mechanisms in place should be provided, to increase their participation and enhance their perceptions about this approach’s usefulness and relevance for L&T quality improvement.
- The LA available mechanisms should be revised and deepened to take into account the new data protection legislation and take into consideration its relevance for transparency and democracy.

It should be made more clearly to everyone that performance deficits can be used as inputs for self-improvement and that performance best practices can be used as examples for others; in fact, it should be turned visible that all the mechanisms existent at the university to monitor L&T are an opportunity for its quality improvement.

Birmingham City University: Baseline Report Summary

Firstly, it is necessary to note that this phase of the project has proven problematic at Birmingham City University (BCU) particularly in respect of recruiting participants for the exercise.⁴ While a number of colleagues across the University have been invited to take part, take-up has not been as comprehensive as the research team would have liked. We believe there are two main reasons for this: firstly, many colleagues hold the view that data collection of the nature investigated here is undertaken by discrete departments for the purpose of informing management strategic decisions. While colleagues might have a working knowledge of some aspects of the indicators under consideration, they are often unsure whether data is currently collected. This is evidenced by the responses given by participants. Secondly, a number of colleagues who initially expressed interest in taking part withdrew after being sent the questionnaire. Anecdotal evidence leads us to conclude that the perceived complexity of the questionnaire discouraged their involvement. Indeed, even senior members of staff who did agree to participate were surprised by the granular nature of the questionnaire.

The first point above echoes the identification of current weaknesses highlighted in the BCU Baseline Report (SQELT Intellectual Output 1). These weaknesses largely stem from the dispersed nature of data collection throughout the University. BCU has no dedicated Institutional Research office and current practice is characterised by pockets of practice for specific purposes and people, without a wider understanding of how the institution could benefit holistically. A clearly expressed rationale, following a process of consultation with relevant stakeholders, might be one way to address current issues. This is not an issue that is unique to BCU: in general, universities are driven by uniformity and standardisation, which acts to encourage the development of rigid and not always appropriate systems.

It is also evident from participant responses that knowledge of and relationship with the indicators under consideration are influenced both by academic discipline and role. Unsurprisingly, senior managers were more inclined to view indicators as ‘Indispensable’ or ‘Useful’ when compared with lecturing staff. This

⁴ This section is a reprint from (SQELT-BLR-BCU 2019, pp. 29-30).

perhaps is an indication of a more strategic outlook and understanding of institutional priorities. However, we could also argue that there is a tendency for senior managers to identify all indicators as essential without a full understanding of how they can contribute to quality processes.

The responses also reinforce the assertion that there is recognition at management level that current systems are not working as efficiently as they could and that changes are necessary to respond to international, national and local demands. There is a commitment from senior management to address the current situation and to re-think current practices if necessary. This extends to the notion of ensuring that data becomes available to those who can make best use of it, which is something that the institution has not addressed in its practice to date. BCU needs to circulate this message to all stakeholders to ensure that all staff are aware of current practices and, more importantly, how such practices can work for them.

As with the above conclusions, the exercise has served to reinforce some of the recommendations made in the Baseline Report (SQELT Intellectual Output 1). In particular, the following:

There is a need to *review performance indicators* for learning and teaching, especially in the current context of re-building the institution's data management system. Stimulation and support in this regard are key expectations of BCU from the SQELT project.

It is also clear that along with the above recommendation, the institution needs to engage with its staff at all levels to ensure that there is full understanding of the reasons that underpin the exercise and clear understanding of how this can benefit all.

The exercise also indicated that there is a level of wariness regarding performance data management and what the collected data might be used for. This reinforces the following recommendation from the Baseline Report:

There is a need for a balance between data requirements for *compliance* and that which is collected to *support change and improvement*. Compliance and improvement should not be separated but considered as having the same goal. The SQELT project will highlight the different experiences of institutions in this regard.

It is evident that some staff need to be reassured and have confidence in any new protocols introduced. A commitment to an open process that allows staff to express their views in this regard might go some way to allaying fears in this respect.

It is clear from our conversations with stakeholders that, for many, the development of performance data indicators and the collection of associated data are something that does not currently form part of their day-to-day working activities. BCU is well placed to ensure that it engages stakeholders in the development process and provides tools that enable easy access to data that is relevant to stakeholders and which can be used and embedded in their professional activities.

Ghent University: Baseline Report Summary

This report is describing the Ghent University case study as a contribution to Intellectual Output O3 in the SQELT project.⁵ Focus group meetings with a sample of stakeholders – HEI leadership, teaching staff, QM staff and students were organized. Their assessments of the lists of core data, performance indicators and evaluation instruments, their opinions on Learning Analytics and the debates on LA and monitoring instruments provide some interesting findings. These, of course, must be linked to the frame of reference of the stakeholders. Ghent University's educational quality assurance, its instruments and their own experience are predominantly present in their assessment.

The discussions on Learning Analytics and monitoring proved more informative than the explorative analysis of the answers to the closed questions. This is partly due to the uncommon, less wide-spread or novel character of the items in the questionnaire. In general, discussions and explorative analysis are remarkably concordant. The stakeholders think the monitoring of the data/indicators in the L&T process should *primarily be focused on the core elements of the learning and teaching process*.

⁵ This section is a reprint from (SQELT-BLR-UGent 2019, pp. 57-59).

When the respondents were asked to rank performance indicators, used at our own university they generally put the core elements of the learning and teaching process first. For them, the structure of the programme, the didactical approach, the course material quality, the learning effect etc. are indispensable indicators of the L&T process. This is mirrored in their answers to the closed questions. In the core data section for instance, pedagogical quality of the teaching process is viewed as more useful than their research quality, student interactions with the Learning Management System are seen as very useful. Performance indicators seen as useful are teaching staff subject competence, teaching staff feedback to students, teaching staff encouraging students' autonomous thinking, student workload, activity learning offers, training in study skills, ...

Quite some basic data on the learning and teaching process were mentioned in the more elaborate version filled in by the active SQELT participants. They also emphasized the importance of e.g. information on student success and the quality of incoming students, teaching resources, grades and examination marks, number of degrees in the core data section and teaching quality, student workload, course quality, satisfaction with study experience in the performance indicators section.

A lot of items, more distant from the core learning and teaching process, are considered useless: e.g. library features, student contacts outside the study environment, research activities by the teaching staff, quality offer of campus activities, student interactions with administrative staff, student experience in discussions with diverse others, ...

The assessment of the collection of the indicators shows considerable 'don't know' answers. This, obviously, can be linked to the uncommon, less widespread or novel character of the items presented. In the educational quality process Ghent University already uses a lot of indicators. A substantial number is listed in the elaborate version of the questionnaire.

A huge majority of the respondents thinks *Learning Analytics is put into practice at Ghent University*. It means that data about learners and their context are measured, collected, analysed and reported and are used to understand and optimize the learning environment. Ghent University indeed has a longstanding tradition of course evaluations by students, and follow up procedures, which are aimed at improving the course/teaching quality of the individual teacher. In the last 10 years the program evaluations by students have had a similar function at program level, where the follow up is the Study Program Committee's task.

The *functions attributed to LA* are in accordance with the UGent context. A huge majority agrees on *LA supporting the quality improvement of courses, the improvement of course design and the verification of student workload*. A smaller majority finds that LA is supporting concrete pedagogical decisions, the prediction of student learning effectiveness and the prediction of student learning progress.

The collection of a lot of data is considered a strength of LA. Opportunities are seen in the improvement of the teaching and learning process, the improvement of individual learning paths and the promotion of good practices. The most cited weaknesses and threats are incorporated in the recommendations below.

The discussions with the different stakeholder groups regarding their views on data and monitoring were informative and produced some cautions, which will be cited under the recommendations heading.

The findings in this report also contain some important recommendations for data monitoring and Learning Analytics at UGent and in general:

- It is important to have a vision on the need for and choice of data/indicators. Monitoring for the sake of monitoring is useless. To avoid an overload of data a considered choice of necessary/wanted essential information is vital.
- Quantitative data are subject to interpretation. Always provide data in a context or framework to avoid divergent interpretations. Qualitative data are a valuable and essential complement.
- Don't limit the use of surveys to students. Other stakeholders, such as teachers, alumni and employers, can provide valuable information on the learning and teaching process.
- Data, and particularly LA data, can be used on different levels. Data for use at institutional level are, by nature, different (more aggregate) from data for individual use by a teacher or student (e.g. information on the learning process of the individual student). This has implications on the processing and accessing.

Privacy is a key element in the use of personal data by third parties. Data access should be closely monitored and determined. Therefore, an ethical code on the use is paramount. Levels of access linked to different roles should be elaborated and made clear to the users.

Jagiellonian University in Kraków: Baseline Report Summary

The study on the Performance Data Management Model was conducted at the Jagiellonian University in Kraków (JU) in the winter semester of the academic year 2018/19 on a sample of various stakeholder groups: students, teaching staff and QM staff. The aim was to verify the use of the common Learning and Teaching (L&T) indicators (using the O20 questionnaire of the SQELT project) and the scope of Learning Analytics (LA) solutions implementation.

There are visible differences between groups of JU stakeholders in assessing the usefulness and degrees of collecting data, PIs or quality management tools.⁶ Unfortunately, the small sample size does not allow to determine whether these differences are systematic in nature or whether they are only a manifestation of the individual experience of respondents. For this reason, it is worth focusing on similar decisions made by them, regardless of their membership in a given group. . In the direct comparison of individual item categories, after excluding the differentiation by respondent group and data type, the lowest average response was obtained in Learning Competences & Processes. This is in line with the general conclusion that "teaching" orientation on education prevails at the JU, while the "learning" is often treated as a matter of individual differences. In each category, the usefulness was rated higher than the degrees of collecting data, which indicates the still existing need for information on the effectiveness of the educational process. Basing on the contingency matrices of individual responses in the three blocks of questionnaire, the most frequently repeated in critical areas items are presented below. The frequency of occurrence is given in brackets.

1) Useful but not sufficiently collected data. Responses with the usefulness scale value higher than the collection of data scale value are interpreted as missing data for L&T areas important to the university. The most frequently indicated items in this group are:

- in terms of L&T Environment: student interactions with faculty (e.g. communication, work) outside of class & coursework;
- in terms of Teaching Competences & Processes: number of teaching staff who participated in formal pedagogical training;
- in terms of Learning Competences & Processes: quality personal (bespoke) learning;
- in terms of Learning Outcomes & Learning Gain & their Assessment: possibility of inclusion of work experience & elements related to work practice; employer satisfaction with graduates.

2) Collecting data too heavily. Responses with the collection of data scale value higher than the usefulness scale value are interpreted as unnecessary data, irrelevant for the L&T at the university. The most frequently indicated items in this group are:

- a) in terms of Teaching Competences & Processes: number of refereed publications during a certain period of time per full time equivalent members of teaching staff; number of teaching staff who were awarded for their outstanding engagement in teaching based on a merit system; number of teaching staff who were awarded for their outstanding engagement in teaching based on a merit system; number of papers or reports presented at academic conferences during a certain period of time per full time equivalent members of teaching staff;
- b) in terms of Learning Outcomes & Learning Gain & their Assessment: ratio of female to male students who complete a doctorate; number of Bachelor graduates who within a period of time after graduation are enrolled in further study.

⁶ This section is a revised reprint from (SQELT-BLR-JU 2019, pp. 76-79).

3) No assessment. There are items in the questionnaire for which the combination of answers "do not know" was repeated simultaneously on both scales. This may result either from incomplete knowledge on the activities undertaken at the university or from doubts about the way the questionnaire item is formulated. The most frequently indicated items in this group are:

- a) in terms of Learning Competences & Processes: social network analysis generated from Learning Analytics tools such as SNAPP (Social Networks Adapting Pedagogical Practice) (e.g. visualization of student relationships established through participation in LMS discussions); discourse analysis generated from Learning Analytics tools such as COHERE (e.g. visualization of social & conceptual networks & connections); student dashboards & monitoring generated from Learning Analytics tools such as Student Activity Meter (e.g. visualization of student activity for promotion of self-regulated learning processes); number & duration of student interactions with course activities (e.g. solution of exercises, watching videos, listening to lecture, participation in working groups, etc.); individual & group monitoring generated from Learning Analytics tools such as GLASS (Gradient's Learning Analytics System) (e.g. visualization of student & group online event activity);
- b) in terms of Learning Outcomes & Learning Gain & their Assessment: predictive models for student performance; predictive models for student attrition.

4) No assessment of usefulness of data. Items for which the answer "do not know" was repeated frequently on the usefulness scale may indicate areas unknown to the respondents or insufficiently defined in the survey. The most frequently indicated items in this group are:

- a) in terms of Learning Competences & Processes: student dashboards & monitoring generated from Learning Analytics tools such as Student Activity Meter (e.g. visualization of student activity for promotion of self-regulated learning processes); learning content interaction generated from Learning Analytics tools such as LOCO-Analyst (e.g. providing insight into individual & group interactions with the learning content); individual & group monitoring generated from Learning Analytics tools such as GLASS (Gradient's Learning Analytics System) (e.g. visualization of student & group online event activity); social network analysis generated from Learning Analytics tools such as SNAPP (Social Networks Adapting Pedagogical Practice) (e.g. visualization of student relationships established through participation in LMS discussions); discourse analysis generated from Learning Analytics tools such as COHERE (e.g. visualization of social & conceptual networks & connections); student self-reports on their dispositions, values & attitudes towards learning, i.e. collection of learner data & pedagogical descriptors (e.g. students' ability in deactivating negative learning emotions, students' learning strategies).

5) No assessment of degree of collection of data. Items for which the answer "do not know" was repeated frequently on the collection of data scale may indicate areas not directly related to the respondents or insufficiently defined in the survey. The most frequently indicated items in this group are:

- a) in terms of L&T Environment: number & duration of student interactions with student information system (SIS); number & duration of student interactions with student admission system (SAS);
- b) in terms of Learning Competences & Processes: quality personal (bespoke) learning;
- c) in terms of Learning Outcomes & Learning Gain & their Assessment: student learning gain in learning strategies (e.g. by comparison of knowledge & skills before & after learning phases); possibility of inclusion of work experience & elements related to work practice.

Groups 1 and 2 are most interesting for the JU, because on the one hand they indicate unmet information needs, and on the other, areas filled with data that can be better managed or eliminated. Group 3 shows extremely irrelevant elements, so it can be helpful in verifying the significance of indicators. In groups 4 and 5 there are items that were not known to various respondents. This may indicate both their ignorance and the insufficient definition of the proposed data, PIs or tools.

The problem of proper understanding certainly applies to Learning Analytics. This term is not well established, so it would be appropriate to start the study by exploring its possible meanings. Three main ways of understanding Learning Analytics scope, which appeared in the statements about the JU, are:

- All activities combined with the study programs offered by the university, which are implemented under various names and for several years related to the concept of quality assurance.
- An individualized approach to the student, consistent with the pedagogical concept of personalised learning.
- Vision of the university as a supervisor or sentinel who wants to interfere in the lives of students.

Despite the involvement in the project, the correct meaning of Learning Analytics is also not clear for SQELT members, as already mentioned. The advantage of this state of affairs was the limited possibility of suggesting answers to respondents.

Danube University Krems: Baseline Report Summary

With large questionnaires that were difficult to understand and limited numbers of respondents per stakeholder group, conclusions must be drawn with the utmost care.⁷

It is fair to say that various stakeholder groups within DUK have a rather positive attitude towards core data, performance indicators, evaluation instruments and the like. The reason might be that DUK is a rather young, practically oriented university and data management is well established even though it is mostly financial data.

It is interesting to see that quality managers are the stakeholder group that is most sceptic about the usefulness of core data, in the sense that experience has shown that data always must be broader contextualized, so that additional information is here very important. The other stakeholder groups seem to follow a “could be useful” approach. They would wish to have more data available, like a wealth of information that they can use whenever necessary.

Generally, students seem to overestimate what data the university has at its hand.

DUK should become more open regarding its data. Lots of data is collected, even more would be easy to get. The University should process these data to enable benchmarking both, between the subunits and programs of the institution, and between DUK and other institutions. A common set of performance indicators from the quality point of view might become a strong counterpoint to the ample financial data that is already widely used for decision making at DUK.

University of Milan: Baseline Report Summary

Six points can be identified from the analysis of the questionnaires' results and the open discussion with the respondents.⁸ The first four concern the questionnaires' findings while the last two are general comments that emerged from the entire research path.

I) The assessment of the usefulness of core data / PIs / quality evaluation instruments: The evaluation of the usefulness displays that the highest scores were attributed to those items within the categories “Teaching competences” and “Learning outcomes”. This assessment is shared quite equally by all the different stakeholders involved. Moreover, the highest scores can be found for core data and PIs, while quality evaluation instruments were judged with lower usefulness by almost all the respondents. These findings are supported by the qualitative judgments emerged during the open discussions. All the stakeholders identified in the employability (Learning outcome) and in the Teaching engagement or clarity/commitment (Teaching competences) the two most relevant attributes to define quality in L&T. Leadership and Teachers underlined also the importance of certain aspect of the L&T environment among these the financial resources dedicated to L&T and the adequacy of the infrastructures.

II) The assessment of the use of core data / PIs / quality evaluation instruments within UNIMI: Two main observations can be drawn from the analysis. First, there is a high number of ‘do not know’ answers, in particular from students and teachers. This is quite interesting since the respondents were selected among

⁷ This section is a reprint from (SQELT-BLR-DUK 2019, p. 44).

⁸ This section is a reprint from (SQELT-BLR-UNIM 2019, pp. 41-43).

those people that should have been informed about QA practices within UNIMI. Second, the analysis highlights the areas in which UNIMI presents a very limited number of items. Almost the entire set of quality evaluation instruments is not monitored within UNIMI since 15 out of the 17 are not monitored in any ways. Moreover, large areas of the “Teaching competences” “Learning competences” are not covered by the current performance data model of UNIMI. It also emerged that those indicators that required an assessment from teachers are completely missing within UNIMI.

III) The matching of the two assessments: By matching the assessment of usefulness and that of the use within UNIMI, it is also possible to highlight in which areas core data, PIs and quality evaluation instruments that are judged as ‘indispensable’ are not monitored. This might suggest paths for improvement for the governance of UNIMI. These areas are in particular the PIs on the ‘student learning gain’, and the core data in the areas of “L&T environment” (finances and supportive environment) and “Learning outcomes” (e.g. data on student success and employability).

IV) Learning Analytics: Only QA management staff and the leadership answered the questions concerning LA within UNIMI. This data reveals, first of all problems in understanding what LA truly is. Second, the answers showed a very low-developed system of LA within UNIMI with several functions not covered and the lack of an institutional commitment to improve them.

Lastly, two more qualitative comments can be generalized from the open discussions with the respondents:

I) The lack of incentives at the individual and institutional level on the improvement of teaching heavily influenced how all the stakeholders conceive the teaching activity and, as a result, their answers in the questionnaires. Teachers and QA management in particular complained about how an unbalanced relationship between research and teaching in terms of incentives and evaluation does not allow to seriously think and improve teaching activities. It follows, that accurate use of L&T data is only on a voluntary basis.

II) There is a low institutional commitment from the central governance towards this topic, and the discontinuity in the governance structure (the Rector is elected every 5 years) does not provide continuity to some initiatives. Moreover, a dedicated organisational unit has only recently been introduced but without the proper powers to really implement innovative paths of actions.

Two main recommendations have been identified to improve the list of items of the questionnaire having in mind the final goal of developing a comprehensive list of core data, PIs and quality evaluation instruments.

First, some of the suggestions identified by the active members of SQELT might be taken into account, especially the ambiguous meaning of some core data and the reliability of their measurement by providing an ‘explanation’ that is shared across all the different national realities present in the SQELT project. This consideration aims thus to reduce the spaces for interpretation that, at the moment, is too large in our view.

Second, the level of teaching activity (course, degree programme, whole academic career) the core data, PIs and quality evaluation instruments refer to might be included in the list of items since it provides a piece of additional information that can change also the assessment of usefulness of these.

Survey on Performance Indicators and Learning Analytics at the EAIR Forum 2018

SQELT participants organised a public session at the EAIR Forum 2018 which took place from 26-29 August 2018 in Budapest, Hungary (SQELT-EAIR 2018). On that occasion an earlier SQELT Questionnaire for Stocktaking and Change Analysis of Quality Monitoring in Learning and Teaching and Learning Analytics was applied. This questionnaire together with the answers of the respondents at the EAIR Forum session is depicted in Appendix 1.

Survey Responses from Teaching Staff and Quality Management Staff

It can be assumed that those attending the EAIR Forum 2018 session were most likely people who are having an above average interest in PIs, and thus their views are more expert opinions, based on a deeper and more sophisticated experience. At the same time, there is a bias risk since attendees to such a specific event are more likely have a positive than a negative stance towards performance indicators. What can be gleaned from Tables 1.1 to 1.4 is that participants at the EAIR session generally find the presented

performance indicators useful and/or indispensable. Regarding Learning Analytics, the respondents equally see strengths and weaknesses and opportunities and threats, see Tables 1.4.1 to 1.4.5.

SQELT International Evaluation Workshop (IEW) Krems

At the International Evaluation Workshop (IEW) on 'Performance Indicators of Higher Education Learning and Teaching in Context: Governance, Quality Management, Learning Theories and Policy' (SQELT-IEW 2019) additional data was collected for this evaluation report of the SQELT project. The general aim of this SQELT Multiplier Event was:

- Disseminate and self-evaluate intermediate results of the SQELT project
- Seek critical advice and evaluation on SQELT
- Gather input from participants' critical reflection
- Embed theme of performance data management and performance indicators into current debates and perspectives on HEI governance and funding and HE politics
- Prepare SQELT project partners for final project phase

The most important reflections on the guiding questions for the two workshops – Workshop 1: Learning Analytics, Ethics and Policy in Performance Data Management and Workshop 2: Institutional Strategy and Performance Indicators in Performance Data Management – of the Multiplier Event in Krems are offered in Appendix 2.

Expert Panel Discussion

In the Krems IEW an evaluation panel was organised with the title "Performance Data Management and Indicators in Higher Education: Comprehensiveness, Justification and Relevance of Various Approaches". The invited panel participants were: Prof. Dr. Cláudia Sarrico (Chair and Introduction) (CIPES, Porto, Portugal & OECD, Paris, France); Prof. Dr. Maarja Beerkens (Leiden University, The Netherlands); Dr. Achim Hopbach (Agency for Quality Assurance and Accreditation Austria, Vienna, Austria); Prof. Dr. Jeroen Huisman (Faculty of Political and Social Sciences; Ghent University, Belgium); Mag. Dr. Lukas Mitterauer (Quality Assurance, University of Vienna, Austria). The panel discussion was complemented by around 35 participants in the audience.

The panel discussion was of duration of 90 minutes and its main hypotheses can be summarized as follows (anonymous characterisation of the panelist(s) responsible for the individual hypotheses in brackets), while there was no explicit consensus intended and brought about among the panelists:

- Higher education is a success story (proposed by higher education teacher and researcher), and by this additionally highlighting the importance of higher education).
- The core purpose of higher education is learning, or at least the learning reflects a characteristic that has gained considerably in recognition (higher education teacher and researcher).
- There exist different opinions and perspectives within the SQELT strategic partnership with respect to the possibility and practical relevance of a comprehensive performance indicators set (higher education teacher and researcher).
- Among HE stakeholders seeing performance indicators as quantitative indicators only still is a dominant view (higher education teacher and researcher).
- A core issues of HE sustainability is financial resources (higher education teacher and researcher).
- Performance indicators are of great importance for internal quality assurance. It is an issue, however, how HEIs make sense of (performance) data. Particularly, the questions of operability and integration of different data from different sources and different coding etc. are ubiquitous (external quality assurance representative).
- An un-reflected use of certain performance indicators may create a "behaviouristic" bias to the understanding of L&T processes (higher education teacher and researcher).

- The intrinsic motivation to learning as well as teaching is important (higher education teacher and researcher).
- Justification of performance indicators that are used in HEIs is missing (external quality assurance representative).
- Specific drivers of “performance indicator business” in HEIs are rectors/presidents and priorities from (HE) politics (external quality assurance representative).
- In and for practice, sets of performance indicators and their usage should be kept as simple as possible (higher education quality management representative).
- When it comes to attention for information there exists a general difference between (HE) policy makers and (HE) researchers: it can be boiled down to the thesis that politicians prefer to receive their information in 1:30 minutes packages (external quality assurance representative).

Brief Summary

The goal of this Evaluation Report on Performance Indicator Models and Learning Analytics Approaches is four-fold: It documents, interprets and summarises main results from

- the Baseline Reports on the SQELT project partner HEIs’ performance data management models (SQELT-BLR 2019),
- a SQELT workshop at the EAIR Forum 2018 in Budapest (26-29 August 2018) (SQELT-EAIR 2018) and
- the SQELT International Evaluation Workshop held at Danube University Krems (1-2 July 2019) (SQELT-IEW 2019).
- In addition, a survey is developed in Appendix 3 for various stakeholder groups to evaluate a subset of the comprehensive performance indicators set in higher education learning and teaching that is developed in the SQELT project (SQELT Intellectual Outputs O6/O9).

The conclusions and recommendations of the six SQELT Baseline Reports are given in Section 2 above (“Insights from Baseline Reports”). They have been considered through the work of the SQELT university partners on the further development of the preliminary SQELT performance indicators set which will eventually lead to the final SQELT performance indicators set represented by Intellectual Output O9.⁹ The feedback from the EAIR Forum workshop and from the International Evaluation Workshop at Danube University Krems has also fed into the SQELT performance indicators’ set development, particularly the identification and characterisation of indicators related to Learning Analytics (see SQELT Intellectual Outputs O6/O9) and the conception of an “Ethical Code of Practice for Data Management” (see SQELT Intellectual Output O8)¹⁰.

The survey, that is documented in Appendix 3, will be used in the context of the further (maximum eight) Multiplier Events of the SQELT project – Final Conference at Ghent University and seven Euro-region Workshops to be held in various partner countries (Austria, Belgium, Germany, Italy, Poland, Portugal, United Kingdom)¹¹ – to evaluate a subset of the SQELT comprehensive performance indicators set. The data collected at these events will be used to establish the Endline Report (Intellectual Output 10) which will be used as a final feedback to the SQELT project’s results within the project’s lifetime.

In an attempt to draw together key lessons of the Baseline Reports, an emphasis can be placed on highlighting some of the more generic lessons:

1. Stakeholders tend to find the PIs that measure directly the L&T process and graduate outcomes as most relevant.

⁹ After finalisation it will also be available on the SQELT website.

¹⁰ After finalisation it will also be available on the SQELT website.

¹¹ It should be noted that at the time when this Evaluation Report is written, due to the Covid-19 pandemic no final decisions were made and have been possible as to whether the eight remaining Multiplier Events will be organised physically or virtually.

2. Different stakeholders have different data needs, and therefore it is important to have data available for those who will and can use it. At the same time there is a fear of data fatigue and loss of focus, and a view that data should be there to zoom on the vision of the institution.
3. Collecting data on PIs is only one side of the coin; who collects it, how it is presented, and how it is distributed and followed-up on is equally important for its effect. Expectedly different stakeholders are not equally familiar with what data has been collected and for which purpose.
4. Apparently, there is a need to embed PI systems also in acknowledgement of a “larger purpose” – a vision, a development project, or something similar. There are examples (such as Birmingham City University), indicating how stakeholders do not see meaning of this activity otherwise.
5. The case of Ghent University demonstrates the relevance of collecting and linking data from different stakeholders, when developing sophisticated PI systems. Collecting student data alone will not provide enough (sufficient) analytical context.
6. Learning Analytics (LA) is a field in development. There seems to be interest in it, but at the same time there is no clear picture of its potential at many HEIs, what it entails, or to what extent it is in use.
7. A related point is that Learning Analytics need to be built on a mixture of data sources, and not only about the “digital life” of students alone. Combining behavioural data with register data would yield more interesting results. The SQELT case studies tend to demonstrate often a rather “narrow view” on what constitutes a LA system; an insight that is in accordance with the fact that at most SQELT partnership universities LA is in the making or even only in its infancy.
8. The SQELT case studies also hint at the importance of having solid (for example, possibly research-based) units in the institutions, which are being responsible for the selection and analysis of the PIs. This could avoid data collection fatigue, as exemplified at Birmingham City University, and could create a visibility for the importance of institutionalisation (beyond that of having leadership support only). Perhaps this may mean to carry institutional research or also higher education research into the management of higher education institutions more directly, and to strengthen here cross-references over to quality management, quality assurance and quality enhancement.

Appendix 1: Filled-in Survey Questionnaire at the EAIR Forum 2018

Assessment of Performance Indicators by Teaching Staff and Quality Management Staff

At the EAIR Forum 2018 in Budapest a session was organised that was dedicated to reflecting intermediate results of the SQELT project. For that purpose, the questionnaire given in Tables 1.1-1.3 below was applied. It was completed by 11 respondents, six respondents from teaching staff and five respondents from quality management staff. The respondents came from eight identified and two unidentified higher education institutions from seven identified and two unidentified countries:

- Teaching staff:
 - Central European University, Budapest, Hungary
 - Liverpool John Moores University, Liverpool, United Kingdom
 - University of Applied Sciences Upper Austria, Wels, Austria
 - Huazhong University of Science and Technology, Hongshan, Wuhan, China
 - Respondent did not identify
 - Respondent did not identify
- Quality management staff:
 - Central European University, Budapest, Hungary
 - Copenhagen University College, Copenhagen, Denmark
 - Erasmus University Rotterdam, Rotterdam, Netherlands
 - University of Stavanger, Stavanger, Norway
 - Vienna University of Economics and Business, Vienna, Austria

To be noted: at this earlier and mostly exploratory project stage (summer 2018) the differentiation of “core data”, “performance issues” and “quality evaluation instruments” was used. At later stages of the SQELT project this differentiation has been given up and replaced by “comprehensive performance indicator set” or “performance indicators” that are elements of a comprehensive performance indicator set.

The assumed sets of core data and performance indicators and quality evaluation instruments for L&T as well as the additional quality features of Learning Analytics all originated from a literature analysis including documents of comparable research projects. The sets of core data and performance indicators for L&T are subdivided into four main conceptual areas to simplify the overview of items: 1. L&T Environment 2. Teaching Competences and Processes 3. Learning Competences and Processes 4. Learning Outcomes and Learning Gain and their Assessment. As it happened, in this phase of the SQELT project quality evaluation instruments that could be assigned to L&T environment were not identified.

The logic how to read the results presented in Tables 1.1-1.3 can be explained by an example referring to the first questionnaire item in Table 1.1: The respondents were asked whether they think that the indicator “Number & duration of student interactions with student admission system (SAS)” is “indispensable” or “useful” or “useless” and whether the same indicator is “regularly collected in my HEI” or “occasionally collected in my HEI” or “not collected in my HEI”. The total sum of answers to the first three features subtracted from 11 gives the number of “no answer” in that feature group; the total sum of answers to the second three features subtracted from 11 gives the number of “no answer” in the second feature group.

Table 1.1: Filled-in survey questionnaire about data (“core data”) for quality monitoring and improvement in L&T (explorative SQELT Performance Indicator Set related to SQELT Intellectual Output O20)

According to your knowledge, WHICH OF THE FEATURES APPLY to the listed DATA (“core data”) that can be collected for QUALITY MONITORING & IMPROVEMENT in L&T (e.g. including them in mandatory or non-obligatory quality reporting requirements, target agreements, rankings etc.)?							
Selection from a comprehensive set (“the more uncommon or less widespread or novel items”)		Indispensable	Useful	Useless	Regularly collected in my HEI	Occasionally collected in my HEI	Not collected in my HEI
L&T Environment							
Student interactions	Number & duration of student interactions with student admission system (SAS) (PDRLA ¹²)	1/0 ¹³	4/4	1/1	2/0	1/3	2/1
	Number & duration of student interactions with student information system (SIS) (PDRLA)	1/1	4/3	1/1	1/1	1/2	3/1
	Number & duration of student interactions with students (e.g. via the HEI’s learning management system - LMS) (PDRLA)	1/1	4/4	1/0	0/1	2/2	3/1
Attraction of master & doctorate students	Number of master students who graduated at another institution	1/1	3/2	1/0	3/3	0/0	2/0
	Number of doctorate students who graduated at another institution	1/1	2/2	1/0	2/3	0/0□	2/0
Teaching Competences & Processes							
Quality of teaching staff	Number of teaching staff who participated in formal pedagogical training	3/2	3/2	0/0	2/3	1/1	2/1
	Number of teaching staff who were awarded for their outstanding engagement in teaching based on a merit system	2/2	4/2	1/0	3/2	0/0	2/3
	Number of refereed publications during a certain period of time [TBD ¹⁴] per full time equivalent members of teaching staff	2/2	4/3	0/0	3/3	1/1	1/0
	Number of papers or reports presented at academic conferences during a certain period of time [TBD] per full time equivalent members of teaching staff	2/1	3/4	1/0	2/3	0/1	3/0
Learning Competences & Processes							
Quality learning & student engagement	Number & duration of student interactions with course activities (e.g. solution of exercises, watching videos, listening to lecture, participation in working groups, etc.) (e.g. via the HEI’s LMS) (PDRLA)	1/0	3/5	1/0	0/1	0/3	5/0
	Number & duration of student interactions with course contents (e.g. via the HEI’s LMS) (PDRLA)	1/1	3/4	1/0	0/0	1/4	4/0
	Number of repetitive visits to learning contents (e.g. during online learning) (PDRLA)	0/0	3/3	2/2	0/0	0/4	5/0
Learning Outcomes & Learning Gain & their Assessment							
Assessment of learning outcomes	Percentage of credits given in service-learning activities (e.g. students in community service activities & social work), in relation to total number of credits	1/1	3/4	2/0	0/3	1/1	4/0
Contact with work environment	Number of Bachelor degree theses made in cooperation with industry/external organisations	2/2	4/1	0/0	0/2	2/1	3/1
	Number of Master degree theses made in cooperation with industry/external organisations	2/2	4/1	0/0	0/3	2/0	3/2
Gender balance in the transition from students to doctorate graduates	Ratio of female to male students who complete a doctorate	2/2	2/2	0/0	2/3	2/1	0/0

¹² PDRLA = Personalised data required for Learning Analytics.

¹³ The number before the slash always refers to teaching staff, the number after the slash refers to QM staff.

¹⁴ TBD = To be determined

Employability	Number of Bachelor graduates who within a period of time [TBD] after graduation are unemployed	4/2	2/1	0/0	4/3	1/0	0/0
	Number of Bachelor graduates who found their first job (after graduation) in the region where the HEI is located	1/0	4/3	1/0	3/2	1/0	1/0
	Number of Bachelor graduates who within a period of time [TBD] after graduation are enrolled in further study	2/2	4/1	0/0	3/2	1/0	1/0
	Number of Master graduates who within a period of time [TBD] after graduation are unemployed	5/3	1/1	0/0	4/2	1/1	0/0
	Number of Master graduates who found their first job (after graduation) in the region where the HEI is located	1/3	4/1	0/0	3/1	2/2	0/0
	Number of Master graduates who within a period of time [TBD] after graduation are enrolled in further study	2/1	4/3	0/0	3/0	1/2	1/1
	Number of doctorate graduates who within a period of time [TBD] after doctorate are unemployed	3/2	3/2	0/0	3/0	1/2	0/0
	Number of doctorate graduates who found their first job (after doctorate) in the region where the HEI is located	1/2	4/2	0/0	3/0	1/2	0/1
	Number of doctorate graduates who within a period of time [TBD] after doctorate are enrolled in further study	1/1	4/0	0/0	2/1	1/0	0/2
Space for additions and comments							
	Other, namelyNO INPUTS.....	0/0	0/0	0/0	0/0	0/0	0/0

Table 1.2: Filled-in survey questionnaire about performance issues (among them “performance indicators”, “performance capacity indicators” and other complex quality performance-related structures, processes and activities) for quality monitoring and improvement in L&T (explorative SQELT Performance Indicator Set related to SQELT Intellectual Output O20)

According to your knowledge, WHICH OF THE FEATURES APPLY to the listed PERFORMANCE ISSUES (among them “performance indicators”, “performance capacity indicators” and other complex quality performance-related structures, processes and activities) that can be reported for QUALITY MONITORING & IMPROVEMENT in L&T (e.g. including them in mandatory or non-obligatory reporting requirements, target agreements, rankings etc.)?							
Selection from a comprehensive set (“the more uncommon or less widespread or novel items”)		Indispensable	Useful	Useless	Regularly monitored in my HEI	Occasionally monitored in my HEI	Not monitored in my HEI
L&T Environment							
Learning resources	Learning diversity offered with respect to course structures to do justice to different learner types & learning processes (PDRLA)	2/2 ¹⁵	2/3	1/0	0/2	1/1	3/2
Student interactions	Student interactions with academic advisors (TBDBE ¹⁶)	4/0	1/5	1/0	0/2	2/1	2/1
	Student interactions with faculty (e.g. communication, work) outside of class & coursework (TBDBE)	2/0	2/4	2/0	0/0	1/3	3/1
Further education & lifelong learning	Compatibility of studies & work (e.g. flexible models for adapting study times to working hours) (TBDBE)	3/0	1/3	1/0	1/0	0/2	3/1
	Recognition of non-academic achievements (TBDBE)	2/0	2/3	1/1	0/0	2/1	2/3
Stakeholder participation in L&T quality development & evaluation	Student participation in curriculum development	2/1	3/3	0/0	1/2	0/1	2/1
	Employer participation in curriculum development	3/1	2/3	1/0	2/1	0/1	2/2
Teaching Competences & Processes							
Quality teaching & teaching staff engagement	Teaching staff subject-matter competences (TBDBE)	4/4	1/0	0/0	2/2	1/2	2/1
	Teaching staff methodological competences (TBDBE)	4/3	1/1	0/0	1/1	1/3	3/1
	Teaching staff encouraging students’ autonomous thinking & acting (TBDBE)	2/2	4/3	0/0	0/1	1/1	4/2
	Fostering sustainability values (social, ecological, economical) (TBDBE)	4/2	2/3	0/0	1/1	1/0	3/3
	Teaching staff feedback to students (e.g. on work in progress, test, completed assignments) (TBDBE)	5/3	1/2	0/0	1/4	2/0	2/0
Learning Competences & Processes							
Quality learning & student engagement	Student workload (TBDBE)	1/3	4/2	0/0	0/4	3/0	1/0
	Activity learning offers (e.g. problem-based learning; research-based learning; internships) (TBDBE)	2/3	4/2	0/0	1/3	2/1	2/0
	Provision of training in study skills & self-regulated learning techniques (TBDBE)	2/2	4/3	0/0	1/2	0/1	4/1
	Quality flexible learning (flexibility in the requirements, time & location of study, teaching, assessment & certification) (TBDBE)	2/2	3/2	0/1	0/0	0/1	5/3
	Quality mobile learning (learning across multiple contexts, through social & content interactions, using personal electronic devices) (TBDBE)	1/2	5/2	0/1	0/0	1/1	4/3
	Quality personal (bespoke) learning (TBDBE) (PDRLA)	0/2	3/2	1/1	0/0	0/2	4/2
Learning Outcomes & Learning Gain & their Assessment							
Constructive alignment of programs/courses	Design & adjustment of teaching & assessments/examinations to defined intended learning outcomes (TBDBE)	4/3	2/2	0/0	0/2	2/2	3/0
Study experience satisfaction	Freshman satisfaction with study experience (TBDBE) (PDRLA)	0/2	5/1	0/0	1/2	2/0	1/0
	Undergraduate satisfaction with study experience (TBDBE) (PDRLA)	0/2	5/1	0/0	2/2	2/0	0/0
	Graduate satisfaction with study experience (TBDBE) (PDRLA)	0/4	4/1	0/0	2/4	0/0	2/0

¹⁵ The number before the slash always refers to teaching staff, the number after the slash refers to QM staff.

¹⁶ TBDBE = To be determined by evaluation

	Postgraduate satisfaction with study experience (TBDBE) (PDRLA)	1/3	4/1	0/0	2/2	0/1	2/0
	Alumni satisfaction with study experience/student life cycle (TBDBE)	2/3	3/2	0/0	2/2	0/2	2/0
Learning gain	Student learning gain in subject-matter competences (TBDBE) (e.g. by comparison of knowledge & skills before & after learning phases) (PDRLA)	4/3	2/2	0/0	1/1	0/2	3/0
	Student learning gain in methodological competences (TBDBE) (e.g. by comparison of knowledge & skills before & after learning phases) (PDRLA)	3/3	3/2	0/0	1/1	1/1	3/2
	Student learning gain in learning strategies (TBDBE) (e.g. by comparison of knowledge & skills before & after learning phases) (PDRLA)	2/2	3/3	0/0	0/0	0/1	4/3
	Student learning gain in social competences (e.g. team, communication & leadership competences; empathy; ability to cooperate; ability to solve conflicts) (TBDBE) (e.g. by comparison of knowledge & skills before & after learning phases) (PDRLA)	3/2	2/3	0/0	1/0	1/2	2/2
	Student learning gain in self-competences (e.g. self-determination; capability of decision & learning; flexibility of action; ability to reflect; sovereignty) (TBDBE) (e.g. by comparison of knowledge & skills before & after learning phases) (PDRLA)	3/2	2/3	0/0	0/1	1/2	3/1
Employability	Possibility of inclusion of work experience & elements related to work practice (TBDBE)	3/3	3/2	0/0	1/3	1/1	2/0
	Employer satisfaction with graduates (TBDBE)	3/3	3/2	0/0	1/1	1/2	2/1
Space for additions and comments							
	Other, namelyNO INPUTS.....	0/0	0/0	0/0	0/0	0/0	0/0

Table 1.3: Filled-in survey questionnaire about quality evaluation instruments for quality monitoring and improvement in L&T (explorative SQELT Performance Indicator Set related to SQELT Intellectual Output O20)

According to your knowledge, WHICH OF THE FEATURES APPLY to the listed QUALITY EVALUATION INSTRUMENTS that can be used for QUALITY MONITORING & IMPROVEMENT in L&T?							
Selection from a comprehensive set (“the more uncommon or less widespread or novel items”)		Indispensable	Useful	Useless	Regularly applied in my HEI	Occasionally applied in my HEI	Not applied in my HEI
Teaching Competences & Processes							
Quality teaching & teaching staff engagement	Quality procedures of teaching staff recruitment (e.g. responsibilities; recruitment & selection process) for lecturers & associate professors	4/2 ¹⁷	2/2	0/0	5/3	0/1	0/0
	Quality procedures of teaching staff recruitment (e.g. responsibilities; recruitment & selection process) for full professors	43/3	2/1	0/0	4/3	1/1	0/0
	Teaching staff peer review or participating observation of courses	2/3	4/1	0/0	3/3	1/1	1/0
Learning Competences & Processes							
Quality learning & student engagement	Reports generated from Learning Analytics tools such as BlackBoard, Moodle, Desire2Learn (e.g. individual user tracking, course based) (PDRLA)	1/1	3/4	1/0	0/2	2/0	3/2
	Social network analysis generated from Learning Analytics tools such as SNAPP (Social Networks Adapting Pedagogical Practice) (e.g. visualization of student relationships established through participation in LMS discussions) (PDRLA)	1/0	4/4	1/0	0/0	1/1	4/4
	Individual & group monitoring generated from Learning Analytics tools such as GLASS (Gradient’s Learning Analytics System) (e.g. visualization of student & group online event activity) (PDRLA)	1/0	2/4	1/0	1/0	0/0	3/5
	Discourse analysis generated from Learning Analytics tools such as COHERE (e.g. visualization of social & conceptual networks & connections) (PDRLA)	1/0	2/4	1/0	1/0	0/1	3/3
	Student self-reports on their dispositions, values & attitudes towards learning, i.e. collection of learner data & pedagogical descriptors (e.g. students’ ability in deactivating negative learning emotions, students’ learning strategies) (PDRLA)	1/1	3/3	1/0	1/2	0/0	4/3
Learning Outcomes & Learning Gain & their Assessment							
Learning gain	Student dashboards & monitoring generated from Learning Analytics tools such as Student Activity Meter (e.g. visualization of student activity for promotion of self-regulated learning processes) (PDRLA)	1/0	3/4	1/1	0/0	1/1	4/4
	Learning content interaction generated from Learning Analytics tools such as LOCO-Analyst (e.g. providing insight into individual & group interactions with the learning content) (PDRLA)	1/0	4/5	0/0	0/0	0/0	5/4
Assessment quality	Student evaluation of assessments/examinations (peer grading)	2/4	3/1	1/0	2/4	2/0	1/0
Prediction of student success	Predictive models for student performance	2/1	3/3	0/0	0/3	1/1	4/1
	Predictive models for student attrition	2/0	1/4	2/0	0/1	1/1	4/2
Accreditation	Accreditation (external) of study programs	2/4	3/1	0/0	3/4	1/0	0/0
	Institutional accreditation (external) of QMS in L&T (program accreditation carried out by HEIs themselves)	1/4	3/1	1/0	1/3	1/1	2/0
Space for additions and comments							
	Other, namelyNO INPUTS.....	0/0	0/0	0/0	0/0	0/0	0/0

¹⁷ The number before the slash always refers to teaching staff, the number after the slash refers to QM staff.

Assessment of Learning Analytics by Teaching Staff and Quality Management Staff

In the above-mentioned session at the EAIR Forum 2018 in Budapest a further survey questionnaire was also used which focused on the implementation and role of Learning Analytics in the respondents' higher education institutions.

For the questionnaire the following commonly used definition of Learning Analytics was used and communicated to the survey participants: **'Learning Analytics is the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environment in which it occurs'** (Siemens 2011; HEC 2016, 4).

The questionnaire was intended for the stakeholder groups of students, teaching staff, quality management staff and leadership. As already mentioned above, six members of teaching staff and five members of quality management staff responded, while students and HEI leadership members were not attending the workshop session.

The questionnaire questions and the responses are documented in the Tables 1.4.1-1.4.5 below. Since the number of respondents is very small, the core information is in the full text comments of respondents. These comments were slightly rephrased in Tables 1.4.1-1.4.5 to make them understandable while rephrasing stayed with the original comments as close as possible. Given the sparsity of the responses a more detailed coding of answers is not worthwhile at this stage.

Table 1.4.1: Filled-in survey questionnaire about the practice of Learning Analytics (part 1)

	Yes	No	Cannot answer, because
Is Learning Analytics put into L&T practice at your HEI?	2/3 ¹⁸	2/1	1: I'm not fully informed/ 1: I think it's researched

Table 1.4.2: Filled-in survey questionnaire about the practice of Learning Analytics (part 2)

If Learning Analytics is put into practice at your HEI, are the following functions realised?		
	Teaching staff	Quality management staff
Supporting concrete pedagogical decisions as actionable results	Zero time Yes; No comments	Three times Yes; Comments: One time: Decisions on course development are supported; two times: Decisions on curriculum development are supported
Supporting the study of learning-related emotions such as enjoyment, curiosity, frustration, or anxiety, & their interactions	One time Yes; Comment: Regular student satisfaction survey is information source	One time Yes; Comment: Cannot be interpreted due to unclear formulation
Supporting the quality improvement of courses	Two times Yes; Comments: One time: Anonymous course evaluation by students may be used by instructors to improve quality of courses	Two times Yes; Comments: One time: Feedback on teaching methods, materials and assignments may be used to improve quality of courses
Supporting the improvement of course design	Two times Yes; Comments: One time: Anonymous course evaluation by students may be used by instructors to improve course design	Three times Yes; Comments: One time: Cannot be interpreted due to unclear formulation One time: Feedback on teaching methods, materials and assignments may be used to improve quality of courses
Supporting the verification of student workload	One time Yes; No comments	Two times Yes; Comments: One time: Cannot be interpreted due to unclear formulation
Supporting the monitoring of students learning progress (stages)	Zero time Yes; No comments	One time Yes; No comments
Supporting the prediction of student learning effectiveness/success	Zero time Yes; No comments	Zero time Yes; No comments
Supporting the identification of students' failures of study	Zero time Yes; No comments	One time Yes; No comments
Supporting the identification of deficits in learning support for students	Zero time Yes; No comments	Two times Yes; No comments

¹⁸ The number before the slash always refers to teaching staff, the number after the slash refers to QM staff.

Supporting the identification of deficits in environment support for students	Zero time Yes; No comments	Zero time Yes; No comments
Supporting the targeted counselling of individual students	Zero time Yes; No comments	One time Yes; Comment: Cannot be interpreted due to unclear formulation
Supporting the improvement of admission & recruitment practices	Zero time Yes; No comments	Two times Yes; No comments
Other	Zero time Yes; No comments	Zero time Yes; No comments

Table 1.4.3: Filled-in survey questionnaire about the practice of Learning Analytics (part 3)

	Teaching staff	Quality management staff
If Learning Analytics is put into practice at your HEI, in which ways could/can you participate in its development?	One comment: Through bringing issues to the Academic Forum, or to the senate (through senate representative)	One comment: Direct participation is possible by monitoring and revision process
If Learning Analytics is put into practice at your HEI, which ethical framework or policy for Learning Analytics is available at your HEI (e.g. referring to data privacy, data reliability, control of data access)?	One comment: General Data Protection Regulation (GDPR) policy	One comment: Available are GDPR, a code of ethics and an ethical research policy One comment: GDPR is implemented while the rest is still under development
If Learning Analytics is put into practice at your HEI, how are appropriate data access controls ensured for different stakeholders?	One comment: Password-protected interfaces to interact with Learning Analytics data, only individuals with relevant job responsibilities may get a password to access the interface	Two comments (summarized): Password-protected interfaces to interact with learning analytics data, only individuals with relevant responsibilities may get a password to access the interface

Table 1.4.4: Filled-in survey questionnaire about the practice of Learning Analytics (part 4)

What are, in your view, strengths, weaknesses, opportunities & threats of Learning Analytics?		
	Teaching staff	Quality management staff
Strengths	Respondent 1: Ability to rely on evidence to inform institutional policies and practices related to learning experience & learning outcomes; Respondent 2: Output orientation, measure results; Respondent 3: No comment; Respondent 4: No comment; Respondent 5: No comment; Respondent 6: No comment	Respondent 1: Is reliable source of data; easy to customize; convincing; Respondent 2: Serves for individual counselling; Respondent 3: Gives overview of how learning is deployed and how it can be improved; Respondent 4: Gives insights that can be applied to improve teaching methods and monitor student progress; Respondent 5: Supports increase of learning quality and understanding of learning efficiency in the learning process
Weaknesses	Respondent 1: Challenges related to data collection & to developing valid & reliable measures of learning outcomes; Respondent 2: Data protection; Respondent 3: No comment; Respondent 4: No comment; Respondent 5: No comment; Respondent 6: No comment	Respondent 1: Price of mistake too high (human factor), requires good grasp of technology, gives numbers but not interpretation; Respondent 2: Risk of misinterpretation, too much focus; Respondent 3: Individual cases are not in focus; Respondent 4: Less useful in small groups (less than 50 students) and at MA and PhD level; Respondent 5: Human interaction between teachers and students as well as students and students could decrease
Opportunities	Respondent 1: Identify data collection approaches other than Learning Analytics tools (e.g. Blackboard, Moodle), as students in non-online delivered programmes barely engage with such tools; Respondent 2: Reduce drop-out, get feedback on teaching; Respondent 3: No comment; Respondent 4: No comment; Respondent 5: No comment; Respondent 6: No comment	Respondent 1: No comment Respondent 2: Teaching can be better planned; Respondent 3: No comment; Respondent 4: Improve and better attune to target group your teaching; Respondent 5: Prepares for the next education massification step/boom
Threats	Respondent 1: Misusing Learning Analytics data to inform decisions about individual students & faculty members; Respondent 2: Helicopter parents' syndrome: students pass on responsibility to university; Respondent 3: No comment; Respondent 4: No comment; Respondent 5: No comment; Respondent 6: No comment	Respondent 1: No comment; Respondent 2: No comment; Respondent 3: No comment; Respondent 4: No comment; Respondent 5: Privacy issues; increasing efficiency will endanger teacher jobs

Table 1.4.5: Filled-in survey questionnaire about the practice of Learning Analytics (part 5)

What ideas do you have using the strengths to overcome the weaknesses, exploit the opportunities and avoid the threats?		
	Teaching staff	Quality management staff
Overcome the weaknesses by/through	Respondent 1: No comment; Respondent 2: Anonymise data; Respondent 3: No comment; Respondent 4: No comment; Respondent 5: No comment; Respondent 6: No comment;	Respondent 1: No comment; Respondent 2: Education of teachers; Respondent 3: No comment; Respondent 4: Have a clear explicit aim why and how you use Learning Analytics and be aware of its limitations; Respondent 5: Make sure that human interaction is part of the learning experience
Exploit the opportunities by/through	Respondent 1: No comment; Respondent 2: Implement system; Respondent 3: No comment; Respondent 4: No comment; Respondent 5: No comment; Respondent 6: No comment;	Respondent 1: No comment; Respondent 2: Education of teachers; Respondent 3: No comment; Respondent 4: Filling in this questionnaire makes clear how little we know about the learning process with students, so it would give you insights; Respondent 5: No comment
Avoid the threats by/through	Respondent 1: Developing institutional policy on what Learning Analytics data may or may not be used for; Respondent 2: Keep data confidential; Respondent 3: No comment; Respondent 4: No comment; Respondent 5: No comment; Respondent 6: No comment;	Respondent 1: No comment; Respondent 2: Education of teachers; Respondent 3: No comment; Respondent 4: Be conscious how and when you use Learning Analytics; Respondent 5: Legal and technical measure that reduce the risk of privacy breach

Appendix 2: Feedback from Workshops on Performance Data Management at the SQELT IEW

The following two sections report the written records of the two workshops held at the SQELT IEW in Krems from 1-2 July 2019 (SQELT-IEW 2019).

Workshop 1 “Learning Analytics, Ethics and Policy in Performance Data Management”

[Comment: Text in square brackets was added to workshop records to support clarification.]

Core question of Workshop 1 “Learning Analytics, Ethics and Policy in Performance Data Management”:
What does Learning Analytics mean to you?

[Institution-wide idea of Learning Analytics and its goals]

- Digital footprint
- What the institution is doing, and why they are doing it
- Data collection is becoming difficult | Data protection
- Need to be careful about what data to collect
- Early warning system [required]
- Different type of data can be used
- Follow-up action
- Basic concern should be about improving learning
- Medial Science stands out as a Learning Analytics “User” / also Music
- Teaching practices influence on students’ success
- Data collection digitally while students do certain tasks

Quality assurance – Learning Analytics

- Quality assurance – baby crib for Learning Analytics? [see also (Rosa et al. 2019)]
- Institutional nature | culture impact on this
- QA – well developed – not too different from Learning Analytics
- Only to [the?] focus will be different
- Digital information is necessary
- Digitalisation – leads to deep analysis

Ethical issues in Learning Analytics

- Data protection regulations
- Data collected but not used

Workshop 2 “Institutional Strategy and Performance Indicators in Performance Data Management”

[Comment: Text in square brackets was added to workshop records to support clarification.]

[Participants’ expectations on workshop]

- Visualization of Data → Ideas
- Reflection on performance indicators considering theory
- Good discussions about performance indicators
- To know more details on institutional strategy in managing data for university performance

- (How) Do indicators shape our strategies and vice versa?
- Learn how contextual (i.e. institutional) factors drive quality assurance approaches
- Expectation: Learn about how HEIs combine performance indicators in performance data management
- Interesting discussions
- Implementation of performance indicators into university governance
- How do other HEIs implement performance indicators – GOOD practices

Positive [aspects and effects of performance indicators]	Negative [aspects and effects of performance indicators]
<ul style="list-style-type: none"> • Can give transparency about HEIs performance • “Objective” discussion • Awareness / stimulating discussions • Incentive system • Makes comparison possible (Benchmarking) • [Performance] Data should be contextualised • Performance indicators could give orientation 	<ul style="list-style-type: none"> • Simplifying • Competing interests / logics • Acceptance / symbolic implementation • Restricts (endangers) autonomy • Makes comparison possible (benchmarking) – Is that always good? • Stakeholders adapt to indicators • Goal displacement • Easy to measure vs. relevance • Performance indicators only focus on “small” aspects of quality • How do we quantify? What do we quantify? • Different groups have a different idea of quality

Challenges for survey-based indicators:

- Response rate
- Culture
- Acceptance

Budget relevant indicators [are relevant]

Preference of easy indicators

Finding measurable indicators for “soft content” e.g. 1. student centred learning 2. Internationalisation and mobility

Response rate of electronic evaluations

Appendix 3: Evaluation Survey for the SQELT Comprehensive Performance Indicator Set

Preliminary Remarks

The survey questionnaire developed in this Appendix is planned to be applied for evaluating the SQELT comprehensive performance indicator set III (SQELT Intellectual Output O6). This could be done at the seven Multiplier Events (“Euro-Region Workshops”) to be held in Aveiro (UA), Birmingham (BCU), Ghent (UGhent), Kraków (JU), Krems (DUK), Mannheim (**evalag**) and Milan (UNIMI) which may be organised either face-to-face or in virtual online meetings. Accordingly, the survey questionnaire could be applied in face-to-face communication (e.g. focus group discussions, semi-structured interviews) and/or in online communication activities (e.g. online surveys).

The survey questionnaire shall be applied for data collection to feed SQELT Intellectual Output O10, formally called “Impact Analysis Report” in the SQELT Application. Originally, O10 was planned as a so-called endline study to be compared with the baseline collected in Intellectual Output O3 to implement a before-after comparison impact analysis. However, the performance indicator set to which O3 referred and from which the SQELT project started was developed very much further during the project. Therefore, it does not make sense to use the same performance indicators as were used in O3. Instead the most developed version of the comprehensive performance indicator set III (SQELT Intellectual Output O6) is used for gathering feedback from various stakeholders, and also the survey questions are used in revised forms according to what has been learned during the project.

The involved stakeholders as intended respondents are

- Teachers, QM members, leadership and students from the **SQELT partnership universities** University of Aveiro, Birmingham City University, Ghent University, Jagiellonian University Kraków, Danube University Krems, University of Milan (as in O3 “Baseline”); to be approached by face-to-face communication and/or an online survey.
- **Quality assurance agencies**, predominantly from the EHEA but not restricted to it; to be approached by an online survey.
- Possibly also some **European higher education networks** (e.g. ENQA, EURASHE, ESU, EUA); to be approached by an online survey.
- External participants of the Euro Region Workshops and the Final SQELT Conference; to be approached by face-to-face communication and/or an online survey.

Introduction to the Survey

Goal and Privacy Policy of the Survey

Through this survey the Erasmus+ Strategic Partnership SQELT (“Sustainable Quality Enhancement in Higher Education Learning and Teaching”; <https://www.evalag.de/sqelt/>) would like to gather information about a selected subset of a comprehensive set of performance indicators that were developed in the SQELT project. The survey results will be used for academic purposes only as a feedback to the SQELT performance indicator set.

The Erasmus+ Strategic Partnership SQELT will treat all data as confidential and will not process it for other purposes than those mentioned above. Information and data handling of the Erasmus+ Strategic Partnership SQELT is carried out in accordance with the GDPR. Particularly, collected data will not be kept for longer than is necessary for data evaluation and interpretation.

The deadline for your response is *DAY MONTH 2020*.

Once you have submitted your response, you will be able to download a copy for your own records. If you have any questions, please contact Prof. Dr. Dr. Theodor Leiber (leiber@evalag.de).

In case of any doubts and questions, please contact Erasmus+ Strategic Partnership SQELT c/o Prof. Dr. Dr. Theodor Leiber at: M7 9a-10, D-68161 Mannheim, Germany or leiber@evalag.de

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A Glimpse on the Conceptual Understanding of Performance Indicators

An uncontested, widely agreed definition of the term “performance indicator” (PI) in higher education L&T is currently not available.

Ideally, as the name says, a performance indicator gives an indication of some performance (or performance pre-condition) of an individual or an organisation, for example, in the context or framework of a project, programme, product or other initiative. Typically, a performance indicator is related to points of reference such as standards and goals against which the measured value of the indicator and thus the achieved degree of performance or success is assessed.

Depending on the complexity of the activity, project, programme or organisation under scrutiny, the performances to be looked at can be very different and therefore performance indicators can cover a wide range of measures of different complexity: from pure performance figures (numerical values; quantitative performance indicators) to complex qualitative performance information, which is based on the measurement and collection of qualitative information (qualitative performance indicators).

Against this backdrop, it is assumed that performance indicators can be used to monitor aspects of performance and performance capacity for comparative purposes, to facilitate the assessment of institutional operations, and to provide evidence for quality assurance and improvement. In this sense, performance indicators ‘represent qualitative and quantitative information and data, which indicate functional qualities (“performance”) of institutional, organisational or individual performance providers.’ Thus, ‘performance indicators provide information about the degree to which quality performance objectives are being met’ (Leiber, T., 2019. A general theory of learning and teaching and a related comprehensive set of performance indicators for higher education institutions. *Quality in Higher Education* 25 (1), pp. 76-97, p. 77).

An example of a quantitative performance indicator in higher education is: Number of student workplaces held in a university’s facilities in relation to the student population of the university and/or per subject field and/or per study programme.

An example of a qualitative performance indicator is: Learning gain in reflective competences including cognitive higher education for sustainable development (HESD) competences (according to relevant quality

criteria to be identified, e.g. systemic thinking, forward thinking, critical thinking, self-perception competence) that could be assessed by (satisfaction) surveys of students, surveys of teaching staff and assessment reports by experts/peers (other than students and teaching staff) including the lawful protection of the use of students' personalised data for Learning Analytics.

Survey Questionnaire Framework

[Comment: This section presents a survey questionnaire framework on the assessed importance of performance indicators for the quality management of learning and teaching in higher education. The following respondents may be approached: members of SQELT partnership universities and external participants of the Euro Region Workshops and the Final SQELT Conference, namely teachers, QM professionals, leadership and students; quality assurance agencies; European higher education networks; education politics. This questionnaire could be applied in the form of face-to-face communication (e.g. focus group discussions, semi-structured interviews) or in the form of an online survey including an online survey carried out during a virtual meeting event.]

Please name your university or other organisation (e.g. quality assurance agency or European higher education network) where you work or study:

.....

To which of the following stakeholder groups do you belong? (multiple answers possible)

- Student
- University teacher
- University leadership (e.g. member of rectorate; dean etc.)
- University quality management (internal quality management)
- Professional of quality assurance agency (external quality management)
- Professional of European higher education network (e.g. ENQA, ESU, EUA, EURASHE)
- Education politics
- Other,

Please name your position in your university/organisation, if applicable:

Questionnaire items	Question for each item					
	How do you assess the following performance indicators for the quality management of learning and teaching in higher education?					
Performance indicators (selected from O6, see Tables 3.1-3.4 below)	Very important <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Completely unimportant <input type="checkbox"/>	Cannot answer <input type="checkbox"/>

Here is some space to add further performance indicators you are missing in the above list, if any.	
Further performance indicators	Short rationale
.....	
.....	
.....	

Please add further comments or reflections on the ways of using performance indicators (e.g. in quality assessments/evaluations; accreditation; benchmarking/classification; decision-making), if any. *[max. 2000 characters]*

.....
.....

Please share what you think about how performance indicators approximate the features and quality of learning and teaching. *[max. 2000 characters]*

.....
.....

Please share what you think about whether performance indicators improve decision-making. *[max. 2000 characters]*

.....
.....

Thank you very much for the time to respond. Please click on the *INSERT NAME OF SYMBOL* to submit your answers.

Shared Survey Questionnaire Items

[Comment1: The following performance indicator set, see Tables 3.1-3.4, is selected from the SQELT Intellectual Output O6 (which could be later replaced by O9, if need be) by choosing those indicators that are related to Learning Analytics (marked by PDRLA = Personalised Data required for Learning Analytics). This choice can be justified by the following considerations: The SQELT comprehensive performance indicators set is large and currently comprises more than 310 distinguishable indicators; this makes it unfeasible to discuss the complete set in a single survey. Given that the main purpose of learning and teaching is good learning success and student-centered learning is important, Learning Analytics is a current and exciting topic that has not yet been fully or satisfactorily exploited at many universities.]

[Comment2: It is clear, that for implementing a survey on performance indicators of learning and teaching in higher education a further selection of the choice of indicators presented in Tables 3.1-3.4 must be made. Otherwise any survey would be unfeasibly too long.]

[Comment 3: Before implementing the online survey and programming it, some final checks are required on the wording of the questionnaire (e.g. footnotes must be eliminated; acronyms must be eliminated or at least reduced to a minimum). The overall lay-out will also be changed while lay-out and structural aspects are usually largely determined by the survey software used.]

Performance Indicators for Teaching Competences and Processes

[Comment: The SQELT performance indicator set for the area of teaching competences and processes has no performance indicators that are related to Learning Analytics. Therefore, performance indicators for this area were selected according to assumed highest relevance of the indicator for higher education quality.]

Table 3.1: Selection from comprehensive set of performance indicators for L&T: teaching competences and processes (SQELT Performance Indicator Set III/O6)

Performance types	Performance sub-types	Performance indicators
Performance area: teaching competences and processes		
Teaching staff workload		Official teaching commitment in average semester or trimester or year hours per week per subject field and/or study programme
		Teaching workload (according to relevant quality criteria to be identified) that could be assessed by satisfaction surveys of relevant groups ¹⁹ of teaching staff (e.g. of a subject field, study programme)
Quality of teaching staff, teaching and teaching staff engagement	Teaching skills	Proportion of teaching staff who participated in pedagogical training (according to relevant quality criteria to be identified, e.g. didactics of Transformative and Holistic Continuing Self-Directed Learning (THCSDL))
		Proportion of teaching staff who participated in support activities for their adaptation of technology-enhanced L&T (e.g. e-learning, flipped classroom) (according to relevant quality criteria to be identified)
		Proportion of teaching staff who participated in peer support systems for teaching staff (according to relevant quality criteria to be identified)
		Proportion of teaching staff who participated in teaching observation (according to relevant quality criteria to be identified)
	Teaching staff recruitment	Quality of teaching courses of recruitment candidates for teaching staff (according to relevant quality criteria to be identified, e.g. didactics of Transformative and Holistic Continuing Self-Directed Learning (THCSDL)) that could be assessed by (satisfaction) surveys of students and teaching staff
		Quality of recruitment procedures (according to relevant quality criteria to be identified, e.g. procedural responsibilities; recruitment and selection process; recruitment quality criteria) for lecturers/associate professors/full professors (according to relevant quality criteria to be identified, e.g. teaching skills, pedagogic skills, research activities) that could be assessed by

¹⁹ The understanding that generally relevant groups should be selected for surveys and other data acquisition procedures applies wherever required throughout this PI set without being explicitly mentioned.

	Publications and presentations	(satisfaction) surveys of students, surveys of teaching staff and assessment reports by experts/peers ²⁰ (other than students and teaching staff) ²¹ (SUSTEX)
		Number and/or percentage of non-refereed publications during a certain time period (e.g. three years) per FTE (full-time-equivalent) member of teaching staff and/or per subject field and/or per study programme
		Number and/or percentage of refereed publications during a certain time period (e.g. three years) per FTE (full-time-equivalent) member of teaching staff and/or per subject field and/or per study programme
		Number and/or percentage of double-blind refereed publications during a certain time period (e.g. three years) per FTE (full-time-equivalent) member of teaching staff and/or per subject field and/or per study programme
		Number and/or percentage of non-refereed presentations at academic conferences during a certain time period (e.g. three years) per FTE (full-time-equivalent) member of teaching staff and/or per subject field and/or per study programme
		Number and/or percentage of refereed presentations at academic conferences during a certain time period (e.g. three years) per FTE (full-time-equivalent) member of teaching staff and/or per subject field and/or per study programme
	Teaching staff competences	Teaching staff's subject-matter competences (according to relevant quality criteria to be identified) that could be assessed by satisfaction surveys of students
		Teaching staff's methodological competences (according to relevant quality criteria to be identified) that could be assessed by satisfaction surveys of students
		Teaching staff's vocational training competences (according to relevant quality criteria to be identified) that could be assessed by satisfaction surveys of students
		Teaching staff's digital skills competences (according to relevant quality criteria to be identified) that could be assessed by satisfaction surveys of students
		Teaching staff's social competences (e.g. team, communication and leadership competences) (according to relevant quality criteria to be identified) that could be assessed by satisfaction surveys of students
		Teaching staff's respect and interest for students (according to relevant quality criteria to be identified) that could be assessed by satisfaction surveys of students
		Teaching staff's encouraging students' autonomous, critical thinking and acting (according to relevant quality criteria to be identified) that could be assessed by satisfaction surveys of students
		Teaching staff's didactics competences and pedagogical knowledge and skills (according to relevant quality criteria to be identified, e.g. didactics competences in Transformative and Holistic Continuing Self-Directed Learning (THCSDL) and knowledge of teaching models and learning processes) that could be assessed by satisfaction surveys of students
		Teaching staff's sensitivity to course level and progress (according to relevant quality criteria to be identified) that could be assessed by satisfaction surveys of students
		Teaching staff's fostering sustainability values (social, ecological, economical) (according to relevant quality criteria to be identified) that could be assessed by satisfaction surveys of students
		Teaching staff's feedback to students (e.g. on work in progress, test, completed assignments) (according to relevant quality criteria to be identified) that could be assessed by satisfaction surveys of students
		Teaching staff's expertise and competences in continuing education and life-long learning (according to relevant quality criteria to be identified) that could be assessed by satisfaction surveys of students
		Quality of teaching courses (according to relevant quality criteria to be identified) that could be assessed by students' (satisfaction) surveys and/or teaching staff peer review and/or by participating observation of teaching staff
		Academic content and structure of courses offered
	Contemporaneity and timeliness of courses' content (according to relevant quality criteria to be identified) that could be assessed by SUSTEX	
	Methods of course delivery, and the quality and quantity of the demands made of students (according to relevant quality criteria to be identified) that could be assessed by SUSTEX	
	Compatibility of studies with working (according to relevant quality criteria to be identified) that could be assessed by SUSTEX	

²⁰ Here as well as at similar places throughout this PI set, it is due to the user of the PI in which form and context such assessment is carried out: for example, the assessment may be integrated part of an accreditation or it may be carried out as an individual evaluation of a study programme. Also, the user of the PI has the choice who exactly these "experts/peers" may be, if any, who may be involved in addition to, or in replacement of the before-mentioned stakeholders.

²¹ In the following and throughout this PI set, these three basic appropriate ways of assessment are abbreviated by SUSTEX.

	Cutting-edge teaching	Use of current research in informing teaching and curricula content (according to relevant quality criteria to be identified) that could be assessed by SUSTEX
	Organisation of course sessions	Organisation of course sessions/flexible learning (exemplary quality criteria include flexibility in the requirements, time and location of study, teaching, assessment and certification) that could be assessed by SUSTEX
	Special teaching staff competences in medicine	Quality of bedside teaching (e.g. concerning mentoring, suitability of rooms and variety of diagnostic techniques applied) (according to relevant quality criteria to be identified) that could be assessed by patient surveys and/or SUSTEX and/or peer review and participating observation by teaching staff and
		Mutual integration of pre-clinical/theoretical and clinical/practical courses including experience with patient contact (according to relevant quality criteria to be identified) that could be assessed by SUSTEX
	Quality skills labs and training centres (exemplary quality criteria include maintenance, accessibility, technical facilities, mentoring) that could be assessed by SUSTEX	
	Overall quality of the student experience of teaching	Overall quality of study programmes, courses and students' experience of teaching (exemplary quality criteria include structure of study programme based on the contemporary state of knowledge and research; quality and relevance of course requirements; teaching based on the contemporary state of knowledge and research; achievability of L&T goals) that could be assessed by satisfaction surveys of students
Contact with work environment	Internships/practical experience/work experience	Number and/or percentage of study programmes (Bachelor, Master, doctoral/PhD) that have compulsory internships
		Number and/or percentage of compulsory internships per study programme (Bachelor, Master, doctoral/PhD)
		Number and/or percentage of hours connected to the internships per study programme (Bachelor, Master, doctoral/PhD)
		Number and/or percentage of ECTS credits connected to the internships per study programme (Bachelor, Master, doctoral/PhD)
		Number and/or percentage of phases of practical experience and/or work experience and/or external projects per study programme (Bachelor, Master, doctoral/PhD)
		Inclusion of internships in the study programme curricula (Bachelor, Master, doctoral/PhD) (according to relevant quality criteria to be identified) that could be assessed by SUSTEX
		Inclusion of phases of practical experience and/or work experience and/or external projects in the study programme curricula (Bachelor, Master, doctoral/PhD) (according to relevant quality criteria to be identified) that could be assessed by SUSTEX
Inclusion of phases of practical experience and/or work experience and/or external projects in the study programme curricula (Bachelor, Master, doctoral/PhD) (according to relevant quality criteria to be identified) that could be assessed by SUSTEX		

Performance indicators for Learning Competences and Processes

Table 3.2: Selection from comprehensive set of performance indicators for L&T: learning competences and processes (SQELT Performance Indicator Set III/O6)

Performance types	Performance sub-types	Performance indicators
Performance area: Learning Competences and Processes		
Quality learning and student engagement	Student workload	Student workload that could be assessed by SUSTEX ²² and/or by Learning Analytics methodologies ²³ including, if required and lawfully protected (e.g. by GDPR), the students' personalised data that are relevant to make use of the performance indicator for Learning Analytics ²⁴ (PDRLA ²⁵)
	Student interactions with learning content	Average duration per student interaction with course activities (e.g. solution of exercises, watching videos, listening to lecture, participation in working groups, etc.) that could be assessed by reports generated from Learning Management Systems (LMSs) and/or Learning Analytics tools ²⁶ per student and/or per study programme including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Average duration per student interaction with course contents that could be assessed by reports generated from LMSs and/or Learning Analytics tools per student and/or per study programme including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number of repetitive visits to learning contents (e.g. during online learning) that could be assessed by reports generated from LMSs and/or Learning Analytics tools per student and/or per study programme including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
	Student motivation	Students' dispositions, values and attitudes towards learning that could be assessed by SUSTEX through collection of learner data and pedagogical descriptors ²⁷ including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
Overall quality of learning experience	Overall quality of student learning experience (according to relevant quality criteria to be identified) that could be assessed by student satisfaction surveys including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)	

²² Student surveys may be based on, e.g., self-assessment, learning diary, think-aloud protocols.

²³ Exemplary quality criteria include visualisation of student activity for promotion of self-regulated learning processes via Student Activity Meter; providing insight into individual and group interactions with the learning content via LOCO-Analyst.

²⁴ In the following and throughout this PI set, this clause about students' personal data protection is used in the abbreviated version: "including the lawful protection of the use of students' personalised data for Learning Analytics".

²⁵ PDRLA = Personalised data required for Learning Analytics.

²⁶ Such as BlackBoard, Moodle, Desire2Learn (e.g. individual user tracking, course-based); Social network analysis generated from Learning Analytics tools such as SNAPP (Social Networks Adapting Pedagogical Practice) (e.g. visualization of student relationships established through participation in LMS discussions); Individual and group monitoring generated from Learning Analytics tools such as GLASS (Gradient's Learning Analytics System) (e.g. visualization of student and group online event activity); Discourse analysis generated from Learning Analytics tools such as COHERE (e.g. visualization of social and conceptual networks and connections).

²⁷ Exemplary quality criteria include learning-related emotions such as enjoyment, curiosity, frustration, or anxiety, and their interactions; students' ability in deactivating negative learning emotions, students' learning strategies.

Performance Indicators for Learning Outcomes and Learning Gain and Their Assessment

Table 3.3: Selection from comprehensive set of performance indicators for L&T: learning outcomes and learning gain and their assessment (SQELT Performance Indicator Set III/O6)

Performance types	Performance sub-types	Performance indicators
Performance area: Learning Outcomes and Learning Gain and their Assessment		
Student success	Coursework performance	Personal student coursework grades and credit points earned including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Assessment/examination grades and credit points earned during the study programme including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Percentage of credit points awarded in service-learning activities (e.g. students in community service activities and social work) in relation to total number of credit points including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
	Final examinations performance	Grades of students' final examinations of the study programme including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
	Completion of study units	Number and/or percentage of students who did not complete the programme modules they had started including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who did not complete the first year of study including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who did not complete the undergraduate programmes within the planned programme duration (Bachelor graduation on time) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who did not complete the undergraduate programmes (Bachelor graduation) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who did not complete the graduate programmes within the planned programme duration (Master graduation on time) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who did not complete the graduate programmes (Master graduation) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who did not complete their long first degree (= more than four years) within the planned programme duration (long first-degree graduation on time) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who did not complete their long first degree (= more than four years) (long first-degree graduation) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who did not complete the doctoral/PhD (or equivalent) programmes within the planned programme duration (postgraduate graduation on time) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who did not complete the doctoral/PhD (or equivalent) programmes (postgraduate graduation) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
	Drop-out	Number and/or percentage of students who intend to exit their study programme per year per HEI and/or per subject field and/or per department/institute and/or per study programme including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who intend to exit their study programme to change to another HEI per year per HEI and/or per subject field and/or per department/institute and/or per study programme including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
Number and/or percentage of students who intend to exit their study programme to leave higher education per year per HEI and/or per subject field and/or per department/institute and/or per study programme including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)		

	Prediction of student success	Student attrition (drop-out) predicted by educational data mining methodologies (according to relevant quality criteria to be identified) per year per HEI and/or per subject field and/or per department/institute and/or per study programme including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Student performance (exemplary quality criteria include earned credit points; examination grades; learning gains; learning effectiveness; monitoring of students learning progress (stages)) predicted by educational data mining methodologies per year per HEI and/or per subject field and/or per department/institute and/or per study programme including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
Contact with work environment	Internships	Number and/or percentage of Bachelor students performing an internship per HEI and/or per subject field and/or department/institute and/or study programme including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of Master students performing an internship per HEI and/or per subject field and/or department/institute and/or study programme including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
Student learning gain with respect to general (higher) education competences, Higher Education for Sustainable Development (HESD) and personality development	Subject-matter competences	Students' examination and assessment results (e.g. final grades; assessments of individual exams and performances such as presentations, homework, workshops within study courses and study modules) with respect to subject-matter competences including cognitive HESD competences ²⁸ (according to relevant quality criteria to be identified) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Learning gain in subject-matter competences including cognitive HESD competences (according to relevant quality criteria to be identified, e.g. examination grades and received credit points, before-after comparison of knowledge and skills) that could be assessed by SUSTEX including the lawful protection of the use of students' personalised data (PDRLA)
	Methodological competences	Students' examination and assessment results with respect to methodological competences including cognitive HESD competences (according to relevant quality criteria to be identified) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Learning gain in methodological competences including cognitive HESD competences (according to relevant quality criteria to be identified) that could be assessed by SUSTEX including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
	Reflective competences	Students' examination and assessment results with respect to reflective competences including cognitive HESD competences (according to relevant quality criteria to be identified, e.g. systemic thinking, forward thinking, critical thinking, self-perception competence) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Learning gain in reflective competences including cognitive HESD competences (according to relevant quality criteria to be identified, e.g. systemic thinking, forward thinking, critical thinking, self-perception competence) that could be assessed by SUSTEX including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
	Higher-order learning	Students' examination and assessment results with respect to higher-order learning (according to relevant quality criteria to be identified, e.g. skills involving analysis, planning/strategic thinking, evaluation/assessment/normative competences and synthesis (creation of new knowledge) according to Bloom's taxonomy) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Learning gain in higher-order learning (according to relevant quality criteria to be identified, e.g. skills involving analysis, , planning/strategic thinking, evaluation/assessment/normative competences and synthesis (creation of new knowledge) according to Bloom's taxonomy) that could be assessed by SUSTEX including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
	Action competences	Students' examination and assessment results with respect to action competences including behavioural HESD competences ²⁹ (according to relevant quality criteria to be identified, e.g. collaborative competences, integrative problem-solution competence) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Learning gain in action competences including behavioural HESD competences (according to relevant quality criteria to be identified, e.g. collaborative competences, integrative problem-solution competence) that could be assessed by SUSTEX including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
	Learning strategies and self-learning	Learning gain in learning strategies and self-learning competences (according to relevant quality criteria to be identified, e.g. collaborative learning) that could be assessed by SUSTEX including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)

²⁸ Such as determined by the respective 85 HESD cognitive learning goals related to the 17 SDGs (cf. UNESCO 2017, pp. 12ff.) or similar approaches.

²⁹ Such as determined by the respective 85 HESD behavioural learning goals related to the 17 SDGs (cf. UNESCO 2017, pp. 12ff.) or similar approaches.

	compe- tences	
	Quantitative reasoning	Students' examination and assessment results with respect to quantitative reasoning (ac- cording to relevant quality criteria to be identified) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Learning gain in quantitative reasoning (according to relevant quality criteria to be identified) that could be assessed by SUSTEX including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
	Digital skills	Students' examination and assessment results with respect to digital skills (according to rele- vant quality criteria to be identified) including the lawful protection of the use of students' per- sonalised data for Learning Analytics (PDRLA)
		Learning gain in digital skills (according to relevant quality criteria to be identified) that could be assessed by SUSTEX including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
	Interdisci- plinary compe- tences	Students' examination and assessment results with respect to interdisciplinary competences including cognitive, socio-emotional and behavioural HESD competences ³⁰ (according to rele- vant quality criteria to be identified) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Learning gain in interdisciplinary competences including cognitive, socio-emotional and be- havioural HESD competences (according to relevant quality criteria to be identified) that could be assessed by SUSTEX including the lawful protection of the use of students' person- alised data for Learning Analytics (PDRLA)
	Transdisci- plinary compe- tences	Students' examination and assessment results with respect to transdisciplinary competences including cognitive, socio-emotional and behavioural HESD competences (according to rele- vant quality criteria to be identified) including the lawful protection of the use of students' per- sonalised data for Learning Analytics (PDRLA)
		Learning gain in transdisciplinary competences including cognitive, socio-emotional and be- havioural HESD competences (according to relevant quality criteria to be identified) that could be assessed by SUSTEX including the lawful protection of the use of students' person- alised data for Learning Analytics (PDRLA)
	Social com- petences	Students' examination and assessment results with respect to social competences including socio-emotional and behavioural HESD competences (according to relevant quality criteria to be identified, e.g. team, communication and leadership competences; empathy; ability to co- operate; ability to solve conflicts) including the lawful protection of the use of students' per- sonalised data for Learning Analytics (PDRLA)
		Learning gain in social competences including socio-emotional and behavioural HESD compe- tences ³¹ (according to relevant quality criteria to be identified, e.g. team, communication and leadership competences; empathy; ability to cooperate; ability to solve conflicts) that could be assessed by SUSTEX including the lawful protection of the use of students' person- alised data for Learning Analytics (PDRLA)
	Self-compe- tences	Students' examination and assessment results with respect to self-competences (according to relevant quality criteria to be identified, e.g. self-determination; capability of decision and learning; flexibility of action; ability to reflect; sovereignty) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Learning gain in self-competences (according to relevant quality criteria to be identified, e.g. self-determination; capability of decision and learning; flexibility of action; ability to reflect; sovereignty) that could be assessed by SUSTEX including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
	Study experience satisfac- tion	Quality of study experience during the student life cycle (according to relevant quality criteria to be identified) that could be assessed by satisfaction survey of freshmen and/or undergrad- uates and/or graduates and/or postgraduates and/or alumni including the lawful protection of the use of students'/alumni's personalised data for Learning Analytics (PDRLA)

³⁰ Such as determined by the respective 255 HESD cognitive, socio-emotional and behavioural learning goals related to the 17 SDGs (cf. UNESCO 2017, pp. 12ff.) or similar approaches.

³¹ Such as determined by the respective 255 HESD cognitive, socio-emotional and behavioural learning goals related to the 17 SDGs (cf. UNESCO 2017, pp. 12ff.) or similar approaches.

Performance Indicators for L&T Environment

Table 3.4: Comprehensive set of performance indicators for L&T: L&T environment (SQELT Performance Indicator Set III/O6)

Performance types	Performance sub-types	Performance indicators
Performance area: L&T Environment		
	Students composition	Number and/or percentage of students with non-traditional background (exemplary criteria include low-income; non-academic families; disadvantaged ethnic and religious groups) per HEI and/or per department/institute and/or per subject field and/or study programme including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
Supportive environment	Special access offerings and facilities	Number and/or percentage of students who need special access offerings and facilities because of visual deficits including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who need special access offerings and facilities because of hearing deficits including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who need special access offerings and facilities because of mobility and other physical issues including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who need special access offerings and facilities because of dyslexia including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who need special access offerings and facilities because of autism including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
	Minority support	Number and/or percentage of students who need support due to ethnic minority status including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who need support due to religious minority status including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who need support due to social minority status including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
	Supportive network options of HEIs	Number and/or percentage of students who use networking options provided by the HEI that meet their social, political and cultural interests (according to relevant quality criteria to be identified, e.g. choir groups, orchestra groups, theatre groups, political discussion groups) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who use networking options provided by the HEI that meet their study interests (according to relevant quality criteria to be identified, e.g. student research groups) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and/or percentage of students who use networking options provided by the HEI that meet their practical world-of-work interests (according to relevant quality criteria to be identified, e.g. offers for organisation of internships) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
	Student interactions	With library
With courses		Students frequency of attending their compulsory courses (per event) (student attendance rate) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Students frequency of attending their non-compulsory courses (per event) (student attendance rate) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
With teaching staff		Number and duration of student interactions with teaching staff in the classroom per semester or study period including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and duration of student interactions with teaching staff in teachers' offices per semester or study period including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)

		Number and duration of student interactions with teaching staff on digital platforms per semester or study period including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and duration of student interactions with teaching staff during additional activities (e.g. research work, research camps, consultations, conferences) per semester or study period including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
	With digital platforms	Number and duration of digitised student interactions and/or average duration per visit with/at student admission system (SAS) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and duration of digitised student interactions and/or average duration per visit with/at student information system (SIS) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
		Number and duration of digitised student interactions and/or average duration per visit with other students (e.g. via the HEI's LMS) including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)
	Quality of incoming students	Entrance and admission score
Students' secondary school grades per study programme including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)		
Students' grades of HEI admission tests per study programme including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)		
Students' grades of introductory courses and/or examinations (e.g. in mathematics, languages) per study programme including the lawful protection of the use of students' personalised data for Learning Analytics (PDRLA)		

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