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The European Higher Education Sector Observatory

Handbook for institutional-level indicators

Preprint Version

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Handbook for institutional-level indicators
2026

Contents

Abbreviations 5
Document summary 6
1 Introduction 7
1.1 The EHESO handbook series 7
2 A framework for the EHESO institutional-level indicators 9
2.1 HEI reference population 9
2.2 Data sources and periodicity 10
3 Resources and personnel 11
4 Teaching and learning indicators 13
4.1 Teaching and learning activities 13
4.2 Teaching and learning outcome indicators 13
4.3 Teaching and learning innovation indicators 13
5 Research activities and outputs 18
6 Indicators on third mission and knowledge transfer 21
7 Indicators on regional engagement 23
8 Indicators on international orientation 25
9 Indicators on societal challenges 29
9.1 Promoting diversity and inclusion 29
9.2 Promoting digital transformation 29
9.3 Promoting green transformation 29
10 Classification indicators 34
11 Indicators computation 37
11.1 General rules 37
11.2 Anonymisation 37
11.3 Quality checks 38

Abbreviations

AY	Academic year
BMT	EHESO Benchmarking Tool
DG EAC	Directorate-General Education, Youth, Sports and Culture
DG RTD	Directorate-General for Research and Innovation
EC	European Commission
EEA	European Economic Area
EFTA	European Free Trade Agreement
ETER	European Tertiary Education Register
ERA	European Research Area
ETER	European Tertiary Education Register
EU	European Union
EUROSTAT	the Statistical Office of the European Union
FOE	Fields of Education
FTE	Full Time Equivalents
HC	Headcount
EHESO	European Higher Education Sector Observatory
HE	Higher Education
EHESS	European Higher Education Sector Scoreboard
HEI	Higher Education Institution
ISCED	International Standard Classification of Educational Degrees
NE	National Experts
NIFU	Nordic Institute for Studies in Innovation, Research and Education
NSA	National Statistical Authority
OECD	Organisation for Economic Cooperation and Development in Europe
UAS	Universities of applied sciences
UOE	UNESCO-UIS/OECD/EUROSTAT data collection on formal education manual

Document summary

This document provides a description of the methodology for the calculation of institutional (HEI-level) indicators in the European Higher Education Sector Observatory (EHESO). The corresponding data can be downloaded through the EHESO Microdata Access and are used for the EHESO Institutional Benchmarking Tool (EHESO-BMT). The specific calculations for the BMT are described in a companion handbook.

For each type of data, the handbook provides information on the indicator definition, the way it is calculated and any specific rules.

This version is updated as of April 2026 and will be revised when additional data sources are integrated in the EHESO.

1 Introduction

This handbook provides methodological guidance for calculation of institutional-level (HEI) indicators in the European Higher Education Sector Observatory (EHESO).

EHESO[1] leverages the strengths of existing EU data tools and capacities, including the European Tertiary Education Register (ETER), U-Multirank (multidimensional institutional benchmarking), Erasmus+ database (student and staff mobilities, transnational cooperations of HEIs), Database of External Quality Assurance Results (DEQAR), Eurostudent (Social dimension of Higher Education), Eurograduate (higher education graduate outcomes), Eurydice higher education policy data (Bologna Process Implementation Reports, Mobility Scoreboard, National Education systems descriptions), and other relevant data sources.

The Observatory makes it possible to compare, analyse and showcase the higher education sector's performance across various fields. Institutions and governments are enabled to strengthen their evidence base on key topics such as inclusion, learning outcomes, progress on digital, green and entrepreneurial skills, technology transfer, employability, students and labour market needs. This process reinforces the institutions' role in innovation ecosystems, and transnational cooperation in the higher education sector.

The consortium implementing the activities of the service contract for establishing EHESO is coordinated by PPMI, in Lithuania, and includes the Centre for Higher Education (CHE) in Germany, the Centre for Higher Education Policy Studies (CHEPS) at the University of Twente in the Netherlands, the Austrian Institute of Technology (AIT) and JOANNEUM RESEARCH in Austria. The project is supported by the Nordic Institute for Studies in Innovation, Research and Education (NIFU) in Norway and the Centre for Science and Technology Studies (CWTS) from Leiden University in the Netherlands, as well as by a number of individual experts.

A core dimension of EHESO is to compute indicators to characterise different dimensions of HEI's activities, such as teaching and learning, research, internationalisation. These indicators are computed from the different HEI-level data available in EHESO, including EHESO-ETER data from National Statistical Authorities, external data sources such as publication and patent data, and data collected through the EHESO institutional and student survey. The methodology for these data is covered by separate indicators.

Indicators are eventually made available to users through the EHESO Microdata Access[2] and mobilised in the EHESO Institutional Benchmarking Tool (EHESO-BMT[3]). The specific calculations for the EHESO-BMT are described in the companion handbook.

1.1 The EHESO handbook series

The EHESO handbook series provides methodological information on the data collection processes, definitions of variables and indicators, and the procedures for their integration in the EHESO data centre and for their use in the EHESO tools. It is an instrument to maintain

[1] https://national-policies.eacea.ec.europa.eu/eheso

[2] https://national-policies.eacea.ec.europa.eu/eheso/micro-data-access

[3] https://national-policies.eacea.ec.europa.eu/eheso/benchmarking-tool-for-higher-education-institutions

quality and consistency of data and indicators and provides documentation for EHESO data users on methods and definitions.

The handbook series comprises the following items:

- EHESO Handbook on country-level indicators, *forthcoming.*
- EHESO Handbook for the European Tertiary Education Register data collection
- EHESO Handbook for external institutional data sources
- EHESO Handbook of institutional data collection (incl. student survey), *forthcoming*.
- EHESO Handbook for institutional-level indicators, ***the current document***.
- EHESO handbook on the institutional benchmarking tool, *forthcoming*.

The handbook is organised as follow:

- The first chapter presents the overall framework for the EHESO indicators (chapter 2).
- The following chapters provide a list of indicators, and definitions for the main areas covered by these indicators, i.e.:
    - Personnel and financial resources (chapter 3).
    - Teaching and learning activities (chapter 4).
    - Research activities and output (chapter 5).
    - Third mission and knowledge transfer (chapter 6).
    - Regional engagement (chapter 7).
    - International orientation (chapter 8).
    - Societal challenges (chapter 9), i.e. diversity, digital and green transition.
    - Indicators for HEIs' classification (chapter 10).
- The final chapter describes the processes and rules for indicators' calculation in the EHESO data centre, data quality checks and access to the indicators through the EHESO micro-data access and the EHESO Institutional Benchmarking Tool (chapter 11).

Remark: this edition is updated as of April 2026. A few changes in naming of indicators and calculations, will be implemented in the data centre until summer 2026.

2 A framework for the EHESO institutional-level indicators

The framework for the EHESO indicators is based on an understanding of the main dimensions of the activity profile of higher education institutions developed in the U-MULTIRANK project and in the EHESO benchmarking tool. The framework considers the goals of the European Strategy for Universities[4], and the associated indicators presented (at the country level) in the EHESO Scoreboard.

The dimensions are organised as follows:

- *HEI resources*, including the number and composition of personnel, respectively volume and composition of financial resources of HEIs.
- *Teaching and learning*. These indicators characterise teaching and learning activities of the HEI in terms of a) volume and composition of teaching activities, b) teaching and learning outcomes and c) teaching and learning innovation.
- *Research activities and outputs*. These indicators characterise the HEI's research activities in terms of their volume, outputs, and quality.
- *Knowledge transfer activities*. These indicators characterise the activities in knowledge transfer and third mission, in terms of innovation and education.
- *International dimension*. These indicators characterise the HEI's international orientation in terms of teaching, and cooperation in research.
- *Regional engagement*. The indicators in this dimension describe the HEI's engagement with the region in their R&D activities and education.
- *Societal challenges*. These indicators characterise the HEI's engagement with three societal challenges, which are digital transformation (mainly in education), green transformation, and diversity and inclusion.
- Finally, *classification indicators* provide a broad general categorisation of HEIs in terms of core characteristics, such as size, subject orientation, education, and research orientation. They are constructed using the previous indicators by identifying suitable breakpoints (see chapter 10).

2.1 HEI reference population

The reference population for the EHESO institutional indicators are the HEIs included in the EHESO-ETER data collection of statistical data.

The EHESO-ETER data collection includes currently the UK, EEA/EFTA countries (Iceland, Liechtenstein, Switzerland and Norway), as well as candidate and potential candidate countries to the European Union (Albania, Bosnia and Herzegovina, Kosovo, Montenegro, Serbia, Türkiye, The Republic of North Macedonia), as well as Andorra.

The data collection includes educational providers (conventionally labelled as *higher education institutions)* for which one major activity is providing education at tertiary level, which are recognised as part of higher education at the national level and which exceed a minimum size threshold (more than 30 FTEs of academic staff or than 200 students).

[4] https://education.ec.europa.eu/sites/default/files/2022-01/communication-european-strategy-for-universities-graphic-version.pdf

For full details on the perimeter, the reader should refer to the EHESO Handbook for the European Tertiary Education Register data collection[5].

2.2 Data sources and periodicity

Corresponding to the EHESO-ETER data collection, most indicators are computed by year for the whole period covered by the EHESO microdata. The table below provides details on the data sources used and their exact periodicity. Details on the methodology are provided in the respective EHESO methodological handbooks.

Notice that the same indicators for the Benchmarking Tool are computed using three-years averages to have achieve better stability and consistency, for full details please refer to the BMT handbook.

Table 1. Data sources for the EHESO Institutional indicators

Data collection	Data	Data Source	Start year	Periodicity
EHESO-ETER	Descriptors, geography	Websites and other public sources	2011	Annual
EHESO-ETER	Personnel, finances, students, graduates, PhD	National Statistical Institutes	2011	Annual
External data	Publication data	OpenAlex	2011	Annual
External data	Patent data	European Patent Office	2011	Annual
External data	Participations in European Framework Projects	AIT-EUPRO database (based on Cordis)	2011	Annual
External data	Erasmus+ mobilities	EACEA	2011	Annual
EHESO institutional survey	HEIs' activities and profile	EHESO	2021	Biannual

[5] https://op.europa.eu/en/publication-detail/-/publication/5ebee9a9-19aa-11f0-b1a3-01aa75ed71a1

3 Resources and personnel

These indicators (Table 2) characterise the volume and composition of resources available to the HEI in two dimensions: the financial resources, on the one hand, and the personnel resources, on the other hand, since academic personnel represents the key resources for undertaking activities such as education, research and third mission.

Table 2. Indicators on financial and personnel resources

ETER Variable label	Variable name	Computation	Explanation and remarks	Primary data source	Range
Academic staff / total staff (FTE)	IND.PERS.ACA_n_TOTALFTE	PERS.ACAFTETOTAL/ PERS.TOTALFTE	Share of personnel resources devoted to academic activities compared to resources for management and administration relative to total personnel in full time equivalents.	ETER	[0, 1]
Senior academic personnel / academic staff (HC)	IND.PERS.ACASENIOR_n_ACA	PERS.ACAHCSENIORTOTAL/ PERS.TOTACAHC	Share of academic personnel at the highest hierarchical degree at higher education institution.	ETER	[0, 1]
Student fees funding / Total current revenues	IND.REV.FEES_n_TOTAL	REV.STUDFEES.NC/ REV.CURRTOTAL.NC	Share of HEI's revenues from tuition fees. Tuition fees represent the amount of money that higher education institutions receive from student fees paid by households and students for participation in educational programmes.	ETER	[0, 1]
Total academic personnel and RTA in Full Time Equivalents	IND.PERS.ACARTAFTETOTAL	PERS.ACAFTETOTAL+ PERS.RESTEACHASSISTFTE	Total academic personnel, including research and teaching assistants, in full time equivalents (FTE).	ETER	[0, ∞]
Total academic personnel and RTA in Headcounts	IND.PERS.ACARTAHCTOTAL	PERS.TOTACAHC+ PERS.RESTEACHASSISTHC	Total academic personnel, including research and teaching assistants, in headcounts (HC).	ETER	[0, ∞]
Total core budget / Total current revenues	IND.REV.CORE_n_TOTAL	REV.CORETOTAL.NC/ REV.CURRTOTAL.NC	Share of HEI's revenues from the core budget. Core budget is defined as funding available for the operations of the whole institution, which are not earmarked to specific activities.	ETER	[0, 1]
Total third-party funding / Total current revenues	IND.REV.THIRD_n_TOTAL	REV.THIRDPARTYTOTAL.NC/ REV.CURRTOTAL.NC	Share of HEI's revenues from third-party funding. Third-party funds refer to revenues acquired for specific activities, such as research projects, services and postgraduate education. These funds are usually limited in time and allocated to specific institutional units. The main component of third-party funds are public research grants attributed by national and international funding agencies based on the competitive evaluation of proposals.	ETER	[0, 1]

4 Teaching and learning indicators

4.1 Teaching and learning activities

These indicators (Table 3) are mostly derived from statistical data and provide a broad characterisation of teaching and learning activities of an HEI in terms of their volume and composition, notably by degree level and subject field.

4.2 Teaching and learning outcome indicators

These indicators (Table 4) characterise the volume of educational output, as well as its composition in terms of subjects, and the relationships between volume of education and outputs (graduation and drop-out rates). Also included are indicators on graduate outcomes in terms of employment.

4.3 Teaching and learning innovation indicators

These indicators (Table 5) reflect the extent to which institutions promote and embed innovation in teaching and learning. They capture the share of academic staff who receive pedagogical training, including competences in Technology-Enabled Learning, and assess the integration of microcredentials through a composite measure covering funding diversity and quality assurance arrangements.

The indicators on the share of pedagogically skilled teaching staff, the embeddedness of micro-credentials and teaching staff trained in technology-enabled learning are collected directly from the institutional survey and described in the corresponding handbook.

Table 3. Teaching & Learning (T&L) indicators. Basic indicators on T&L activities

Indicator	Variable name	Computation	Explanation and remarks	Primary data source	Range
Students to academic staff ratio	IND.STUDACASTAFFHC	STUD.TOTALISCED5_7/ IND.PERS.ACARTAHCTOTAL	Ratio of short cycle, bachelor's and master's students (ISCED 5-7) to academic personnel including research and teaching assistants in headcounts.	ETER	[0, ∞]
Master-degree orientation	IND.GRAD.MASTERDEGORIENT	(GRAD. ISCED7TOTAL+ GRAD.ISCED7LONGTOTAL)/ (GRAD.TOTALISCED5_7)	Share of master's level graduates (ISCED 7 and ISCED 7 long) out of all short cycle, bachelor's and master's level graduates (ISCED 5-7).	ETER	[0, 1]
Share of students in STEM ISCED 5-7	IND.STUD.STEMORIENT	SUM(STUD.ISCED5_7FOE05; STUD.ISCED5_7FOE06; STUD.ISCED5_7FOE07)/ STUD.TOTALISCED5_7	Share of short cycle, bachelor's and master's level students (ISCED 5-7) in science, mathematics, computing, engineering, manufacturing and construction (STEM).	ETER	[0, 1]
Student subject concentration ISCED 5-7 (Herfindahl index)	IND.STUD.HERFISCED5_7	$\frac{\sum_{x=0}^{10}(STUD.ISCEDSTUD.ISCED5_7FOEx)^2}{(\sum_{x=0}^{10} STUD.ISCED5_7FOEx)^2}$	Sum of squares of the share of short cycle, bachelor's and master's level students (ISCED 5-7) in each of the eleven ISCED fields of education and training. It ranges from 0.09 (equal distribution of students across fields) to 1 (all students in one field).	ETER	[0.09, 1]

Table 4. Teaching & Learning (T&L) indicators. Indicators on T&L outcomes

Indicator	Variable name	Computation/ Category labels	Explanation and remarks	Primary data source	Range
Share of graduates in STEM ISCED 5-7	IND.GRAD.STEMORIENT	SUM(GRAD.ISCED5_7FOE05; GRAD.ISCED5_7FOE06; GRAD.ISCED5_7FOE07)/ GRAD.TOTALISCED5_7	Share of graduates in science, mathematics, computing, engineering, manufacturing and construction (STEM) at short cycle, bachelor's and master's level (ISCED 5-7).	ETER	[0, 1]
Dropout rate ISCED 6	SURVEY.IND.DROPOUTISCED6	SURVEY.GRAD.DROPOUTBA/ GRAD.ISCED6TOTAL	Share of bachelor's students (ISCED 6) who leave and do not re-enrol in a specific educational programme or course without completing it or earning a qualification. It shows the success of higher education	Institutional survey	[0, 1]

Indicator	Variable name	Computation/ Category labels	Explanation and remarks	Primary data source	Range
			institution to guide new entrants through the first year of higher education studies. National regulations and institutional practices regarding selection and admission of new entrants may have an impact on this indicator.		
Graduation on time ISCED 6	SURVEY.IND.GRAD.INTIMEISCED6	SURVEY.GRAD.BASP/ GRAD.ISCED6TOTAL	Share of bachelor's graduates (ISCED 6) completing a degree within the expected timeframe.	Institutional survey	[0, 1]
Graduation on time ISCED 7	SURVEY.IND.GRAD.INTIMEISCED7	SURVEY.GRAD.MASP/ GRAD.ISCED7TOTAL+ GRAD.ISCED7LONGTOTAL	Share of master's graduates (ISCED 7 and ISCED 7 long) completing a degree within the expected timeframe.	Institutional survey	[0, 1]
Graduate unemployment ISCED 6	SURVEY.IND.GRAD.UNEMPLOYISCED6	No calculation, data taken directly from the institutional survey SURVEY.GRAD.BAUNEMPLOYEDRANGE	Share of bachelor's graduates (ISCED 6) who are able to and willing to work but unable to do so 18 months after graduation. 1= "0%"; 2 = "0-5%"; 3="6-10%"; 4="11-25%"; 5="more than 25%"	Institutional survey	(1,2,3,4,5)
Graduate unemployment ISCED 7	SURVEY.IND.GRAD.UNEMPLOYISCED7	No calculation, data taken directly from the institutional survey SURVEY.GRAD.MAUNEMPLOYEDRANGE	Share of master's graduates (ISCED 7 and ISCED 7 long) who are able to and willing to work but unable to do so 18 months after graduation. 1= "0%"; 2 = "0-5%"; 3="6-10%"; 4="11-25%"; 5="more than 25%"	Institutional survey	(1,2,3,4,5)

Table 5. T&L indicators. Teaching and Learning Innovation Indicators

Indicator	Variable name	Computation/ category labels	Explanation and remarks	Primary data source	Range
Pedagogically skilled teaching staff	SURVEY.IND. PERS.PEDTE ACHING	No calculation, data taken directly from the institutional survey Q26:	Share of academic personnel who have had formal or informal training for their teaching tasks. 1="0-24%"; 2="26-49%"; 3="50-74%"; 4="75-100%"	Institutional survey	(1,2,3,4)

Indicator	Variable name	Computation/ category labels	Explanation and remarks	Primary data source	Range
		What part of academic staff has some training in pedagogical and didactical skills; • external training with a recognised certificate (formal) • Internal training or professional development training, without certification (informal)			
Embeddedness of micro-credentials	SURVEY.IND.PROG.MICROCREDENTIALS	Q30a: Where do the financial resources to provide micro-credentials come from? (multiple answers) • National government/ministry • Regional or local government • Participants (tuition fees) • Third parties (employers,..) Q30b: are those micro-credentials subject to national process of quality control? • yes • no	A composite indicator that indicates the status of the institutional offer of microcredentials (funding sources and quality control). A high score implies a strong embedding of microcredentials, i.e. diverse funding sources and integration in regular quality control systems. More specifically, it reaches from 1: limited embeddedness to 12: maximum embeddedness. 1="one financial source, no public source, not subject to national quality assessment (QA)" 2="two financial sources, no public source, not subject to national QA” 3="one financial source, public source, not subject to national QA” 4="two financial sources, public source, not subject to national QA” 5="three financial sources, public sources, not subject to national QA" 6="four financial sources, public sources, not subject to national QA” 7="one financial source, no public source, subject to national QA" 8="two financial sources, no public source, subject to national QA” 9="one financial source, public source, subject to national QA" 10=”two financial sources, public source, subject to national QA”	Institutional survey	(1,2…11,12)

Indicator	Variable name	Computation/ category labels	Explanation and remarks	Primary data source	Range
			11=”three financial sources, public sources, subject to national QA” 12=”four financial sources, public sources, subject to national QA”		
Teaching staff trained in technology-enabled learning	SURVEY.IND.PERS.TECHENHANCEDLEARNING	Q28: What part of the teaching staff is trained to develop or use Technology-Enabled Learning?	The part of the teaching staff who is trained to develop or use Technology-Enabled Learning. 1="No trained staff"; 2="less than 1/3"; 3="1/3 to 2/3"; 4="more than 2/3"	Institutional survey	(1,2,3,4)

5 Research activities and outputs

These indicators (Table 6) capture the volume and intensity of research activities in higher education institutions. They include measures of doctoral education, research engagement through European Framework Programme participation, and publication output per academic staff.

Table 6. Indicators on research activities and outputs

Indicator	Variable name	Computation	Explanation and remarks	Primary data source	Range
PhD intensity	IND.RES.PHDINTENSITY	RES.GRADISCED8TOTAL/ GRAD.TOTALISCED5_7	Share of doctoral level graduates (ISCED 8) out all short cycle, bachelor's and master's level graduates (ISCED 5-7).	ETER	[0, ∞]
PhD students per academic personnel	IND.PHDACASTAFFHC	RES.STUDISCED8TOTAL/ IND.PERS.ACARTAHCTOTAL	Number of doctoral students (ISCED 8) per academic personnel including research and teaching assistants in headcounts (HC).	ETER	[0, ∞]
Herfindahl index PhD graduates	IND.RES.HERFPHDGRAD	$\sum((\text{RES. GRADISCED8FOEX})^2)$ / $(\text{RES. GRADISCED8TOTAL} + \text{RES. GRADISCED8FOEUNCL})^2$ with X ranging from 00 to 10	Distribution of PhD graduates (ISCED 8) by field of education and training (ISCED-F). Graduates are preferred to students, as data are considered more reliable. Since PhD education is closely associated with research, this can also be considered as an indicator of subject concentration in research.	ETER	[0.1, 1]
EU-FP participations per academic personnel	IND.EUFPACASTAFFHC	EUFP.PROJECTS / IND.PERS.ACARTAHCTOTAL	Number of participations in European Framework Programmes (EU-FP) projects per academic personnel including research and teaching assistants in headcounts (HC).	EUPRO	[0, ∞]
Publications per academic personnel	IND.PUBFRACACASTAFFHC	PATPUBL.PUBLFRACTOT / IND.PERS.ACARTAHCTOTAL	Number of fractionalised publications per academic personnel including research and teaching assistants in headcounts (HC).	OpenAlex	[0, ∞]
Share of publications in 10% top-cited	IND.PUBTOP10SHARE	PATPUBL.PUBTOP10TOT/ PATPUBL.PUBLFRACTOT	Share of top 10% most cited scientific publications with at least one author coming from the higher education institution. Publications are weighted by the number of authors in the country (fractional counting). Publication time window is four years (i.e. 2021 data refer to publications in 2018-2021).	OpenAlex	[0, 1]
Total Mean Normalised Citation Score	IND.PUBMNCS	PATPUBL.MNCS/PATPUB.PUBFRACTOTAL	This indicator measures the scholarly impact in terms of number of citations normalised by citation averages in every single field per total number of publications (fractional counting).	OpenAlex	[0, ∞]

Indicator	Variable name	Computation	Explanation and remarks	Primary data source	Range
Share of open access publications	IND.PUBOPENACCESSSHARE	PATPUBL.PUBOATOT/ PATPUBL.PUBLFULLTOT	Share of open access publications relative to the total number of publications (full counting).	Open Alex	[0, 1]
Art related outputs	SURVEY.IND.KT.ARTREL	SURVEY.KT.ARTRELATEDOUTPUT/ *IND.PERS.ACARTAHCTOTAL*	Number of scholarly outputs in the creative and performing arts per academic personnel including research and teaching assistants, in headcounts (HC).	Institutional survey	[0, ∞]
Professional publications per academic personnel	SURVEY.IND.KT.PROFPUB	SURVEY.KT.PROFPUBLICATIONS/ IND.PERS.ACARTAHCTOTAL	Number of professional publications per academic staff including research and teaching assistants in headcounts. Professional publications are all publications published in journals, books, and other media that are addressed to a professional audience and that can be traced bibliographically.	Institutional survey	[0, ∞]

6 Indicators on third mission and knowledge transfer

These indicators (Table 7) assess the extent and intensity of third mission activities and knowledge transfer. They capture institutional engagement with industry through academic patents, collaborative EU Framework Programme projects involving companies, and co-publications with corporate partners. Additionally, student and doctoral traineeships, graduate start-up creation, private-sector funding and revenues from continuous professional development reflect the interaction between higher education and industry.

Table 7. Indicators on third mission and knowledge transfer

Indicator	Variable name	Computation	Explanation and remarks	Primary data source	Range
Academic patent intensity	IND.ACAPATINTENSITY	PATPUBL.PATACADTRANS/ IND.PERS.ACARTAHCTOTAL	Number of academic patents with at least one inventor affiliated to the higher education institution, normalised by academic personnel including research and teaching assistants in headcounts (HC).	EPO	[0, ∞]
EU-FP project cooperation intensity with industrial partners	IND.EUFPCOMPACA	EUFP.COOPCOMPANY / IND.PERS.ACARTAHCTOTAL	Number of EU-FP projects participations with at least one company as partner, normalised by academic personnel including research and teaching assistants in headcounts (HC).	EUPRO	[0, ∞]
ERASMUS+ student traineeship intensity	IND.ERATRAINEE57NORM	ERA.OUTGOINGTRAINEE57 / STUD.TOTALISCED5_7	Number of student traineeship at short cycle, bachelor's and master's levels (ISCED 5-7), normalised by total students (ISCED 5-7).	Erasmus+	[0, ∞]
ERASMUS+ PhD traineeship intensity	IND.ERATRAINEE8NORM	ERA.OUTGOINGTRAINEE8/ RES.STUDISCED8TOTAL	Number of traineeships at doctoral level (ISCED 8), normalised by total number of doctoral students (ISCED 8).	Erasmus+	[0, ∞]
Share of co-publications with industry partners	IND.PUBINDUSTRYSHARE	PATPUBL.PUBINDTOT/ PATPUBL.PUBLFULLTOT	Share of publications with at least one author affiliated to the higher education institution and one author affiliated to a company (full counting).	OpenAlex	[0, 1]
Share of private third-party funding	IND.SHARETHIRDPARTYPRIVATE	REV.THIRDPARTYPRIVATE.NC/ REV.CURRTOTAL.NC	Funding from the private sector as share of total revenues from third-party funding in national currency.	ETER	[0, 1]
Graduate companies	SURVEY.IND.KT.GRADCOMPANIES	SURVEY.KT.GRADCOMPANIES/ ((GRAD.ISCED7TOTAL+ GRAD.ISCED7LONGTOTAL)* 1000)	The number of companies newly founded in the reference year by graduates who completed their degree within the previous two years normalised by 1000 master's level graduates (ISCED7 and ISCED 7 long).	Institutional survey	[0, ∞]
Spin-offs	SURVEY.IND.KT.SPINOFF	SURVEY.KT.SPINOFFS/ *(IND.*PERS.ACARTAHCTOTAL* 100)	The number of spin-offs (i.e. firms established based on a formal knowledge transfer arrangement between the institution and the firm) newly created per year by the institution, normalised by 100 academic staff including research and teaching assistants in headcounts.	Institutional survey	[0, ∞]
Income from continuous professional development	SURVEY.IND.KT.CPD	SURVEY.REV.CPD.NC/ REV.CURRTOTAL.NC	Share of the HEI's total revenues that is generated from activities delivering continuous professional development courses and training normalised by total current revenues in national currency.	Institutional survey	[0, 1]

7 Indicators on regional engagement

These indicators (Table 8) assess the degree of regional engagement of higher education institutions. They measure collaboration with regional partners through EU Framework Programme projects and the share of research income from regional sources as well as internships and employment of graduates withing the same region.

The three indicators on the *share of bachelor graduates working in the region*, the *share of master graduates working in the region* and the *share of external research revenues from regional sources* are collected directly from the institutional survey and described in the corresponding handbook.

Table 8. Indicators on regional engagement

Indicator	Variable name	Computation	Explanation and remarks	Primary data source	Range
EU-FP regional cooperation intensity	IND.EUFPREGCOOPINT	EUFP.REGCOOP/ IND.PERS.ACARTAHCTOTAL	Number of EU-FP projects participations with at least one company located in the same NUTS3 region as partner, normalised by academic personnel including research and teaching assistants in headcounts (HC).	EUPRO	[0, ∞]
External research revenues from regional sources	SURVEY.IND.REG.EXTRESREVREGION	No calculation, data taken directly from the institutional survey SURVEY.REV.REGIONALPERC	Proportion of external research revenues - apart from government or local authority core/recurrent grants – that comes from regional sources (i.e. industry, private organisations, charities), where the region refers to NUTS2.	Institutional survey	[0, 1]
Student internships in the region	SURVEY.IND.REG.STUDINTERNREGION	SURVEY.STUD.INTERNREGION/ SURVEY.STUD.INTERNTOTAL	Share of all students (ISCED 5–7) who completed an internship with a company or organisation located in the same NUTS2 region relative to all students who did an internship.	Institutional survey	[0, 1]
Bachelor graduates working in the region	SURVEY.IND.REG.WORKINREGIONISCED6	No calculation, data taken directly from the institutional survey SURVEY.GRAD.BAREGION	Share of bachelor's level graduates (ISCED 6) who found a job in the same NUTS2 region where the HEI is located within 18 months after graduation. 1="0%"; 2 = "0-25%"; 3="26-50%"; 4="51-75%"; 5="more than 75%"	Institutional survey	
Master graduates working in the region	SURVEY.IND.REG.WORKINREGIONISCED7	No calculation, data taken directly from the institutional survey SURVEY.GRAD.MAREGION	Share of master's level graduates (ISCED 7) who found a job in the same NUTS2 region where the HEI is located within 18 months after graduation. 1="0%"; 2 = "0-25%"; 3="26-50%"; 4="51-75%"; 5="more than 75%"	Institutional survey	(0,1,2,3,4,5)

8 Indicators on international orientation

These indicators (Table 9) capture the international orientation of higher education institutions. They reflect the international composition of students, graduates, and academic personnel; participation in international mobility programmes, cross-border research collaboration; and engagement in internationally joint degrees.

The indicator on the *share of costs of joint programmes* is collected directly from the institutional survey and described in the corresponding handbook.

Table 9. Indicators on international orientation

Indicator	Variable name	Computation	Explanation and remarks	Primary data source	Range
Share of mobile students ISCED 5-7	IND.STUD.SHAREMOBISCED5_7	STUD.ISCED5_7MOB/(STUD.ISCED5_7MOB+STUD.ISCED5_7RES)	Share of enrolled short cycle, bachelor's and master's level students (ISCED 5-7) having obtained their previous degree granting access to higher education in another country.	ETER	[0, 1]
Share of mobile PhD students	IND.RES.SHAREMOBPHDSTUD	RES.STUDISCED8MOB/ (RES.STUDISCED8MOB+RES.STUDISCED8RES)	Share of enrolled doctoral students (ISCED 8) having obtained their previous degree granting access to higher education in another country.	ETER	[0, 1]
Share of mobile graduates ISCED 5-7	IND.GRAD.SHAREMOBISCED5_7	GRAD.ISCED5_7MOB/ (GRAD.ISCED5_7MOB+GRAD.ISCED5_7RES)	Share of graduates (ISCED5-7) having obtained their degree granting access to higher education in another country.	ETER	[0, 1]
Share of mobile PhD graduates	IND.RES.SHAREMOBPHDGRAD	RES.GRADISCED8MOB/(RES.GRADISCED8MOB+RES.GRADISCED8RES)	Share of PhD graduates (ISCED8) having obtained their degree granting access to higher education in another country.	ETER	[0, 1]
Share of foreign academic staff	IND.PERS.SHAREFORACA	PERS.ACAHCFOR/ (PERS.ACAHCFOR+PERSACAHCNAT)	Share of foreign academic staff, i.e. staff without the citizenship of the country, among total academic personnel in headcounts (HC).	ETER	[0, 1]
Share of international joint publications	IND.SHAREINTJOINTPUB	PATPUBL.PUBINTTOT/ PATPUBL.PUBLFULLTOT	Share of publications with at least one co-author affiliated in another country (full counting).	OpenAlex	[0, 1]
Share of international joint publications (non-EU)	IND.JOINTPUBNONEU	PATPUBL.PUBNOTEUTOT/ PATPUBL.PUBLFULLTOT	Share of publications with at least one co-author affiliated in another non-EU country (full counting).	Open Alex	[0, 1]
Share of Erasmus+ incoming students ISCED 5-7	IND.ERA.CREDITMOBINCOMING_ISCED5_7	(ERA.INCOMING_STUDENTS_ISCED5+ERA.INCOMING_STUDENTS_ISCED6+ERA.INCOMING_STUDENTS_ISCED7)/STUD.TOTALISCED5-7	Ratio between total incoming Erasmus+ students and total students enrolled at the higher education institution (ISCED 5-7)	Erasmus+	[0, ∞]
Share of Erasmus incoming students ISCED 8	IND.ERA.CREDITMOBINCOMING_ISCED8	(ERA.INCOMING_STUDENTS_ISCED8)/ RES.STUDISCED8TOTAL	Ratio between total incoming Erasmus+ PhD students and total PhD students enrolled at the higher education institution (ISCED 8)	Erasmus+	[0, ∞]

Indicator	Variable name	Computation	Explanation and remarks	Primary data source	Range
Share of Erasmus+ outgoing students ISCED 5-7	IND.ERA.CREDITMOBOUTGOING_ISCED5_7	(ERA.OUTGOING_STUDENTS_ISCED5+ERA.OUTGOING_STUDENTS_ISCED6+ERA.OUTGOING_STUDENTS_ISCED7)/ STUD.TOTALISCED5-7	Ratio between total outgoing Erasmus+ students and total students enrolled at the higher education institution (ISCED 5-7)	Erasmus+	[0, ∞]
Share of Erasmus+ outgoing students ISCED 8	IND.ERA.CREDITMOBOUTGOING_ISCED8	(ERA.OUTGOING_STUDENTS_ISCED8)/ RES.STUDISCED8TOTAL	Ratio between total outgoing Erasmus+ PhD students and total PhD students enrolled at the higher education institution (ISCED 8)	Erasmus+	[0, ∞]
Researchers mobility intensity	IND.RES.RESMOBINTENSITY	EUFP.RESEARCHERSTAFFMOB/ PERS.ACAFTETOTAL	Number of EU-FP projects the HEI participated in that provide funding for researchers and staff exchanges relative to the total number of academic personnel in full time equivalents.	ETER	[0, ∞]
Share of foreigners PhD graduates	IND.RES.SHAREFORPHDGRAD	RES.GRADISCED8FOR/ RES.GRADISCED8TOTAL	Share of PhD (ISCED 8) graduates without the citizenship of the country.	EUPRO	[0, 1]
Share of foreigners PhD students	IND.RES.SHAREFORPHDSTUD	RES.STUDISCED8FOR/ (RES.STUDISCED8FOR+RES.STUDISCED8NAT)	Share of PhD (ISCED 8) students without the citizenship of the country.	ETER	[0, 1]
Share of foreigners students ISCED 5-7	IND.STUD.SHAREFORISCED5_7	STUD.ISCED5_7FOR/ (STUD.ISCED5_7FOR+STUD.ISCED5_7NAT)	Share of enrolled students (ISCED 5-7) without the citizenship of the country.	ETER	[0, 1]
Share of foreigners graduates ISCED 5-7	IND.GRAD.SHAREFORISCED5_7	GRAD.ISCED5_7FOR/ (RES.GRADISCED8FOR+RES.GRADISCED8NAT)	Share of graduates (ISCED 5-7) without the citizenship of the country.	ETER	[0, 1]
Relative costs of joint degree programmes	SURVEY.IND.INT.RELCOSTJOINT	No calculation, data taken directly from the institutional survey SURVEY.PROG.JOINTDEGREESCOSTS	Costs of providing joint degree programmes compared to costs of similar programmes offered in a regular way. 1: lower costs, 2: no difference, 3: higher costs, 4: don't know.	Institutional survey	(0.1.2.3.4)

Indicator	Variable name	Computation	Explanation and remarks	Primary data source	Range
Share of students in joint degree programmes	SURVEY.IND.INT.SHAREJOINTSTUD	SURVEY.STUD.JOINTDEGREES/ STUD.TOTALISCED5_7	Share of students in internationally joint degree programmes relative to the total number of students enrolled in degree programmes (ISCED 5-7).	Institutional survey	[0, 1]
Share of joint degree programmes	SURVEY.IND.INT.SHAREJOINTPROG	*SURVEY.PROG.JOINTDEGREES/ (SURVEY.PROG.SHORTTOTAL + SURVEY.PROG.BATOTAL + SURVEY.PROG.MATOTAL + SURVEY.PROG.LONGFIRSTTOTAL)*	Share of internationally joint degree programmes offered relative to the total number of degree (ISCED 5-7) programmes offered.	Institutional survey	[0, 1]
Share of bachelor programmes taught in foreign language	SURVEY.IND.INT.SHAREPROGFORISCED6	*SURVEY.PROG.BAFOREIGN/ SURVEY.PROG.BATOTAL*	Share of bachelor's level (ISCED 6) programmes offered in a foreign language.	Institutional survey	[0, 1]

9 Indicators on societal challenges

These indicators capture the engagement of higher education institutions with key societal challenges. They reflect the representation of women and other underrepresented groups among students and staff, the development of digital capacity through ICT education, research, online courses, and investments, and the integration of sustainability and climate change topics into curricula and monitoring

9.1 Promoting diversity and inclusion

These indicators (Table 10) assess the extent to which higher education institutions promote diversity and inclusion across their student body and academic staff. They cover gender balance among students, graduates, doctoral candidates, and academic personnel, including senior positions, as well as age diversity among students and graduates. In addition, they reflect institutional efforts to widen participation through outreach activities and the inclusion of students with caring responsibilities or disabilities.

9.2 Promoting digital transformation

These indicators (Table 11) Table 12measure the extent to which higher education institutions promote and integrate digital transformation in teaching and research. They capture the development of digital skills through ICT graduates at bachelor's, master's, and doctoral levels, as well as research focus on ICT within EU Framework Programme participation and publications. In addition, they assess institutional digitalisation efforts through the provision of fully online degree programmes and financial investments in digitising teaching and learning.

9.3 Promoting green transformation

These indicators (Table 12) the extent to which higher education institutions promote green transformation through their educational offer and institutional practices. They capture the integration of climate change topics within degree programmes and the level of institutional engagement in sustainability monitoring.

These indicators currently include the amount of degree programmes with courses on climate change and level of engagement in green monitoring. Both are collected directly from the institutional survey and described in the corresponding handbook.

Table 10. Indicators on societal challenges. Diversity and inclusion

Indicator	Variable name	Computation/Category labels	Explanation and remarks	Primary data source	Range
Share of women students ISCED 5-7	IND.STUD.SHAREWOMENISCED5_7	STUD.ISCED5_7WOMEN/ (STUD.ISCED5_7WOMEN +STUD.ISCED5_7MEN)	Share of short cycle, bachelor's and master's level female students among total short cycle, bachelor's and master's level students (ISCED 5-7).	ETER	[0, 1]
Share of women PhD students	IND.RES.SHAREWOMENPHDSTUD	RES.STUDISCED8WOMEN/ (RES.STUDISCED8WOMEN +RES.STUDISCED8MEN)	Share of female doctoral students among total doctoral students (ISCED 8).	ETER	[0, 1]
Share of women graduates ISCED 5-7	IND.GRAD.SHAREWOMENISCED5_7	GRAD.ISCED5_7WOMEN/ (GRAD.ISCED5_7WOMEN +GRAD.ISCED5_7MEN)	Share of female graduates among total graduates (ISCED 5-7).	ETER	[0, 1]
Share of women PhD graduates	IND.RES.SHAREWOMENPHDGRAD	RES.GRADISCED8WOMEN/ (RES.GRADISCED8WOMEN +RES.GRADISCED8MEN)	Share of female PhD graduates among total PhD graduates (ISCED 8).	ETER	[0, 1]
Share of women academic staff	IND.PERS.SHAREWOMENACA	PERS.ACAHCWOMEN/ (PERS.ACAHCWOMEN +PERS.ACAHCMEN)	Share of female academic personnel among total academic personnel in headcounts.	ETER	[0, 1]
Share of women in senior academic personnel	IND.PERS.SHAREWOMENACASENIOR	PERS.ACAHCSENIORWOMEN/ (PERS.ACAHCSENIORWOMEN+ PERS.ACAHCSENIORMEN)	Share of senior female academic personnel among senior academic personnel in headcounts. Senior refers to those occupying the highest levels of academic hierarchy.	ETER	[0, 1]
Share of mature students ISCED 5-7	IND.STUD.SHAREMATURESTUDISCED5_7	SUM(STUD.ISCED5_725TO29; STUD.ISCED5_7OVER29)/ (STUD.ISCED5_7BELOW20 + STUD.ISCED5_720TO21 +STUD.ISCED5_722TO24 +STUD.ISCED5_725TO29 +STUD.ISCED5_7OVER29)	Share of short cycle, bachelor's and master's level students (ISCED 5-7) aged 25 years or older relative to the total number of students at the same level.	ETER	[0, 1]

Indicator	Variable name	Computation/Category labels	Explanation and remarks	Primary data source	Range
Share of mature graduates ISCED 5-7	IND.GRAD.SHAREMATUREGRADISCED57	SUM(GRAD.ISCED5_725TO29; GRAD.ISCED5_7OVER29)/ (GRAD.ISCED5_7BELOW20 + GRAD.ISCED5_720TO21 + GRAD.ISCED5_722TO24 + GRAD.ISCED5_725TO29 + GRAD.ISCED5_7OVER29)	Share of graduates (ISCED 5-7) aged 25 years or older relative to the total number of graduates at the same level.	ETER	[0, 1]
Number of outreach programmes	SURVEY.IND.SOC.OUTREACHPROG	1= not engaged in any of the activities mentioned 6=engaged in all of the activities mentioned	Scope of outreach activities. Outreach programmes aim to increase the enrolment of underrepresented groups through (1) partnerships with secondary schools, (2) summer schools, (3) media-/recruitment campaigns, (4) guidance and advice, (5) partnerships with neighbourhoods or regions or (6) other initiatives.	Institutional survey	[0, 6]
Share of students with children ISCED 6	SURVEY.IND.SOC.SHARESTUDCHILDRENISCED6	SURVEY.STUD.BASTUDENTSWITHCHILDREN/ STUD.TOTALISCED6	Share of bachelor's level students (ISCED 6) with one or more young children.	Institutional survey	[0, 1]
Share of students with disability status ISCED 6	SURVEY.IND.SOC.SHARESTUDDISABILITYISCED6	SURVEY.STUD.BASTUDENTSDISABILITIES/ STUD.TOTALISCED6	Share of bachelor's level students (ISCED 6) with a disability status.	Institutional survey	[0, 1]

Table 11. Indicators on societal challenges. Digital transformation

Indicators	Variable name	Computation/Category labels	Explanation and remarks	Primary data source	Range
Share of graduates in ICT	IND.ICTORIENTGRAD	GRAD.ISCED5_7FOE06/ GRAD.TOTALISCED5_7	Share of short cycle, bachelor's and master's level graduates (ISCED 5-7) in information and communications technology (ICT).	ETER	[0, 1]

Share of PhD graduates in ICT	IND.ICTORIENTPHD	RES.GRADISCED8FOE06/ RES.GRADISCED8TOTAL	Share of doctoral level graduates (ISCED 8) in information and communications technology (ICT).	ETER	[0, 1]
Intensity of EU-FP projects in ICT	IND.EUFPINTENSITYICT	EUFP.PROJECTSFOE06/ IND.PERS.ACARTAHCTOTAL	Number of EU-FP projects participations in information, communication and technology (ICT), normalised by academic personnel including research and teaching assistants in headcounts (HC).	EUPRO	[0, ∞]
Intensity of publications in ICT	IND.PUBINTENSITYICT	PATPUBL.PUBLFRACFOE06/ IND.PERS.ACARTAHCTOTAL	Share of publications (fractional counting) in the field of Information and Communications Technology (ICT) normalised by academic personnel including research and teaching assistants in headcounts.	OpenAlex	[0, ∞]
Share of online degree programmes	SURVEY.IND.SOC.ONLINEPROG	*(SURVEY.PROG.SHORTONLINE + SURVEY.PROG.BAONLINE + SURVEY.PROG.MAONLINE + SURVEY.PROG.LONGFIRSTONLINE + SURVEY.PROG.PHDONLINE)/ ((SURVEY.PROG.SHORTTOTAL+ SURVEY.PROG.BATOTAL + SURVEY.PROG.MATOTAL + SURVEY.PROG.LONGFIRSTTOTAL + SURVEY.PROG.PHDTOTAL)*	Share of degree programmes offered fully online relative to the total number of degree programmes offered online and on campus (ISCED 5-8).	Institutional survey	[0, 1]
Digital investment	SURVEY.IND.SOC.DIGITALINVEST	SURVEY.CHALL.DIGITALEDUINVESTMENT.NC/ REV.CURRTOTAL.NC	Share of financial resources spent on digitising teaching and learning relative to the total current revenues in national currency of the higher education institution.	Institutional survey	[0, 1]

Table 12. Indicators on societal challenges. Green transformation

Indicator	Variable name	Computation/Category labels	Explanation and remarks	Primary data source	Range
Green courses	SURVEY.IND.SOC.GREENCOURSES	No calculation, data taken directly from the institutional survey Q29a: In how many degree programmes are courses on climate change/environmental sustainability part of the programme?	The amount of degree programmes with courses on climate change, on a scale from 1 (none) to 5 (all).	Institutional survey	(1,2,3,4,5)
Green monitoring	SURVEY.IND.SOC.GREENMONITOR	No calculation, data taken directly from the institutional survey Q29e: Does your institution monitor/collect data on the following topics (yes/no): • Electricity consumption • Water usage • Carbon footprint • Waste management • Sustainable travel of staff	The level of engagement in green monitoring (e.g. renovation of buildings, number of sustainability topics monitored, and number of sustainability topics in strategic plans). On a scale from 0 (none) to 5 (full engagement).	Institutional survey	(1,2,3,4,5)

10 Classification indicators

Classification indicators (Table 13) allow classifying in groups HEIs included in the EHESO according to some core dimensions. There are useful for the identification of groups of HEIs, and to identify similar institutions for the purposes of benchmarking.

Moreover, classification indicators can be integrated in datasets, such as those from EUROGRADUATES and EUROSTUDENTS, where HEI-level individual data cannot be disclosed because of requirements of anonymity.

Classification indicators build on available indicators in the EHESO and categorise them using the distributions of variables so that the size of each data cell remains large enough to guarantee anonymisation. Given the very skewed distribution of most indicators, break points are at p25, p50, p75 and p90.

The table overleaf provides the list of indicators and how they are computed and categorised for continuous variables. Since most variables are highly skewed, the choice of cut points takes into account the quantiles (to have good numerosity by class), adapted however to provide a better coverage of the large institutions – implying that generally large classes will include less HEIs.

Missing data are completed by interpolation at two conditions:

- at least ¾ of the yearly values should be available.
- categories are stable across years.

This procedure reduces somewhat the missing values in the dataset, particularly when a single year is missing in the dataset.

Table 13. Classification Indicators

Dimensions	Variable	Variable name	Definition and remarks	Computation in ETER	Categorization
Institutional variables	Classification - Institutional control	CLASS.INSTCONTROL	Dummy, 0 if the institution is under public control or is mostly financed by the state, 1 if it is private and mostly funded by private sources.	Recoded from BAS.LEGALSTAT by including private government-dependent in public.	0 Public control (BAS.LEGALSTAT= 0 OR 2) 1 Private control
	Classification - PhD status	CLASS.PHDSTATUS	Whether the HEI has the right of awarding the PhD degree.	Recoded from STUD.HIGHDEG	0 No PhD (STUD.HIGHDEG <3) 1 PhD (STUD.HIGHDEG=3)
	Classification – Age Class	CLASS.AGE	Categories based on the HEI's foundation year	Recoded from BAS.FOUNDYEAR	1: before 1800 2: 1800 – 1899 3: 1900 – 1949 4: 1949 – 1979 5: 1980 – 1999 6: 2000 -
HEI size	Classification - HEI size	CLASS.HEISIZE	Number of academic personnel FTE	Recoded from PERS.ACAFTETOTAL When only HC are available, FTEs estimated from HC to minimise missing data.	1 below 100 FTEs 2 below 500 FTEs 3 below 1,500 FTEs 4 more or equal 1,500 FTEs
Educational activities	Classification - Education intensity	CLASS.EDUCINTENSITY	Number of diploma, bachelor and master students ISCED5-7 divided by academic staff	Recoded from IND.STUDACASTAFFFTE	1 below 10 2 below 25 3 below 50 4 50 or above
	Classification - Master degree orientation	CLASS.MASTERDEGORIENT	Number of master students divided by the number of diploma, bachelor and master students.	Recoded from IND.GRAD.MASTERDEGORIENT	1 below 0.30 2 below 0.50 3 below 0.70 4 more or equal to 0.70

Research activities	Classification - PhD intensity	CLASS.PHDINTENSITY	Number of PhD students divided by students	Recoded from IND.RES.PHDINTENSITY	1 below 0.005 2 below 0.03 3 below 0.08 4 more or equal to 0.08
Subject scope	Classification - Subject concentration	CLASS.SUBJECTCONC	The index is computed as the sum of the squares of the share of students ISCED5-7 in each of the ten subject fields of educational statistics (Herfindahl index). It ranges between 1 (all students in a field) to 0.1 (students equally distributed between fields).	Recoded from IND.STUD.HERFISCED5_7	1 below 0.30 2 below 0.65 3 more or equal to 0.65
	Classification - Relative specialisation in natural sciences and engineering	CLASS.RELSPECNATSCIEENG	Share of bachelor and master students in the corresponding fields normalised by the average share in the whole sample.	Recoded from IND.STUD.STEMORIENT	1 below 0.15 2 below 0.35 3 below 0.60 4 more or equal 0.60
	Classification - ISCED Fields with most students	CLASS.FIELDMOSTSTUD	The field with the largest number of students ISCED5-7	Computed from STUD.ISCED5_7FOE00-10	0 = generic 1 = education 2 = arts and humanities 3 = social sciences 4 = business, administration and law 5 = natural sciences 6 = information and communication technologies 7 = engineering 8 = agriculture 9 = health and welfare 10 = services unknown

11 Indicators computation

Indicators are computed directly in the EHESO data centre from the underlying data. The calculations are made through an external python scripts.

Computation is undertaken at the following instances:

- When substantial batches of data are published (such as a new wave of ETER data).
- In case of substantial updates of the EHESO tools requiring changes in the underlying indicators.
- Regularly every month to cater with smaller changes in the underlying data.

When computation is redone, all existing value of the indicator are overwritten in order to account for smaller changes in the dataset (e.g. correction of the underlying data). Before importing the data, a correlation score is computed between old and new values by indicator; if correlation is below 0.9, differences need to be checked before importing the new indicators.

11.1 General rules

A number of general rules applies to the calculation of indicators.

All indicators in the data centre – and available through the EHESO micro-data access - are computed for individual years – mostly calendar years, in some cases academic years for students. Notice that the same indicators for the Benchmarking Tool are computed using three-years averages to have achieve better stability and consistency, for full details please refer to the BMT handbook.

Unclassified values are not included in the calculation of indicators. For example, if the gender is unknown, the share of women will be calculated as the share of women among men and women, where any unclassified person (missing) is excluded. A similar case is when the nationality is unknown. In these cases, the share of foreign personnel will only be calculated as the share of foreign nationals among foreign nationals and nationals. However, indicators computed from breakdowns where the share of unclassified cases exceeds 25% will be flagged with 'ic'. Any flags from the parent variables are copied over for the indicators to make users aware of possible data problems.

Flags related to data will also be applied to the indicators using that data as follows:

- When data used for calculating an indicator is missing (code 'm'), the indicator will be set to missing.
- When a total is '0', the value for the indicator referring to a breakdown will be set to 'a' (not applicable). For example, this applies when a HEI has '0' students at a specific ISCED level.

All indicators are calculated for individual years and HEIs.

11.2 Anonymisation

In the calculation of indicators concerning students and staff, care must be taken to protect anonymity of individuals in case the underlying data are too small. This applies to original data (for example counts of students), but also to indicators to avoid that raw numbers can be reconstructed from the indicators.

This methodology follows the one adopted the UK Higher Education Statistical Agency (https://www.hesa.ac.uk/about/regulation/data-protection/rounding-and-suppression-anonymise-statistics)

- Counts of people are rounded to the nearest multiple of 5.
- Shares (like % of students who are disabled) are not published if they are fractions of a small group of people (fewer than 22.5).
- Averages (like average age or average salary) are not published if they are averages of a small group of people (7 or fewer).

11.3 Quality checks

Quality checks for indicators include three main dimensions:

- Consistency, i.e. checking whether the values are within the theoretical range (for example [0 1] for shares as described in the above tables.
- Multiannnual checks, i.e. checking for substantial changes as compared with the previous years as compared with the baseline fluctuation of the indicator considered over the whole time series.

  Specifically, we use the mean absolute deviation from the median.

  To this aim, for each institution i, we compute the average absolute deviation of the difference between two consecutive data points to the median difference for this institution, where the average runs over the whole period covered by the dataset. This is compared to the absolute deviation of the differences to the median difference of one institution.

  Specifically, outliers are identified by the condition:

  $|(x_{it} - x_{it-1}) - median((x_{it} - x_{it-1})| > 3.29 * mean\ (|(x_{it} - x_{it-1}) - median((x_{it} - x_{it-1})|)$.

  The checks are only applied to cases where the indicator numerator as well as the average absolute deviation from the median and/or relative change exceeds a certain threshold.

  Quality checks are implemented with every substantial update of the indicators.

  Detected problematic cases are listed in a report including:

  - The institution name and the country.
  - The data on which the indicator has been computed for all the years, and the respective flags and remarks.
  - The indicator score for all the years, and the respective flag.
  - Information on demographic events since these might generate breaks in series.

The process of handling potentially problematic cases is as follows:

- First, cases are prechecked based on observed data. Clearly unproblematic cases are excluded, these might include for example:
  - Outliers generated by small underlying values – such as only one publication.
  - Outliers generated by known characteristics of the institution, such as outlying student to staff ratio for on-line universities.

These cases are flagged as ‘nd’ (not deviant) and excluded when checked are implemented anew,

- Outliers for which the underlying data are already flagged and described as deviant. These cases are flagged as ‘d’ (deviant).
- Remaining outliers whose reason needs to be checked – particularly problematic cases are:
    - Single deviant years in a stable time series.
    - Outliers for an observation that are also deviant in the corresponding time series.
    - Outliers that are detected for several institutions for the same year and indicator, which might indicate a systematic error (such as column swaps) or break in series.
    - Outliers that are detected for the same HEI and several indicators, which might be due to demographic events, but also to systematic mistakes such as row swaps.

About the European Higher Education Sector Observatory

The European Higher Education Sector Observatory (EHESO) is a user-centred data and information platform on the higher education sector in Europe. The Observatory enables the comparison, analysis, and showcasing of the sector's performance across multiple levels, actors, and themes.