Methodological Note on the Index of Readiness for Digital Lifelong Learning

This document provides a methodological overview of the **Index of Readiness for Digital Learning (IRDLL)**. The index presents a **combined qualitative and quantitative assessment** of 27 EU Member States' current situation to help policy-makers, social partners, media and the public understand what needs to be done in digital lifelong learning.[1] The index has a numerical value in the [0,1] range, with 1 indicating full marks on every component of the index. A country reaches this value only if it is extremely successful in addressing the challenge of digitalisation in learning. The reference year for the index is 2018, using data for the period 2015-2018.

We constructed the index with existing data as well as new data generated from surveys with national experts for the EU-27. In developing the index, we took inspiration from other indices[2] exploring various elements of education and digitalisation, and practical guidance from literature on creating composite indicators.[3]

The approach is to create **a blended index combining** information not only from **existing conventional indicators** (e.g. Eurostat, Eurobarometer, OECD, the Bertelsmann Stiftung and the World Bank), **but also rare yet knowledge-generating sources** (e.g. expert-based or newly generated data). To this aim, we developed a questionnaire[4] and identified national experts[5] for each Member State in the EU-27. The existing data is strategically combined with information coming from the expert questionnaire to plug the holes created by lack of ready-made data in certain areas. Last but not least, the index methodology also allows its successful repetition in the subsequent years, as long as the data utilised is generally annual, and not one-time.

The IRDLL index is composed of nine indicators in three categories (see Table 1). It starts with the premise that the following three broad categories are most relevant to understand digital learning readiness across countries: **learning outcomes and participation**, **institutions and policies**, and the **availability of digital learning**. The literature suggests that each of these provides insight into a particular aspect of digital learning readiness. The index is constructed

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[1] The index calculations excludes the United Kingdom.

[2] For example, the Regional Innovation Scoreboard, Euler Hermes: Enabling Digitalization Index, International Digital Economy and Society Index, Digital Transformation Scoreboard, the European Lifelong Learning Indicators (ELLI).

[3] The most authoritative is the OECD's Handbook on Constructing Composite Indicators (Methodology and User Guide) (2008).

[4] See the dedicated index website here.

[5] Several countries were handled in house by the authors of this report. National experts were found through literature and informal stakeholder consultations. For a few countries where CEPS was unable to identify suitable and available experts, Google's team assisted with suggestions for national experts and their contact information.

as a weighted average of individual sub-indices in these particular areas as shown in the following table. For simplicity, values of all indicators and data used is normalised to the [0,1] range prior to the aggregation of data into the index.

Table 1. The composition of the index

Index section	Weight
A – Learning participation and outcomes	**30%**
Learning outcomes (composite, existing data)	15%
Educational attainment and participation (existing data)	7.5%
Participation in lifelong learning (composite, existing data)	7.5%
B – Institutions and policies for digital learning	**40%**
Institutions and policies (expert-based)	10%
Regulation and funding (expert-based)	15%
Educators and schools (expert-based)	10%
Governance and implementation (composite, existing data)	5%
C – Availability and use of digital learning	**30%**
Attitudes towards digitalisation (composite, existing data)	15%
Accessibility of digital learning (composite, created from a list of existing data)	15%
Google search and app data (new data)	Not used

Source: Authors' elaboration.

Index section A: Learning participation and outcomes (30%)

This section focuses on traditional indices measuring learning participation and outcomes of individuals in a given country, using data from the last available year for each indicator considered. Specifically, it has three main elements: a composite indicator on **learning outcomes**, a composite indicator on **educational attainment and participation**, and an indicator measuring the intensity of **ongoing learning**.

Composite indicator for learning outcomes: Individuals' learning outcomes are measured with mean standardised test scores as well as educational outcome measured from conventional surveys. Test scores for both children and adults are considered. Together, these cover proficiency in mathematics, reading and science, literacy, numeracy, and problem solving in a technology rich environment. The standardised tests used are PISA, PIAAC, TIMSS, and PIRLS (i.e. country average for PISA mathematics, reading and science; national mean score for PIAAC literacy, numeracy and problem solving in tech rich environment, as well as including any other relevant international testing data – e.g. TIMSS, PIRLS). Each of these is available for nearly all, but not all of the countries in EU-27. Moreover, due to low frequency of some of these surveys, up-to-date data is not always available. The methodological approach here is similar to how, for example, Transparency International constructs its Corruption Perception Index – using all available data for a given country in a given period and averaging it into one composite indicator. In other words, if country X has PISA science, mathematics and reading scores as well as TIMSS and PIRLS, but not PIAAC, that is what is used and averaged. Only data from last three years before the reference year (2018) is included (2015 and after).

Indicator for learning participation and attainment: The attainment and participation is summarised by the share of the population with tertiary education. These data come from Eurostat for the most recent year (2018).[6]

Composite indicator on participation in ongoing learning: Ongoing learning is essential given the pace of technological change – the skills and proficiencies in highest demand shift at a faster pace than before. The attainment and participation for lifelong learning includes not only participation rates, but also intensity of participation. To this aim, the share of the adult population (25-64 years) in education and training in the past four weeks is used to summarise participation in ongoing learning. These data come from Eurostat (2018).[7] Moreover, the mean instruction hours spent by participant in education and training is used to measure the intensity of ongoing learning participation. These data are also from Eurostat (2016).[8]

Index section B: Institutions and policies for digital learning (40%)

This section focuses on institutions and policies in play to allow, stimulate and develop digital learning. It consists of two parts: expert's assessment and existing indicators. Given the lack of existing comparable and quantified data on the topic, this is where the index relies mostly on assessment by national experts. Such data has some inherent level of subjectivity; however, these are minimised by disaggregating the assessment into a number of specific questions and by asking them to provide both quantitative assessment (yes/no or a numerical rating) and descriptive information with links to documents to justify the assessment.

Specifically, the questions for experts contain a series of assessments generally phrased in the following way: "Is there evidence…" or "How do you evaluate…" These questions are phrased in such a way that the answer is converted into numeric answers. Moreover, to force experts to critically consider each answer, to allow the research team to cross-check quantitative assessments, and to aid the core research team in drafting the project report, each quantitative question is accompanied by an open-ended question asking for justifications, commentary and sources. Finally, the experts are asked a separate series of open-ended questions. These concern, for example, the most important actions, activities or barriers in the given area, together with links to sources of information. This further helps to identify best practices to be included in the report. The questionnaire for national experts is in the online Appendix.

Following these guidelines, experts are asked questions on the following subjects: institutions and policies; regulation and funding; and educators and schools as explained in the following.

Institutions and policies: National experts were asked a number of questions to assess the quality of institutions and policies relevant for digital learning. These included questions on the awareness of policy-makers on digital learning, the existence of policies and priorities on digital learning, and clear delegation of responsibilities in this area.

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[6] According to data from the Eurostat Labour Force Survey – Population by educational attainment level, sex and age (%) - main indicators, available here.

[7] According to data from the Eurostat Labour Force Survey – Participation rate in education and training (last 4 weeks) by sex and age, available here.

[8] According to data from the Eurostat Adult Education Survey – Mean instruction hours spent by participant in education and training by age, available here

Regulation and funding: National experts were asked a number of questions to better understand if regulatory and funding frameworks were harmful, neutral, or beneficial towards digital learning. Questions focused on curricula, funding, use of digital technology in the classroom, use of digital technology beyond the classroom, personnel rules, and outcome requirements. These questions were specifically asked for primary and secondary level, university and higher education level, and in adult/ongoing learning institutions.

Educators and schools: National experts were asked a number of questions on the skills of educators and availability of resources to educators in schools. These questions were specifically asked for primary and secondary level, university and higher education level, and in adult/ongoing learning institutions. This also considers the presence (or absence) of programmes supporting system-wide or school-wide change in digital learning.

Governance and implementation: This is a composite indicator on quality of governance institutions and policies (overall) from existing governance indices. Specifically, the governance indicators from the World Bank (2017) and the policy performance indicators from Bertelsmann Stiftung (2018) are used for this purpose.

Index section C: Availability and use of digital learning (30%)

This section measures the actual availability of and attitudes towards digital learning tools. These give insights into people's possibilities, behaviour and feelings concerning digital technology.

Attitudes towards digitalisation: To measure attitudes, a number of questions from a Eurobarometer study (2017)[9] were selected. These ask participants questions such as: *How do you think new digital technologies affect society? How do you think new digital technologies affect the economy? How do you think new digital technologies affect quality of life? How do you feel about robots and artificial intelligence?*

Accessibility of digital learning: To measure the availability and usage of digital means of learning, several components from OECD (PISA) data (2015) and Eurostat survey on ICT usage in households and by individuals (2015-2018) are combined into an average value:

- Level of internet access (% of households),
- Individuals using mobile devices to access the internet on the move (%of individuals aged 16- 74),
- Individuals using the internet for consulting wiki (% of individuals aged 16-74),
- Individuals using the internet for doing an online course (% of individuals aged 16-74),
- Individuals using the internet for looking for information about education, training or course offers (% of individuals aged 16-74),
- Individuals who have basic or above basic overall digital skills by sex (% of individuals aged 16-74).

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[9] Special Eurobarometer 460: Attitudes towards the impact of digitisation and automation on daily life, available here.

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INTRODUCTION

Thank you for agreeing to take part as country expert. The present survey is an integral part of a project undertaken by CEPS, the Centre for European Policy Studies, in collaboration with Google, to construct an Index of Readiness for Digital Lifelong Learning for the member states of the EU.

The purpose of the study is to **push for improvement in policies and change in attitudes with regard to use of digital technologies in lifelong learning**. Partial objectives of the project are to:

- Construct the Index of Readiness for Digital Lifelong Learning. The index would be constructed for European Union countries and published in late 2019, and potentially updated annually.
- Analyse current trends in digitalisation of learning in Europe and provide European-level and national-level policy recommendation for improvement.
- Publicise the results of the project.

Purpose of the Survey

The present survey is intended to provide the core research team with data on digital lifelong learning. While publicly available data form an important part of the index's construction, country-specific expertise is still required to assess each country, and fill in gaps where existing indicators are lacking.

Beyond providing quantitative data, the survey will provide a "**mini literature review**" for each country, which serves to explain quantitative ratings, identify best practices, and enrich the final report.

Definitions

To assure a common understanding among experts, we present the following definitions.

Lifelong learning: encompasses all learning activities undertaken throughout life with the aim of improving knowledge, skills and competences, within personal, civic, social or employment-related perspectives.

Digitisation: the conversion of analogue materials (e.g. text, pictures, or sound) into digital form that can be used by a computer.

Digitalisation: the broad transformations brought about by the widespread adoption of digital technologies (robotics, machine learning, sensors, virtual reality, etc.).

Digitalisation of learning: the broad process by which education undergoes transformation with the use of digital technologies.

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INSTRUCTIONS

- Before submitting your survey, please ensure **each question is filled out completely.**
  - The **explanation boxes are not optional**: rather, a necessary component for the research team to understand your justifications for answers.
  - Including a source (e.g. hyperlink or document) is not strictly required for each question. For example, if you have selected "No" due to a lack of evidence, it is not reasonable for us to require a source.
  - Still, **we expect most answers should include sources or hyperlinks**, to assure the maximum possible objectivity.
  - Note that both English and non-English documents and links are welcome.
- Please list relevant English citations in the following format:
  - European Commission (2017), "The title of the document", Brussels, available at fake-hyperlink.eu.
- Please list relevant non-English citations in the following format:
  - European Commission (2017), "Der Titel des dokuments" [The title of the document], Brussels, available at fake-hyperlink.eu.
- Extensive desk research is necessary to complete the survey, but we also **strongly encourage you to conduct field work**, such as informal phone interviews with stakeholders or other experts.
- After receiving your first draft (at latest on **19 May, 23:59**), the research team will review your survey, and may request clarifications or additional work before accepting your submission as final.
  - This feedback will be provided as soon as possible, but due to the number of surveys, may require a brief delay.
  - Upon receiving feedback, please implement any changes as soon as possible. The final version of all surveys must be accepted by **15 June**.
- In case of any questions or concerns, please contact Zachary Kilhoffer (zachary.kilhoffer@ceps.eu) and Manon Jacquot (manon.jacquot@ceps.eu), who will provide feedback in short order.

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SECTION 1: Institutions and Policies

* Please type the name of the country, for which you are completing this survey.

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QUESTION 1

On a scale of 1-5, please rate average awareness among senior policy-makers about the importance and potential of digitalisation of learning.

- *as evidenced by the issue being mentioned either in an official government policy document, or statements by ministers/senior leaders*

☐ (1) Not at all aware

☐ (2) Not so aware

☐ (3) Somewhat aware

☐ (4) Very aware

☐ (5) Extremely aware

Explanation:

Please cite any relevant publications or websites:

Please provide any documents relevant to this question:

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QUESTION 2

Is there a ministry and/or governmental organisation formally responsible for driving progress in this area?

- *as evidenced by a law, government decision or other official designation – even on the institution's website*

☐ Yes

☐ No

Explanation:

Please cite any relevant publications or websites:

Please provide any **documents** relevant to this question:

Only PDF, DOC, DOCX, PNG, JPG, JPEG, GIF files are supported, up to 16MB.

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QUESTION 3

Does the government have a policy on digitalisation of learning?

- *A policy is "a course or principle of action adopted or proposed by an organisation or individual". Policies are most often stated in official documents.*

☐ Yes

☐ No

Title of policy:

Explanation:

Please cite any relevant publications or websites:

Please provide any documents relevant to this question:

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QUESTION 4

Have official **priorities** been designated by government/ministry/other institutions with regard to digitalisation of learning?

- ☐ Yes
- ☐ No

List of priorities:

Explanation:

Please cite any relevant publications or websites:

Please provide any documents relevant to this question:

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QUESTION 5

Are the responsibilities for digitalisation of learning in different areas (primary and secondary education, higher education, adult education, etc.) explicitly and clearly allocated?

☐ Yes

☐ No

Explanation:

Please cite any relevant publications or websites:

Please provide any documents relevant to this question:

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QUESTION 6

Are there any digital self-assessment tools for citizens to assess, evaluate and compare their knowledge and skills?

☐ Yes

☐ No

Explanation:

Please cite any relevant publications or websites:

Please provide any **documents** relevant to this question:

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SECTION 2: Regulatory and Funding framework

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QUESTION 7

Is the regulatory framework for **primary and secondary education** harmful (-), neutral or beneficial (+) to digitalisation of learning?

Please check-off one of the three options for each category in the following table, providing a brief narrative explanation.

	Harmful (-)	Neutral	Beneficial (+)
Curriculum (*freedom to experiment with various approaches, specific allowances for digitalisation*)	○	○	○
Explanation:			
Funding (*availability of funding and/or autonomy to invest, or specific assistance schools may use to invest in digitalisation*)	○	○	○
Explanation:			
Use of digital technology in the classroom (*autonomy to use it and freedom to mix it with traditional instruction*)	○	○	○
Explanation:			
Use of digital technology beyond the classroom (*autonomy to use it and freedom to mix it with traditional instruction*)	○	○	○

	Harmful (-)	Neutral	Beneficial (+)

Explanation:

Personnel rules
(*ability to mix traditional staff with ad hoc staff/specialists, use of external providers, credential rules for classroom personnel*)

	Harmful (-)	Neutral	Beneficial (+)
	○	○	○

Explanation:

Outcome requirements
(*exams, majority exams, test requirements, entrance requirements, etc.*)

	Harmful (-)	Neutral	Beneficial (+)
	○	○	○

Explanation:

Overall assessment

	Harmful (-)	Neutral	Beneficial (+)
	○	○	○

Explanation:

Please cite any relevant publications or websites:

Please provide any documents relevant to this question:

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QUESTION 8

Is the regulatory framework for **universities and higher education institutions** harmful (-), neutral or beneficial (+) to digitalisation of learning?

Please check-off one of the three options for each category in the following table, providing a brief narrative explanation.

	Harmful (-)	Neutral	Beneficial (+)
Accreditation and regulatory equivalence (*e.g. do they treat digital learning - e.g. MOOCs - as equal to traditional delivery*)	○	○	○
Explanation:			
Funding (*funding availability, autonomy of universities and higher education institutions to invest in digitalisation, specific assistance to invest in digitalisation, incentives for learners/trainees to participate in digital education/training*)	○	○	○
Explanation:			
Use of digital technology in the learning process (*autonomy to use it and freedom to mix it with traditional instruction*)	○	○	○
Explanation:			

	Harmful (-)	Neutral	Beneficial (+)
Personnel rules (*ability to mix traditional staff with ad hoc staff/specialists, use of external providers, credential rules for classroom personnel*)	○	○	○

Explanation:

	Harmful (-)	Neutral	Beneficial (+)
Outcome requirements (*exams, majority exams, test requirements, entrance requirements, etc.*)	○	○	○

Explanation:

	Harmful (-)	Neutral	Beneficial (+)
Overall assessment	○	○	○

Explanation:

Please cite any relevant publications or websites:

Please provide any documents relevant to this question:

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QUESTION 9

Is the regulatory framework for **adult education** harmful (-), neutral or beneficial (+) to digitalisation of learning? Please check-off one of the three options for each category in the following table, providing a brief narrative explanation.

	Harmful (-)	Neutral	Beneficial (+)
Accreditation and regulatory equivalence (*do they treat digital learning - e.g. MOOCs - as equal to traditional delivery*)	○	○	○
Explanation:			
Funding (*funding availability, autonomy of training institutions to invest in digitalisation, specific assistance to invest in digitalisation, incentives for learners/trainees to participate in digital education/training*)	○	○	○
Explanation:			
Use of digital technology in training (*autonomy to use it and freedom to mix it with traditional instruction*)	○	○	○
Explanation:			
Personnel rules (*ability to mix traditional staff with ad hoc staff/specialists, use of external providers, credential rules for classroom personnel*)	○	○	○
Explanation:			
Outcome requirements (*exams, majority exams, test requirements, entrance requirements, etc.*)	○	○	○
Explanation:			
Overall assessment	○	○	○
Explanation:			

Please cite any relevant publications or websites:

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Please provide any documents relevant to this question:

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QUESTION 10

Please provide brief suggestions for up to **3 proven practices in digitalisation of learning** for your country.

Proven practice should be something that has already been proven – optimally by a formal evaluation, but at least backed up by substantial evidence. Proven practice can cover any of the following:

● **Holistic national strategy in the area of digitalisation of learning (or with substantial overlap)**

● **Specific national government program/policy that is part of digitalisation of learning**

● **Specific project by a government institution, corporation, social partners or NGOs**

● **Specific product/tool/app**

Proven practice 1	
Explanation:	
Proven practice 2	
Explanation:	
Proven practice 3	
Explanation:	

Please cite any relevant publications or websites:

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Please provide any documents relevant to this question:

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SECTION 3: Educators and Schools

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QUESTION 11

For **primary and secondary education**, how do you evaluate the **availability** - to teachers - of well-developed pedagogical approaches and materials utilising digitalisation in learning?

☐ **(1) No availability**

☐ **(2) Very limited availability (e.g. in the most elite schooling programmes)**

☐ **(3) Moderate availability**

☐ **(4) High availability (e.g. in all but a few schooling programmes)**

☐ **(5) Universal availability**

Explanation:

Please cite any relevant publications or websites:

Please provide any documents relevant to this question:

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QUESTION 12

How would you evaluate digital skills, and digital teaching competency, of educators in primary and secondary schools?

Please select from 1-5, with "1" meaning the worst possible, and "5" meaning the best possible.

1	2	3	4	5
○	○	○	○	○

Explanation:

Please provide any documents relevant to this question:

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QUESTION 13

11. How would you evaluate digital skills, and digital teaching competency, of university and higher education educators?

Please select from 1-5, with "1" meaning the worst possible, and "5" meaning the best possible.

1	2	3	4	5
◯	◯	◯	◯	◯

Explanation:

Please cite any relevant publications or websites:

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QUESTION 14

11. How would you evaluate digital skills, and digital teaching competency, of educators in adult learning programmes?

Please select from 1-5, with "1" meaning the worst possible, and "5" meaning the best possible.

1	2	3	4	5
○	○	○	○	○

Explanation:

Please cite any relevant publications or websites:

Please provide any documents relevant to this question:

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QUESTION 15

Are there programs to provide training/skills needed for educators to use digital resources?

	No	Yes
Primary and Secondary educators	○	○
Explanation:		
University and higher-education educators	○	○
Explanation:		
Adult education educators	○	○
Explanation:		

Please cite any relevant publications or websites:

Please provide any documents relevant to this question:

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QUESTION 16

Are there programs supporting system-wide/school-wide change in terms of digitalisation of learning?

☐ Yes

☐ No

Explanation:

Please cite any relevant publications or websites:

Please provide any documents relevant to this question:

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SECTION 4: Innovation

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QUESTION 17

Please provide examples of up to **3 interesting innovations in digitalisation of learning**. They can cover any of the areas mentioned with regard to proven practices, but do not have to be proven. Here we are looking for things that are too recent to be rigorously evaluated, but which the experts consider interesting or relevant.

Innovation 1

Explanation:

Innovation 2

Explanation:

Innovation 3

Explanation:

Please cite any relevant publications or websites:

Please provide any documents relevant to this question:

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QUESTION 18

To what extent are innovative practices and experimentation in education supported?

☐ (1) Not at all   ☐ (4) A lot

☐ (2) A little   ☐ (5) A great deal

☐ (3) A moderate amount

Explanation:

Please cite any relevant publications or websites:

Please provide any documents relevant to this question:

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QUESTION 19

Are there any research or pilot programmes to use blockchain, machine learning, or AI to track or evaluate skill shortages, training efficiency, and emerging technologies?

☐ No

☐ Yes

Explanation:

Please cite any relevant publications or websites:

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SECTION 5: Other

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QUESTION 20

To what extent have EU policy documents or other EU outputs had impact on national policy and/or discourse with regard to digitalisation of learning?

☐ (1) Not at all   ☐ (4) A lot

☐ (2) A little   ☐ (5) A great deal

☐ (3) A moderate amount

Explanation:

Please cite any relevant publications or websites:

Please provide any documents relevant to this question:

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QUESTION 21

Is/are there any national initiative/s assessing the national or sectoral progress on digitalisation of learning?

☐ Yes

☐ No

Explanation:

Please cite any relevant publications or websites:

Please provide any documents relevant to this question:

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QUESTION 22

Please indicate how you answered the questionnaire.

	Yes	No
Desk research (e.g. peer-reviewed studies, grey literature, popular media outlets) Please explain:	○	○
Field work (e.g. conversations with stakeholders or other experts, attending a conference, etc.) Please explain:	○	○
Other Please explain:	○	○