D5.2 A PROTOCOL FOR QUALITY ASSURANCE TO INFORM THE ACCREDITATION PROCESS

Project acronym: OTTER

Project title: Outdoor Science Education for a Sustainable Future

Call: H2020-SwafS-2018-2020

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List of Acronyms

D#	Deliverable
EOC	Education Outside the Classroom
H&S	Health & Safety
OTTER	Outdoor Science Education for a Sustainable Future
P	Parameter
QA	Quality Assurance
QAG	Quality Assurance Guidelines
QAP	Quality Assurance Protocol
R&D	Research & Development
SDGs	Sustainable Development Goals
SMART	Specific, Measurable, Attainable, Relevant, Time Bounded
STEAM	Science, Technology, Engineering, Arts, Mathematics
WP#	Work Package

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Project Consortium

Geonardo Environmental Technologies
(GEO)

European Science Foundation
(ESF)

University of Groningen
(RUG)

University of Limerick
(UL)

Learning Scoop - oppimisen osuuskunta
(LS)

The Big Van Theory
(TBVT)

Centre for the Advancement of Research & Development in Educational Technology
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The OTTER Project

OTTER is a H2020-funded project aiming to enhance the understanding of methods and pedagogies surrounding Education Outside the Classroom (EOC) and how those effectively support the acquisition of scientific knowledge and transferable skills in students, specifically in the field of environmental sustainability and the reduction of plastic waste. It strives to increase interest in scientific topics among young people while contributing to a range of innovative educational projects, further establishing scientific citizenship within the EU.

Moreover, OTTER aims to strengthen education outside-the-classroom (EOC) networks within Europe, connecting experts from four different regions within the continent (Finland, Hungary, Ireland and Spain). The strengthened networks will be utilised to carry out a programme of EOC pilot schemes, further analysing their impact on student performance, including their levels of sophisticated consumption and scientific citizenship, ultimately building a clearer understanding of the effects of Education Outside the Classroom (EOC) on EU citizens. The pilot schemes will share a common theme revolving around issues of plastic waste and recycling, building on the existing momentum of joined efforts focusing on tackling related global educational, social, and environmental issues, as well as the need for sophisticated consumers.

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1 Introduction

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1.1 Purpose & Rationale

While Education Outside the Classroom (EOC) constitutes an invaluable medium of diverse and experiential learning opportunities for students, the development and implementation of a robust Quality Assurance Protocol (QAP) is imperative, primarily serving as a mechanism and a process for further improving and advancing the quality of its pursued outcomes.

Importantly, the establishment of such a framework in the broader context of the OTTER project is not only relevant, but indispensable in laying the groundwork for conceptualising Task 5.5, Guidelines of Accreditation for EOC. As such, the proposed content of this QAP aspires to lay the dialectic ingredients facilitating the formulation of respected EOC systems of accreditation. Achieving such a monumental task on a European level adheres to the dual objective of OTTER's Work Package (WP) 5:

a) to facilitate the creation of both conditions and preconditions, allowing for the gradual integration and establishment of education outside the classroom as an integral element of the formal education systems of European states, and,

b) to provide the tools and means to non-formal education EOC providers, allowing them to elevate the status, credibility and quality of the learning opportunities they provide to their respective audiences through continuous enrichment and refinement of their educational capacity.

The present QAP is in fine dialogue with OTTER's preceding work and deliverables, acting as a linchpin between the established understanding and know-how already generated throughout OTTER's lifespan to this day and the work which is to proceed. Having this in mind, we sought to generate the relevant Quality Assurance extrapolations by drawing and further analysing the interconnections between and among the following:

- **D2.1 - Literature Review and Compendium of Successful Practice**
- **D3.3 - Guidelines to Develop OTTER Lab**
- **D4.1 - Monitoring and Evaluation Framework**
- **D4.3 - Methodologies for Monitoring and Evaluating Students' Scientific Knowledge and 21st Century Skills**
- **D5.1 - EOC Accreditation in Europe - A Mapping Study**

The resulting QAP outlines guidelines, quality indicators and self-assessment rubrics for effective use by EOC practitioners and EOC providers willing to design and implement EOC activities and programmes adhering to the OTTER methodological framework are the outcome of the aforementioned analysis and emerging interlinks.

1.2 Key Objectives

The key objectives of the present QAP are identified as follows:

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- To provide detailed Quality Assurance Guidelines, Indicators and Rubrics to Teachers and EOC Educators to effectively devise and implement EOC Activities adhering to the OTTER Methodology.

- To provide detailed Quality Assurance Guidelines, Indicators and Rubrics governing the effective training, support, and ongoing professional development of educators pursuing to implement EOC Activities adhering to the OTTER Methodology.

- To provide detailed Quality Assurance Guidelines, indicators, and rubrics governing the administrative and organisational capacity of EOC providers offering educational services and opportunities that adhere to the OTTER Methodology.

1.3 Target Audience

The proposed QAP seeks to address and empower various key actors, elucidating their potential roles and prospective contributions in further elevating the status of EOC while refining its practice. For the scope and purpose of this deliverable, we identify those as follows:

Teachers & EOC Educators: Practitioners across all educational levels working both within the context of formal and non-formal education settings pursuing to either conceptualise, develop and/or implement EOC activities utilising the fundamental principles of OTTER Methodology.

EOC Programme Providers: An array of public or private institutions and entities fostering EOC learning seeking to enhance and optimise their capacity to deliver meaningful and high-quality learning experiences to their targeted audiences while ensuring consistency, credibility, safety, and continuous improvement of their services.

Policymakers & Accreditation Stakeholders: Public or private accreditation bodies and entities intending or actively pursuing to inform their endeavours in formulating EOC accreditation systems aiming to foster a culture of innovation and continuous improvement within the field.

1.4 Limitations

While pursuing the development of a QAP that can ensure the effectiveness and sustainability of outdoor learning initiatives, it is crucial to acknowledge the dynamic and complex nature of such a process. Having closely reviewed critical data collected during the pilot implementations of the OTTER

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Labs, we have identified and extrapolated various inherent limitations associated with implementing a QAP in this context. These are listed below as follows:

Diversity of Learning Environments:

EOC activities unfold in a wide range of natural and cultural settings, each presenting unique challenges and opportunities. The diversity of these environments can make it challenging to establish standardised quality assurance protocols applicable across all contexts - something which falls beyond the scope of this QAP.

Measuring attainment of 21st-century life skills:

The outcomes of EOC experiences are often diverse, encompassing the development of an array of 21st-century life skills (Creativity and Innovation, Critical Thinking, Communication, Collaboration, Personal and Social Responsibility)). Measuring these outcomes in a standardised manner is inherently challenging. The proposed QAP, in its current form, depends on proceeding deliverables (namely D5.4) to demonstrate the effectiveness of EOC in that regard.

Diverse Professional Ecosystems:

Ensuring educators are adequately prepared to deliver high-quality EOC experiences is a critical QA aspect captured in this protocol. Nevertheless, considering the ground realities and considerable variations across professional ecosystems of European states, it is highly probable that various QA recommendations are non-applicable to certain contexts. This may be rooted in limitations related to the lack of necessary support and guidance towards teachers and educators, highly inflexible educational systems and a lack of specialised training opportunities. These hindrances can impede the successful implementation of our propositions tailored for educators in outdoor learning environments.

EOC's Interdisciplinary Collaborations:

EOC often involves collaboration between educators, outdoor learning providers, and accreditation stakeholders from diverse fields. Coordinating efforts and communication among these stakeholders with varying expertise and perspectives can be challenging. Establishing indicators for ensuring a shared understanding of quality assurance standards and procedures across interdisciplinary teams, although valuable, is something to consider moving forward for QAP.

Continually Evolving Educational Policies:

Educational policies, both on a European as well as on a national level, are by default subject to continuous change and reform. Incorporating EOC into formal education might prove challenging in some countries, considering that various elements presented in the QAP might demonstrate a lower degree of adaptability to policy changes. At the same time, it is important to acknowledge the existence of less rigid educational systems, such as in Finland, where EOC is already embedded and well-established, serving as an example of good practice, suggestive of the necessary reforms and changes to be pursued on a broader systemic level.

Assessment Validity and Reliability:

Measuring the success of EOC activities requires valid and reliable assessment tools. However, developing assessments that accurately capture the multifaceted outcomes of outdoor learning can be intricate. Ensuring the validity and reliability of assessments while accommodating the diverse nature of EOC experiences requires more elaborate tools and processes and further research in the field.

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In light of these limitations, it is imperative for stakeholders involved in EOC and the prospective development of EOC accreditation systems to approach this particular QAP with a reflective and adaptive mindset. Continuous collaboration, research, and feedback loops will be instrumental in refining guidelines to address these challenges and enhance the overall quality of EOC.

1.5 Glossary of Terms

21st-century Skills	A set of 12 abilities deemed essential in navigating students during the Information Age - these being: Critical Thinking & Problem Solving, Creativity & Innovation, Communication, Collaboration, Information Literacy, Media Literacy, ICT Literacy, Flexibility & Adaptability, Initiative & Self-direction, Social & Cross-cultural interaction, Productivity & Accountability, Leadership & Responsibility.
Citizen Science	Research conducted with participation from the general public, or amateur/non-professional researchers or participants for science, social science and many other disciplines.
Education Outside of the Classroom (EOC)	EOC is characterised by curriculum-based educational activities practised outside the school buildings, in natural (e.g., a park or forest) or cultural (e.g., a museum or library) settings.
EOC Educator	A trained educator engaging or specialising in Education Outside the Classroom activities or programmes either through design or implementation working within non-formal education settings.
EOC Learning Guide	Practitioners with field-specific knowledge lacking substantial educational training and background knowledge yet serving at a given site or setting which can potentially constitute an EOC location of choice.
EOC Practitioners	An overarching term used for the purpose of this Quality Assurance Protocol to describe teachers, Education Outside the Classroom (EOC) Educators, and EOC Learning Guides.
EOC Provider	Any entity or institution pursuing to offer Education Outside the Classroom Learning Experiences
Intellectual Capital	An EOC practitioner's intellectual capital refers to any pre-existing knowledge, skills and competencies he or she possesses.
OTTER Lab	An educational hands-on activity aiming to promote sustainable development through education outside the classroom, adopting student-centred pedagogical approaches which may or may not be directly linked to an established curriculum.

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Quality	The fitness to the purpose of a given activity, product or service according to a set of required standards.
Quality Assurance	Quality Assurance describes the systematic efforts taken to ensure that a given (educational) product or service is designed and delivered to end-users (students), adhering to a set of predefined quality standards and expectations.
Quality Standards	The core elements of a Quality Assurance Protocol outline the required level of quality. They describe the expected or required minimum level of quality that ought to be attained. Quality standards aim to guarantee that EOC activities effectively contribute to student learning.
Self-Assessment	Self-assessment constitutes a facet of a performance review which offers learners, teachers and educational providers the opportunity to self-reflect, identifying their strengths and limitations, subsequently leading to personal, professional or institutional growth through action.
Standards	Measurable criteria that provide the basis for forming judgments concerning the performance of a learning-related event.
Teacher	A teaching practitioner working at any level of education within the context of formal education - that being a preschool, primary, secondary or university teacher.
Youth Initiative	A youth initiative is a student-led activity enabling learners to influence their own environment and social settings by empowering them as active agents of their own learning and actions.

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2 Introduction to Quality Assurance Principles

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2.1 Rationale of Quality Assurance in Education

The benefits and importance of focusing on quality assurance systems in the educational sector are clear. Strong quality assurance systems that are based on transparency and trust can support the development and maintenance of high-quality education for all students, promote better inclusive practices, and facilitate student mobility (European Commission, 2023).

In this context, quality assurance has been defined as involving the "systematic review of educational provision to maintain and improve its quality, equity and efficiency" (European Commission, 2023); therefore, for quality assurance frameworks to successfully maintain and enhance educational programming and processes, they require a systematic evaluation.

Design and Implementation of Quality Assurance Principles

The Commission proposes eight guiding principles regarding quality assurance in education, with the overarching understanding that to enhance quality, equity, and efficiency, improvement but also innovation must be taken into account (Looney & Grainger Clemson, 2018). Additionally, it is important to understand that flexibility is required and modifications are required to accommodate feedback and decision-making requirements across systems better.

Coherence	Systems should strive over time to achieve balance and coherence across different mechanisms that have been developed to meet the demands and expectations of stakeholders working within schools and in the wider school education system
Professional Learning Communities	Quality assurance policies should support professional learning communities to make the best use of quality assurance data for school and system development with the ultimate goal of ensuring the best learning opportunities for all learners
Trust And Shared Accountability	Trust and respect between and among internal and external actors are fundamental for effective evaluation and school development
Support Innovation	School leaders and teachers need opportunities to take considered risks in order to innovate and develop. Careful attention to data on the impact of innovations, including potential unintended outcomes, is essential
Shared Understanding And Dialogue	Quality assurance approaches should support the development of a common language and shared understanding among internal and external actors that the fundamental purpose of evaluation is to support school development
Networks	Networks between schools and with local and broader communities can support collective engagement, build social

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	and intellectual capital and spark new synergies across school systems
Building Capacity For Data	Investments in building the capacity of key actors to generate, interpret and use data are crucial
Different Data For Balanced View	Different types of data - both quantitative and qualitative, and gathered over time - are necessary for a balanced understanding of school development and learner progress. These data should communicate authentic narratives of schools and provide the information necessary to support decision-making both within schools and across school systems

Table 1: EU eight guiding principles regarding quality assurance

2.2 Rationale in Quality Assurance in EOC & Science Education

High-Quality Science Education

There have been multiple attempts by several national agencies, including the National Research Council, the United States Department of Education, and the National Science Foundation, to identify characteristics of high-impact STEM programs (U.S. Department of Education, 2007; What Works Clearinghouse, 2008; National Research Council, 2011, 2013).

Science Education Quality Measurement

Researchers propose different ways to evaluate the quality of scientific learning activities. According to Xanthoudaki (2012), quality science education embraces continuous quality improvement at every level and calls out to organisations in charge of administering science education to take measures to improve at every level, engage and consult with a broad range of stakeholders and empower the use of new forms of pedagogy into their practice.

Achievement as a factor

There are multiple factors that focus on different elements and stages of learning in the search for quality assurance in science education; international large-scale assessments, like PISA and TIMSS, however, focus specifically on student achievement (Kyriakides et al., 2014).

EOC Activity Quality Measures

In a review of the literature on EOC outcomes regarding the design of activities and their connection with outcomes for EOC activities, certain common elements have been identified, with the exception of budget restrictions (Institute for Learning Innovation, 2007; U.S. Department of Education, 2007; National Research Council, 2009, 2015).

- goals, content and concept evaluation
- relevance to everyday challenges

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- team organisation and inclusion
- schedule

Furthermore, In *D5.1 EOC accreditation in Europe: a mapping study,* the project defined several accreditation indicators that are relevant and useful in the process of defining quality assurance indicators. They are:

- degree with which EOC programs are aligned with specific curriculum standards,
- clearly defined learning outcomes,
- assessment processes to verify learning outcomes,
- quality and experience of EOC providers,
- qualifications of staff designing and implementing the activities
- alignment with age level, school needs, and processes.

2.3 Metrics and Quality Indicators

There is significant variation in frameworks examining quality spanning school, district, country and beyond, each system designed to meet the respective unique needs. Depending on the type of organisation, its size and its scope, there is also a variety of quality indicators and end metrics for measuring quality.

The European Union, for example, through its agenda and strategic framework, has developed specific metrics and performance indicators to ensure they are meeting them (European Education Area, 2023, European Commission, Directorate-General for Education, Youth, Sport and Culture, 2023). They are broad in scope and focus on EU-level targets. Examples of indicators include early childhood and care, early school leaving, basic skills, digital skills, Work-based learning in vocational education and training, tertiary education attainment and adult education.

UNESCO also has its own set of global education quality indicators focused on the following dimensions: (UNESCO, 2004).

- **Learner Characteristics:** including learner aptitude, perseverance, readiness for school, prior knowledge, barriers to learning, and demographic variables.
- **Context:** including public resources for education, parental support, national standards, labour market demands, socio-cultural and religious factors, peer effects, and time available for schooling and homework.
- **Enabling Inputs:** including teaching and learning materials, physical infrastructure and facilities, and human resources.
- **Teaching and Learning:** including learning time, teaching methods, assessment, and class size.
- **Outcomes:** including skills in literacy and numeracy, values, and life skills.

  (UNESCO, 2004:36)

Preliminary research indicates that the significant variation in metric and quality indicator frameworks makes it difficult to summarise essential indicators that can generally be applied not just in education

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settings like schools but also for the purposes of this project, EOC activities like OTTER lab. Given the specific purposes and outcomes of the project itself, indicator development will depend on the specific goals and objectives of the project itself, informed by and developed in the following chapter.

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3 EOC & OTTER Methodology Implementations

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3.1 Fundamental Principles of the OTTER Methodology

OTTER Methodology constitutes a system of practices and procedures that teachers, educators, mentors, and learning guides alike can employ in their students' learning journeys. The design outcome of the methodological framework itself is the OTTER Labs, best described as student-centred, hands-on activities aiming to promote Sustainable Development (SD) through Education Outside the Classroom (EOC).

In further analysing the contents of **D3.1 - Methodological protocol to generate transformative EOC activities designed for specific age groups**, as well as **D3.3 - Guidelines to Develop an Outdoor Lab**, we provide a brief overview of those fundamental principles and elemental aspects we have taken into consideration in developing a Quality Assurance Protocol tailored to serve best the needs of EOC providers, instructional designers, teachers and educators alike.

The principal characteristics of OTTER Methodology falling within the scope of our interest and analysis are summarised in *Table 2.*

A summative overview of the principal characteristics of the OTTER Methodology		
1	**Theoretical Foundations**	• OTTER Methodology evidently draws its theoretical foundations from the Social Constructivism Learning Theory, emphasising the collaborative nature of learning. • Knowledge is constructed and further developed on the basis of interpersonal interactions and enculturation and through social participation and social contexts of learning. • Similarly, learning is perceived as an active process through which learners rely on their social environment to construct their own knowledge and reality through others. • Touches upon learners' own activity, motivation, participation, collaborative learning reflections, connections, and prior knowledge
2	**Underlying Pedagogical Principles**	**The OTTER Methodology incorporates elements and traits of the following instructional/pedagogical approaches:** • Project-based Learning • Collaborative-Learning • Hands-on Learning • Experiential Learning • Student-centred Approaches • Inquiry-Based Learning

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3	**Goals & Pursued Learning Outcomes**	**OTTER Methodology pursues to fulfil the following goals:** ● To support the acquiring of scientific knowledge and the development of transferable skills in the fields of environmental sustainability and global environmental challenges. ● To offer meaningful outdoor learning experiences, ultimately leading to the development of an educational Youth Initiative tightly connected to STEAM subjects. ● To facilitate the development of students' 21st-century skills. ● To promote citizenship competencies and encourage intellectual curiosity.
4	**Dominant Learning Environment**	**Education Outside the Classroom (EOC)** ● Learning, teaching and educational activities are linked to environments outside the confined boundaries of classrooms - in natural, cultural, and scientific settings (e.g. parks, forests, museums, libraries, science centres, etc.). Such authentic learning environments help students construct tangible visual and mental representations of surrounding life phenomena.
5	**Curricular Architecture & Design**	**OTTER's curricular architecture consists of a cycle of consecutive spiral phases/steps:** ● Preparation ● Orientation ● Discovery ● Impact ● Reflection Peer collaboration, and student-centred approaches are core elements characterising all five steps. The core activities of each of the phases/steps are best visualised in Figure 1.
6	**Student's /Learner's Role**	● Students/learners are encouraged to collaborate closely with their peers, to share their perceptions and preconceptions, and to engage within the framework of distributed expertise and interactive learning. Their prior knowledge is taken into serious

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		consideration, serving as an integral part of the design and content of a given OTTER implementation. ● Effectively, the pursuit of Youth Initiatives allows students to participate and actively engage in decision-making processes influencing and impacting their social surroundings through investigation and contemplation. Importantly, the OTTER framework allows students to serve as active agents of their own learning and actions.
7	**Teacher's Role**	● In the context of the OTTER Methodology, teachers and EOC educators undertake a facilitating role, aiming to support and nurture students' development and learning. They actively pursue fostering social interactions, building on student interests while integrating everyday experiences into outdoor learning. In their students' consciousness, they register as agents of change and ambassadors of sustainable development.
8	**Community Involvement**	● OTTER Methodology principally promotes and encourages ● active citizenship, ● scientific citizenship, ● civic engagement, ● civic participation. As such, it seeks to draw connections, build bridges and secure collaborations with the local community and various stakeholders through the development of Youth Initiatives. These student-led activities enable students to influence their own environment and social settings.
9	**Adaptability & Flexibility**	**Methodological elements which have been identified to exhibit a relative degree of flexibility and adaptability:** ● Adaptable and applicable to a wide age range covering the 6 to 18 age bracket. ● Provides the opportunity and the flexibility to teachers to decide upon the content and methods they wish to employ in the outdoor learning experiences they design. ● Highly adaptable to and a ready-made educational outdoor activity model suited for different classes and courses.

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		• Highly suitable and supportive of STEAM education, activities and projects. • Allows the freedom of choosing a location or setting best suited to the learning objectives of a given activity or project. • Suitability of the OTTER Methodology to be employed within, used with and linked to any national/local curriculum.

Table 2. Fundamental Principles of the OTTER Methodology

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Figure 1. OTTER Lab Cycle Process

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3.2 Introduction to the components of Quality Assurance Rubric for OTTER Lab Activities

Effective planning and comprehensive design of EOC activities are critical to the quality of an outdoor learning experience. Moreover, the particularities ascribed to the OTTER Methodology and the emerging opportunities for in-depth and transformative student learning require respective mechanisms of support and guidance. For this purpose, having closely analysed the OTTER Methodological framework, surfacing both the pedagogical and procedural requirements for its effective application, we have extrapolated relevant indicators that fit the purpose. These are presented in Table 3. Quality Indicators for planning and implementing EOC activities adhering to the OTTER Methodology.

The preferred order of the areas of pedagogical competence and effective implementation of a given learning procedure - adheres to the OTTER Lab Cycle Process: **PREPARE**, **ORIENTATE**, **DISCOVER**, **MAKE AN IMPACT** and **REFLECT**. The respective indicators allowed for the development of **Rubric A: Quality Assurance Rubric for Designing & Implementation of EOC Activities adhering to the OTTER Methodology** - structured on a three-level Likert scale in ascending order of attainment of the level of knowledge, skill, or result: Developing, Intermediate, and Advanced. For each quality indicator and level of attainment, a relevant description is provided, aiming to guide the reader on the respective evaluation criteria.

We highly encourage EOC practitioners (teachers, EOC educators and Learning Guides) to utilise Rubric A as a formative assessment tool throughout all phases of development and deployment of their EOC activities. Most importantly, though, the Rubric itself indirectly constitutes a map of prospective opportunities for professional development both for individuals as well as for communities of practice. Its usefulness and value, though, will depend on the willingness of practitioners to inform and reform their practice.

It is important to underline that any effort towards informing one's EOC knowledge and teaching practice is best fostered in supportive environments where know-how, best practices and constructive feedback are all shared and welcomed, respectively, in the spirit of collegiality and a shared vision. It is of greater value for one to strive to create an EOC movement rather than an EOC moment. The former constitutes a sustained and collaborative commitment to enhancing education, whereas the latter is a mere lone practice destined to fade over time.

Areas of interest	Quality Indicators
A1. Broad Aims	• **A0.1 - Sustainable Development Goals** • **A0.2 - 21st-Century Skills** • **A0.3 - Inclusion and Diversity**

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A2. Step 1: Prepare	• **A1.1 - Objectives** • **A1.1.1 - Objective connections** • **A1.1.2 - Age-Appropriate** • **A1.2 - EOC Activity alignment** • **A1.3 - Assessment for and of Learning**
A3. Step 2: Orientate	• **A2.1. - Pedagogical Approach** • **A2.2 - Student awareness** • **A2.3 - Prior Knowledge** • **A2.4 - EOC Relevance** • **A2.5 - Learning Tasks**
A4. Step 3: Discover	• **A3.1 - Peer Engagement** • **A3.2 - Evidence generation**
A5. Step 4: Make an impact	• **A4.1 - Data Analysis** • **A4.2 - Youth Initiative Design**
A6. Step 5: Reflect	• **A5.1 - Reflection**
A7. Step 6: Health & Safety - Risk Assessment - Emergency Mitigation	• **A6.1 - Location** • **A6.2 - Student** • **A6.3 - Transportation** • **A6.4 - Emergency Plan** • **A6.5 - Determination of national, regional, contextual specificities & particularities relevant to Rubric's A thematic coverage**

Table 3. Quality Indicators for the planning and implementing EOC activities adhering to the OTTER Methodology

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3.3 Rubric A: Quality Assurance Rubric for Designing & Implementing EOC Activities adhering to the OTTER Methodology

Rubric A: Quality Assurance Rubric for Designing & Implementing EOC Activities adhering to the OTTER Methodology	
Target User:	Teachers, Educators, Instructional Designers, Curriculum Developers, Educational Supervisors, Institutional EOC Providers
Function:	Evaluation, Assessment, Self-Assessment, Development
Purpose:	Assessing an EOC activity's quality and degree of adherence to the OTTER Methodology.
Application Timeframe:	Prior to designing and delivering EOC activities and for ongoing use.

Rubric A: Quality Assurance Rubric for Designing & Implementing EOC Activities adhering to the OTTER Methodology			
Quality Indicator	**Developing**	**Intermediate**	**Advanced**
A1. Broad Aims			
A0.1 - Sustainable Development Goals: GOAL 6: Clean Water and Sanitation GOAL 11: Sustainable Cities and Communities GOAL 12: Responsible Consumption and Production GOAL 13: Climate Action GOAL 14: Life Below Water GOAL 15: Life on Land	Does not include or vaguely relates to Sustainable Development Goals (SDGs) while designing the objectives of the OTTER Lab.	Takes the specific SDGs into account when designing the objectives for the OTTER Lab.	Effectively and creatively designs the OTTER Lab's learning objectives, focusing on more than the specific SDGs.

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Rubric A: Quality Assurance Rubric for Designing & Implementing EOC Activities adhering to the OTTER Methodology				
	Quality Indicator	**Developing**	**Intermediate**	**Advanced**
	A0.2 - 21st-Century Skills *Creativity and innovation, Critical thinking, Problem-Solving, Decision-Making and Learning to Learn, Metacognition, Communication, Collaboration, Information Literacy, ICT literacy, Scientific Literacy, Citizenship – Local & Global, Life & Career Skills, Personal and Social Responsibility*	Does not consider (or vaguely includes) the connection and development of 21st-century skills through the OTTER Lab's design.	Takes into consideration and pursues to develop 21st-century skills in a meaningful way through the OTTER Lab's design.	Designs an OTTER Lab pursuing to enhance and develop specific 21st-century skills in a meaningful way.
	A0.3 - Inclusion and Diversity *Interacting Considerately, Creating Awareness, Acting with Respect on aspects pertaining to social inclusion, gender identity, gender + inclusivity, cultural awareness and diversity.*	Does not consider respectful interactions nor take into consideration gender-related differences in outdoor and nature-based learning,; is not proactively inclusive towards Gender + and does not address gender identity, issues pertaining to ethnicity, nationality and socio-economic backgrounds while designing and delivering OTTER labs.	Aware and considerate in managing respectful interactions, partially taking into consideration gender-related differences in outdoor and nature-based learning, Gender + inclusivity, gender identity, as well as issues pertaining to ethnicity, nationality and socio-economic backgrounds while designing and delivering OTTER labs.	Proactive in fostering respectful interactions, raising awareness among students on gender-related differences in outdoor and nature-based learning, Gender + inclusive, and proactive in providing opportunities for raising awareness on issues of social and cultural inclusion while designing and delivering OTTER labs - allowing for students to express and share their perspectives and experiences.

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Rubric A: Quality Assurance Rubric for Designing & Implementing EOC Activities adhering to the OTTER Methodology				
	Quality Indicator	**Developing**	**Intermediate**	**Advanced**
	A2. Step 1: Prepare			
	Pre- conditions ● Lab has a duration of a minimum of 6 hours. ● Includes at least four different sessions. ● Requires a suitable learning environment outside of the classroom and is pre-arranged.			
	A1.1 - Objectives *Clarity and quality of learning objectives.* *The extent of the connection to the broad aims (SDGs, 21st-century skills & inclusion and diversity).*	Learning objectives are broad or too vague and do not connect to specific skills, knowledge or attitudes.	Learning objectives are clear and mostly connected to specific knowledge, skills or attitudes students should gain from the Lab.	Learning objectives are clear and connected to specific knowledge, skills or attitudes students will gain from the Lab.
	A1.1.1 - Objective connections *Connections with curriculum and real-world environmental problems which require a collaborative multidisciplinary approach in order to be addressed.*	Shows minimal or no alignment between the learning objectives and the local curriculum and does not tackle real-world environmental issues. Does take into consideration thematically relevant topics during planning.	Objectives are connected with local curricula and address real-world problems whilst also touching upon some relevant sub-topics.	Objectives connect with local curricula and address real-world problems while touching on relevant sub-topics. Educators sought collegial support and collaboratively designed the OTTER Lab.
	A1.1.2 - Age-Appropriate *EOC* activity *learning experiences provide age-appropriate and relevant opportunities to accelerate and challenge learners based on the four levels.*	The design of the OTTER Lab did not differentiate learning objectives and activity design based on age grouping.	The design of the OTTER Lab followed age group differentiation and followed example guides as resources.	The design of the OTTER Lab followed age group differentiation, and independent research was conducted on further best practices for differentiating instruction for different age

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Rubric A: Quality Assurance Rubric for Designing & Implementing EOC Activities adhering to the OTTER Methodology				
	Quality Indicator	**Developing**	**Intermediate**	**Advanced**
				groups.
	A1.2 - EOC Activity alignment *Extent of alignment of activity and location with learning objectives. Students are involved in the process.*	The activities demonstrate poor alignment with the learning objectives and lack thorough consideration of feasible and suitable locations for implementation. Students were not involved in any stage of the decision-making process.	The activities show clear alignment with learning objectives as well as alignment with the chosen location for implementation. Students were involved in some decision-making.	The activities and location are aligned with learning objectives, having made thoughtful and considerate choices of location while engaging location stakeholders in the overall design process. Students were actively involved in decision-making
	A1.3 - Assessment for and of Learning *Consideration of assessment for and of student learning throughout the design process*	The design of the OTTER Lab lacks an assessment approach to student learning.	Some consideration of assessment approaches (mostly summative) in the design of the OTTER Lab (mostly pre and/or post).	A variety of rich and differentiated assessment approaches (formative and summative) are embedded throughout the design of OTTER Labs.
	A3. Step 2: Orientate			
	A2.1. Pedagogical Approach *Help students feel and understand the importance of the topic. EOC activity learning experiences are engaging and inspire creativity and imagination.*	Relies solely on traditional teaching methods and lacks active teaching and learning approaches resulting in a minimal demonstration of the topic's relevance and limited impact on intrinsic motivation.	Utilises various active teaching and learning methods and resources, effectively demonstrating the topic's relevance while moderately enhancing students' understanding and intrinsic motivation.	Skillfully employs various engaging and student-centred teaching and learning methods and resources to effectively highlight the topic's significance while boosting intrinsic motivation among students.

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Rubric A: Quality Assurance Rubric for Designing & Implementing EOC Activities adhering to the OTTER Methodology				
	Quality Indicator	**Developing**	**Intermediate**	**Advanced**
	A2.2 - Student awareness *Comprehensively informs students about the EOC activity and the learning process.*	Limited or no information is provided to students prior to the implementation of the OTTER Lab.	Informs students about the activity; little input from students considered.	Comprehensively informs students about the activity and all the steps and/or actively involves students during the design stage.
	A2.3 - Prior Knowledge *Students map any prior knowledge that they have had about the topic.*	Students go into the activity without much discussion or evaluation of previous knowledge.	Students are engaged in prior knowledge mapping exercises.	Students are actively engaged in activities that map their prior knowledge; they collaborate with their peers, evaluating their knowledge critically.
	A2.4 - EOC Relevance *Gather relevant information.*	Students go into the activity without gathering any relevant information on the EOC activity.	Students gather relevant information utilising various resources on the EOC activity.	Students and educators are engaged in gathering relevant information and connecting the concepts with the EOC activity.
	A2.5 - Learning Tasks *Encourage students to set, propose and design learning tasks for the EOC activity.*	Students do not engage in the setting of learning tasks.	Students are generally engaged in preparing the learning tasks either independently or in groups.	Students are actively engaged in preparing the learning tasks and planning how they will tackle these tasks during the EOC, either independently or in groups.
	A4. Step 3: Discover			
	A3.1 - Peer Engagement *Get students engaged in real-life activities.*	Students do not engage in any peer group work.	Students engage somewhat in peer collaboration in pairs or small groups.	Students engage in peer collaboration in pairs or small groups for different tasks and with different groups.

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Rubric A: Quality Assurance Rubric for Designing & Implementing EOC Activities adhering to the OTTER Methodology				
	Quality Indicator	**Developing**	**Intermediate**	**Advanced**
	A3.2 - Evidence generation *Provide students with opportunities to observe and gather evidence.*	Students do not engage in any gathering of evidence or engage in minimal observational practices but not first-hand.	Students are supported in first hand evidence generation like observations, notes, photos/videos with teacher guidance.	Students engage in first hand evidence generation through observations, notes, photos/videos with minimal teacher interference.
	A5. Step 4: Make an impact			
	A4.1 - Data Analysis *Students analyse the collected data and share new information through various methods.*	Students perform basic data analysis, utilising minimal sharing methods with limited summarisation of their findings, resulting in surface-level understanding.	Students engage in moderate data analysis, utilising various sharing methods, summarising their findings to some extent, and showcasing a reasonable grasp of the collected information.	Students conduct thorough data analysis, employing diverse sharing methods to effectively summarise their findings, showcasing a deep understanding of the collected data and its implications.
	A4.2 - Youth Initiative Design *Design a youth initiative proposal*	Students' YI design provides minimal creativity ideation, lacks diverse exploration of solutions, and offers limited consideration of implementation levels, resulting in shallow proposals.	Students' YI design offers moderate creativity, explores varied solutions, and discusses potential impact levels (e.g., classroom, school, community), demonstrating a reasonable depth in proposal development.	Students YI design facilitates extensive idea exploration and encourages diverse solution proposals with considerations for impact across different levels (e.g., classroom, school, community, societal), fostering detailed and innovative plans for implementation.
	A6. Step 5: Reflect			
	A5.1 - Reflection	Tasks are designed so students	Tasks are designed so that	Tasks are designed so that

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Rubric A: Quality Assurance Rubric for Designing & Implementing EOC Activities adhering to the OTTER Methodology				
	Quality Indicator	**Developing**	**Intermediate**	**Advanced**
	Reflect on the learning process.	engage in limited reflection, lack depth in exploring learning connections to real life and previous knowledge, and do not engage in self-assessment and setting new learning goals, resulting in a superficial reflection process.	students engage in some forms of reflection, encourages some exploration of learning connections to real life and previous knowledge, and engage in self-assessment and setting new learning goals, resulting in a satisfactory reflection process.	students engage in comprehensive reflective practice and extensive exploration of learning connections to real life and previous knowledge. Students engage in meaningful self-assessment and set ambitious new learning goals, resulting in a thorough and impactful reflection process.
	A7. Step 6: Health & Safety - Risk Assessment - Emergency Mitigation			
	A6.1 - Location *Preparation to ensure the safety of the chosen location for EOC activities.*	Demonstrates inadequate consideration of location risks and safety measures, lacking awareness of potential hazards.	Shows a satisfactory understanding of location risks and safety, implementing basic measures to address potential hazards.	Displays an advanced understanding of location risks and effectively identifies and mitigates potential hazards, ensuring a safe learning environment.
	A6.2 - Student *Preparation to ensure the safety of students in any chosen location during EOC activities.*	Shows limited attention to student safety and lacks comprehensive measures to ensure students' well-being during EOC activities	Demonstrates adequate student safety measures, ensuring basic care and attention during outside learning experiences.	Ensures comprehensive student safety, employing advanced measures to guarantee optimal well-being and security throughout EOC experiences.
	A6.3 - Transportation *Preparation to ensure the safety of students and staff getting to and from any chosen location for*	Exhibits insufficient planning and attention to transportation safety, lacking proper protocols	Implements satisfactory transportation safety measures, ensuring basic	Demonstrates exceptional transportation safety protocols, employing

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Rubric A: Quality Assurance Rubric for Designing & Implementing EOC Activities adhering to the OTTER Methodology				
	Quality Indicator	**Developing**	**Intermediate**	**Advanced**
	EOC activities.	and measures for safe travel during outside activities.	protocols and precautions during travel to and from locations outside the classroom.	comprehensive planning for secure and safe travel during EOC experiences.
	A6.4 - Emergency Plan *Preparation of a protocol that is shared with students in case of an emergency.*	Shows a deficient emergency plan, lacking proper procedures and strategies for handling unexpected situations or emergencies during activities outside the classroom. The Plan is not made clear to students well in advance.	Develops a basic emergency plan, incorporating fundamental procedures for handling unforeseen events during outside learning experiences. The plan is handed out without discussion to students.	Creates an advanced and detailed emergency plan, incorporating comprehensive strategies to manage unexpected situations or emergencies effectively, ensuring swift and appropriate responses. The plan is shared well in advance and discussed with students.
	A6.5 - Determination of national, regional, contextual specificities & particularities relevant to Rubric's A thematic coverage Practitioners and providers further determine quality assurance parameters relevant to their contexts.	To be determined by EOC practitioners and providers.	To be determined by EOC practitioners and providers.	To be determined by EOC practitioners and providers.

****Note:** *Quality Indicator A6.5 aims to allow readers and prospective users of the Rubric to identify quality indicators relevant to their professional contexts and ground realities. Collaboration among colleagues and in-depth reflective discussions can lead to further adjustments of the tools provided here and the possibility of further tailoring our QA proposition to their needs and requirements.*

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4 Quality Assurance Guidelines for EOC Practitioners utilising the OTTER Methodology

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4.1 Introduction to the components of Quality Assurance Rubric for EOC Practitioners

Findings of both D2.1 - Literature Review and Compendium of Successful Practice, as well as D5.1 - EOC Accreditation in Europe - A Mapping Study, indicate the need for adequate training and continuous professional development of EOC practitioners, associating those with positive learning outcomes surrounding core aim indicators (SDGs & 21st-century skills). The present set of Quality Assurance Guidelines aims to support EOC practitioners, benchmark processes, and pursue pathways for further professional development, both essential for designing and implementing high-quality EOC activities adhering to the OTTER Methodology. The Guidelines do so by addressing the following areas of interest:

- Practitioners' preexisting knowledge and skills surrounding EOC.
- Practitioners' capacity and level of readiness to devise and implement an OTTER Lab.
- Practitioners' capacity to further enrich, refine and advance their EOC praxis.

For the scope and purpose of this Quality Assurance Protocol, we identify **EOC practitioners** as our overarching target group, further clustering it into three distinct subdivisions on the basis of their professional workspace settings. These are as follows:

Teachers: Teaching practitioners working at any level within the formal education landscape, either in the public or private sphere (early childhood, primary, secondary or tertiary education), wishing to engage with EOC activities adhering to the OTTER Methodology and/or willing to improve and enhance their existing praxis.

EOC Educators: Practitioners working within the non-formal education landscape, either in the public or private sector, exhibiting field-specific knowledge in combination with relevant educational training, wishing to engage with EOC activities adhering to the OTTER Methodology and/or willing to improve and enhance their existing praxis. Such settings include museums, zoos, natural resorts, parks, science centres, etc.

EOC Learning Guides: Practitioners with field-specific knowledge lacking substantial educational training and background knowledge yet serving at a given side or setting, which can potentially constitute an EOC location of choice.

In our effort to devise relevant quality indicators serving as the basis of QA Rubrics, we have considered several varying parameters assumably characterising each of the above sub-target groups. We do acknowledge that these constitute mere speculative generalisations and that different national and local contexts in European states may exhibit considerable variations. These considerations are presented in Annex 1: *Table 7. Assumptions surrounding background knowledge, experience, and access to professional support.*

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Having defined those characteristics, we further identified the unique points of departure related to the average level of EOC knowledge for each sub-target group, pinpointing the corresponding needs and requirements for guidance and support. The extrapolated quality indicators covering those needs and requirements for all three sub-groups combined are presented below in *Table 4. Quality Indicators for EOC Practitioners.*

Areas of interest	Quality Indicators
B1 - Pre-existing Knowledge, Skills & Attitudes	• B1.1 - Pedagogical awareness and capacity to foster optimal conditions for experiential and inquiry-based learning • B1.2 - STEAM approach awareness and level of competency in applying it to daily teaching practice • B1.3 - Knowledge and Attitude towards Environmental Education & Education for Sustainable Development • B1.4 - Fundamental Principles of Education Outside the Classroom (EOC)
B2 - OTTER Lab Framework Skills & Awareness	• B2.1 - OTTER Lab Learning Objectives • B2.2 - Articulating effective and relevant learning objectives • B2.3 - Consideration of planning required to design OTTER Lab's • B2.4 - OTTER Lab's Cycle Process Framework • B2.5 - Risk Assessment and Health & Safety Awareness
B3 - Training and Capacity Building	• B3.1 - EOC Effective Practices • B3.2 - Hands-on and EOC Student Centred Pedagogies • B3.3 - Awareness surrounding prospective EOC Locations and Stakeholders Locally • B3.4 - Awareness and Integration of Core Aims & Connections (21st-century skills, SDGs, Inclusion & Diversity)
B4 - Continuous Assessment	• B4.1 - Planned Assessment points aligned with learning objectives • B4.2 - Formative and Summative Assessment Approaches Embedded within the OTTER Lab Cycle • B4.3 - Collegial feedback
B5 - Contextualisation	• B5.1 - Determination of national, regional, contextual specificities & particularities relevant to Rubric's B thematic coverage.

Table 4. Quality Indicators for EOC Practitioners

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4.2 Assessing Pre-existing Skills & Competencies

The planning and deployment of an OTTER Lab Activity presuppose a set of pre-existing skills and competencies on behalf of an EOC practitioner, all contributing towards fostering a meaningful outdoor learning experience. Though the capacity of attainment for those may vary and differ substantially between all three sub-target groups, the principal intent of the QAP is ntable 3ot to exclude EOC practitioners who circumstantially happen to be unfamiliar and inexperienced on the subject matter. Instead, it aspires to surface and highlight the opportunities for further professional development, allowing individuals to inform their understanding and practice effectively.

For the scope and purpose of this QAP, we are looking at three key elements concerning EOC practitioners' intellectual capital: pre-existing knowledge, skills and competencies. These are defined in Figure 2.

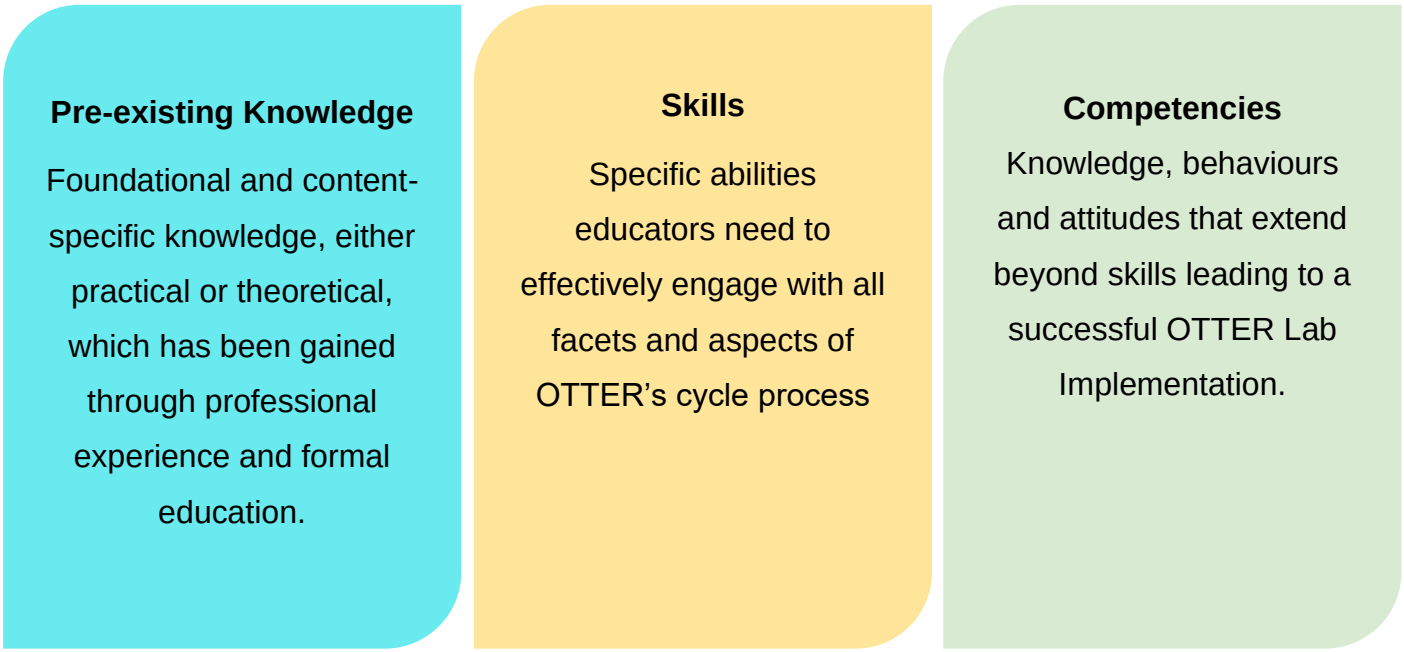

Figure 2. EOC Practitioners' Intellectual Capital

Having defined the assumed pre-existing intellectual capital across all three target sub-groups of EOC practitioners, we compare it against the various pedagogical needs and requirements derived from OTTER's cycle process. The comparison and analysis of the two is refined through a line of guiding questions leading to articulated quality indicators. The process itself is visible in *Table 5.*

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A.A	OTTER Lab Steps	EOC Practitioners' Intellectual Capital	Guiding Questions	Quality Indicators for Pre-existing Knowledge, Skills & Competencies
1	**PREPARE**	• **P3:** Pedagogical Proficiency • **P5:** Field-specific/thematic proficiency • **P7:** EOC proficiency	• What is the pre-existing knowledge and experience required to facilitate the Planning phase in terms of defining learning objectives, devising activities, choosing a relevant overarching topic, choosing an appropriate location, as well as exploring collaborations with various stakeholders through which students' outdoor learning experience will benefit from?	• **B1.1** - Pedagogical awareness and capacity to foster optimal conditions for experiential and inquiry-based learning • **B1.2** - STEAM approach awareness and level of competence in applying it to daily teaching practice • **B1.3** - Knowledge and Attitude towards Environmental Education & Education for Sustainable Development • **B1.4** - Fundamental Principles of Education Outside the Classroom (EOC) • **B3.1** - EOC Effective Practices • **B3.1.1** - Inquiry-Based Practices • **B3.1.2** - Collaborative Learning
2	**ORIENTATE**	• **P3:** Pedagogical Proficiency • **P4:** Educational working experience • **P5:** Field-specific/thematic proficiency • **P6:** Frequency of working interaction with students and opportunities to engage them in long-term EOC activities • **P7:** EOC proficiency • **P9:** Access to professional support	• What is the pre-existing knowledge and experience required to facilitate the Orientate phase in terms of communicating the importance of a given site, conducting the necessary preparatory work with students leading to a site visit, mapping and utilising students' knowledge, and setting engaging and highly motivating learning tasks?	
3	**DISCOVER**		• What is the pre-existing knowledge and experience required to facilitate the "Discover" phase to engage students in real-life activities, enabling students' observations and data analysis?	
4	**IMPACT**		• What is the pre-existing knowledge and experience required to facilitate the Impact phase in supporting and guiding students	

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			with their data analysis and interpretation, effectively supporting students in designing and implementing a Youth Initiative?	• **B3.2** - Awareness surrounding prospective EOC Locations and Stakeholders Locally • **B3.3** - Awareness and Integration of Core Aims & Connections (21st-century skills, SDGs, Inclusion & Diversity)
5	**REFLECT**		• What is the pre-existing knowledge and experience required to facilitate the Reflect phase in supporting students in their reflections and learning outcome refinement?	

Table 5. Drawing interconnections leading to Quality Indicators

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4.3 Identifying Capacity Building Needs & Requirements for Advancing EOC Praxis

The introduction of a novel EOC methodological framework requires establishing corresponding mechanisms that adequately support and guide EOC practitioners through a newly proposed pedagogy. Such a venture necessitates a commitment to professional growth and lifelong learning, allowing teachers and educators to allocate time and effort effectively informing their daily practice (Torres, 2023). By investing in their development, practitioners become more confident and equipped to meet the diverse opportunities of meaningful learning experiences EOC provides.

This section explores pathways to meeting such capacity-building needs and requirements. For the scope and purpose of this QAP, we identify Capacity Building as the process of enhancing EOC practitioners' knowledge, skills and competencies to improve the overall educational quality and, subsequently their professional well-being. The following key aspects are considered:

1. Expanding Knowledge

Fostering continuous learning in subject matter and pedagogical

2. Skill Development

Enhancing instructional and EOC management skills.

3. Adaptability

Equipping teachers with the necessary means and tools to creatively

4. Collaboration

Encouraging and fostering teamwork and partnerships within the education

In that regard, OTTER Methodology offers an array of professional development and building capacity opportunities.

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4.4 Rubric B: Quality Assurance Rubric For Effective Training, Support, and Ongoing Professional Development of EOC Teachers & Educators

In light of the so far analysis surrounding the definition of quality indicators for all three areas governing EOC practitioners' a) pre-existing skills, b) capacity and level of readiness to utilise the OTTER Methodology, and c) their capacity to advance their EOC praxis - **The Quality Assurance Rubric B: Quality Assurance Rubric For Effective Training, Support, and Ongoing Professional Development of EOC Teachers & Educators** has been devised aiming to support and guide the evaluation of all three components.

The target audience for the Rubric includes EOC practitioners, educational leaders and supervisors, instructional designers and curriculum developers seeking to devise professional development programmes and courses, and institutional EOC providers wishing to support and facilitate the capacity building of their staff. Additionally, the Rubric itself may indirectly provide indications surrounding onboarding and hiring criteria for EOC professionals.

Rubric B is structured on a three-level Likert scale in ascending order of attainment of the knowledge, skill, or result level: Developing, Intermediate, and Advanced. For each quality indicator and level of attainment, a relevant description is provided, aiming to guide the reader on the respective evaluation criteria.

We highly encourage users of the Rubric to utilise it as a formative assessment tool to be applied thoughtfully throughout all phases of OTTER's Methodology cycle, both before planning and conceptualising EOC, as well as during and after a given implementation. The frequency of application of the Rubric itself is directly related to the level of pedagogical proficiency of an EOC practitioner to conduct EOC activities adhering to the OTTER framework. The principal idea behind its use is rooted in the notion of improving rather than rating practitioners.

From the standpoint of EOC providers, it is imperative that the QA Guidelines and Rubric provided here are not perceived as a performance management practice and means of monitoring practitioners but instead as a coaching framework leading to ongoing conversations around professional learning goals that are tailored to the individual. While some may argue for the distinction between 'quality assurance' and 'professional development' practices, we choose to treat those boundaries lightly, hoping to avoid a 'tick-box' mindset where such practices are performed to meet certain narrow criteria rather than nurturing teachers' capabilities and the quality of teaching.

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Rubric B: Quality Assurance Rubric For Effective Training, Support, and Ongoing Professional Development of EOC Teachers & Educators	
Target User:	Teachers, Educators, Instructional Designers, Educational Programme Designers, Curriculum Developers, Educational Supervisors
Function:	Evaluation, Self- Assessment, Assessment, Development
Purpose:	Assessing educators readiness and capacity to effectively design and implement high-quality EOC activities adhering to the OTTER Methodology.
Application Timeframe:	Prior to designing and delivering EOC activities and for ongoing use.

Rubric B: Quality Assurance Rubric For Effective Training, Support, and Ongoing Professional Development of EOC Teachers & Educators			
Quality Indicators	**Developing**	**Intermediate**	**Advanced**
B1. Pre-existing Knowledge, Skills & Attitudes			
B1.1 - Pedagogical awareness and capacity to foster optimal conditions for experiential and inquiry-based learning *Knowledge and understanding surrounding the fundamental principles of experiential and inquiry-based learning alongside the necessary*	Absence of knowledge and understanding surrounding the fundamental principles of experiential and inquiry-based learning alongside the necessary pedagogical	Moderate knowledge and understanding surrounding the fundamental principles of experiential and inquiry-based learning alongside the necessary pedagogical	Exceptional knowledge and understanding surrounding the fundamental principles of experiential and inquiry-based learning,

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Rubric B: Quality Assurance Rubric For Effective Training, Support, and Ongoing Professional Development of EOC Teachers & Educators				
	Quality Indicators	**Developing**	**Intermediate**	**Advanced**
	pedagogical application skills and competencies	application skills and competencies.	application skills and competencies.	accompanied by extensive experience and the necessary skills and competencies for its effective application.
	B1.2 - Application of teaching practices within and across STEAM disciplines *Knowledge and Interest towards STEAM Education, accompanied by the relevant pedagogical skills and competencies, allowing for its effective application.*	Limited or absence of interest and capacity to apply the STEAM Education approach for the purpose of guiding student inquiry, dialogue, and critical thinking.	Demonstrates interest towards STEAM education, with relative capacity for its application, for the purpose of guiding student inquiry, dialogue, and critical thinking.	Shows exceptional enthusiasm and comprehensive understanding of STEAM education and concrete skills of application for the purpose of guiding student inquiry, dialogue, and critical thinking.
	B1.3 - Knowledge and Attitude towards Environmental Education & Education for Sustainable Development *Knowledge and Attitudes towards environmental issues related to the Sustainable Development Goals.*	Limited awareness or absence of expressed interest towards environmental issues, reduced plastics use and sustainability practices.	Exhibits awareness and a general understanding of basic environmental issues, reduced plastics use and sustainability practices.	Demonstrates comprehensive understanding and awareness of environmental issues, reduced plastics use, and sustainability practices, proactively taking action towards addressing those themes in the framework of his/her educational

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Rubric B: Quality Assurance Rubric For Effective Training, Support, and Ongoing Professional Development of EOC Teachers & Educators				
	Quality Indicators	**Developing**	**Intermediate**	**Advanced**
				practice.
	B1.4 - Fundamental principles of Education Outside the Classroom (EOC)	Limited awareness or absence of previous experience related to EOC in terms of design and implementation.	Moderate awareness and relative previous experience surrounding EOC in terms of design and implementation.	A high degree of awareness related to EOC in terms of design and implementation, backed up by extensive experience in the application and delivery of outdoor learning experiences.
	B2 - OTTER Lab Framework Skills & Awareness			
	B2.1 - OTTER Lab Learning Objectives *Knowledge of OTTER Lab's Goals.*	Limited or absence of awareness surrounding the goals of the OTTER Lab framework.	Understands and is able to explain and communicate the goals of the OTTER Lab framework.	Demonstrates deep understanding of the goals of the OTTER Lab framework incorporating innovative elements into his/her EOC designs.
	B2.2 - Articulating effective and relevant learning objectives *Ability to articulate SMART* cognitive, affective and psychomotor *learning objectives addressing real-world environmental problems which can be aligned with the national curriculum.*	Demonstrates difficulty in articulating SMART cognitive, affective and psychomotor objectives addressing real-world environmental problems	Exhibits moderate skill in articulating SMART cognitive, affective and psychomotor objectives addressing real-world environmental problems	Exhibits advanced proficiency in articulating SMART cognitive, affective and psychomotor objectives addressing real-world

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Rubric B: Quality Assurance Rubric For Effective Training, Support, and Ongoing Professional Development of EOC Teachers & Educators			
Quality Indicators	**Developing**	**Intermediate**	**Advanced**
	which are aligned with the local national curriculum.	which are aligned with the respective national curriculum.	environmental problems, which are aligned with the local national curriculum.
B2.3 - Consideration of planning required to design an OTTER Lab *Understanding the necessary planning preconditions to be fulfilled in order to implement an OTTER Lab successfully.*	Limited or absence of understanding of the planning considerations required to develop an OTTER Lab successfully.	Demonstrates understanding of the planning considerations required to develop an OTTER Lab successfully.	Fully comprehends and creatively fulfils the necessary planning considerations required to develop an OTTER Lab successfully.
B2.4 - OTTER Lab's Implementation *Knowledge of the Implementing the student-centred OTTER Lab cycle.*	Limited or absence of knowledge and understanding of the *OTTER Lab cycle.*	Good knowledge and understanding of the *OTTER Lab cycle, implementing it effectively and consistently.*	Excellent grasp of the *OTTER Lab cycle,implementing it* innovatively and critically.
B2.5 - Risk Assessment and Health & Safety Awareness *Understanding the importance of creating and adhering to a risk assessment protocol adequately addressing health and safety procedures.*	Limited understanding of the importance of utilising risk assessment protocols and limited knowledge of their practical use.	Understands the importance of risk assessment protocols and has some experience with writing and/or utilising them.	Has extensive knowledge of risk assessment protocols as well as health and safety procedures, showcasing both the ability to draft as well as manage such procedures.
B3 - Training and Capacity Building			

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Rubric B: Quality Assurance Rubric For Effective Training, Support, and Ongoing Professional Development of EOC Teachers & Educators			
Quality Indicators	**Developing**	**Intermediate**	**Advanced**
B3.1 - EOC Effective Practices *Knowledge of effective evidence-based student engagement EOC practices.*	Demonstrates minimal knowledge of best practices for effective student engagement in EOC activities, primarily relying on traditional classroom practices.	Demonstrates a foundational understanding of effective student engagement practices and follows best practices research on student engagement.	Has advanced knowledge of best practices for EOC activities demonstrated through the application and deployment of innovative and effective student engagement strategies.
B3.2 - Hands-on and EOC Student-Centred Pedagogies *Knowledge of and ability to incorporate Hands-on and EOC Student-Centred Pedagogies into his/her curricular design.*	Demonstrates minimal knowledge of inquiry-based learning and primarily relies on traditional classroom practices.	Demonstrates foundational understanding and has relative experience enacting *Hands-on and EOC Student Centred Pedagogies.*	Demonstrates deep understanding and has experience enacting *Hands-on and EOC Student Centred Pedagogies.*
B3.3 - Awareness surrounding prospective EOC Locations and Stakeholders Locally *Knowledge and awareness surrounding the local surroundings and geography of locations of educational value as well as local stakeholders and opportunities of learning experiences locally available.*	Displays minimal knowledge of local surroundings, stakeholders, and available experiences for implementation. Is not willing to advocate for new collaborations with local EOC providers.	Displays some knowledge of available EOC opportunities and locations of educational value and has made an effort to create connections and formulate collaborations with local stakeholders.	Is proactive about fostering collaborations with local stakeholders and EOC providers, maintaining an up-to-date data repository on locally available EOC locations and providers.
B3.4 - Awareness and Integration of Core Aims & Connections *Knowledge and ability to incorporate SDGs, 21st-century skills, knowledge and attitude towards*	Displays minimal knowledge or ability to incorporate core aims connections in his/her	Displays foundational knowledge and understanding for incorporating core aims and	Demonstrates comprehensive knowledge and understanding,

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Rubric B: Quality Assurance Rubric For Effective Training, Support, and Ongoing Professional Development of EOC Teachers & Educators			
Quality Indicators	**Developing**	**Intermediate**	**Advanced**
inclusion and diversity learning objectives and activities.	curricular design into the curriculum under development or the activity being designed.	connections into the curriculum under development or the activity being designed.	proactively incorporating core aims and connections in his curricular design.
B4 - Continuous Assessment			
B4.1 - Planned Assessment points aligned with learning objectives	There is a lack of clear connection between what is assessed and the intended learning outcomes.	Assessment is partially aligned with the learning objectives - there are areas where the connection leaves room for further improvement.	There is a clear and intentional connection between what is being assessed throughout the OTTER Lab cycle and the stated learning outcomes.
B4.2 - Formative and Summative Assessment Approaches Embedded within the OTTER Lab Cycle	The design of the OTTER Lab lacks an assessment approach to student learning	Some consideration of assessment approaches (mostly summative) in the design of the OTTER Lab	A variety of rich and differentiated assessment approaches (formative and summative).
B4.1 - Collegial Feedback* Understands the value of performance evaluation and continuous feedback from colleagues, utilising it effectively to refine one's own practice further. ***We define ***Collegial feedback*** as structured conversations, ideally between more than two educators, about their teaching to ensure quality and further develop teaching practices. The*	Displays relative understanding of the value and usefulness of collegial feedback and experiences difficulties utilising it effectively for the purpose of refining his/her own practice.	Displays a clear understanding and recognises the value of collegial feedback and applies it effectively to refine his/her own practice.	Demonstrates an in-depth understanding and recognises the value of collegial feedback, further building and reflecting on it, proactively pursuing to inform his/her curricular design and EOC implementations in a

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Rubric B: Quality Assurance Rubric For Effective Training, Support, and Ongoing Professional Development of EOC Teachers & Educators			
Quality Indicators	**Developing**	**Intermediate**	**Advanced**
frequency of such an occasion is directly related to the degree of competence and need for further improvement of one's practice. Collegial feedback may be provided either by colleagues residing in the immediate working surroundings. Alternatively, in the absence of those, feedback could be sought from external experts, consultants, accreditation bodies or members of an established community of practice focusing on EOC.			manner that is ever continuous and transformative to one's own practice.
B5 - Contextualisation			
B4.2 - Determination of national, regional, contextual specificities & particularities relevant to Rubric's B thematic coverage** Practitioners and providers further determine quality assurance parameters relevant to their contexts.	To be determined by EOC practitioners and providers.	To be determined by EOC practitioners and providers.	To be determined by EOC practitioners and providers.

****Note:** *Quality Indicator B4.2 aims to allow readers and prospective users of the Rubric to identify quality indicators relevant to their professional contexts and ground realities. Collaboration among colleagues and in-depth reflective discussions can lead to further adjustments of the tools provided here and the possibility of further tailoring our QA proposition to their needs and requirements.*

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5 QA Guidelines for Institutional EOC Providers Utilising the OTTER Methodology

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5.1 Introduction to the components of QA Rubric for EOC Providers

The present set of Quality Assurance Guidelines aims to support EOC providers, benchmark processes, and pursue pathways for further advancing their institutional capacity for either hosting, designing or implementing high-quality EOC activities adhering to the OTTER Methodology. The Guidelines do so by addressing the following areas of interest:

- EOC providers' institutional readiness to effectively provide EOC experiences of high educational value.
- EOC providers' capacity to devise and implement EOC activities adhering to the OTTER Methodology.
- EOC providers' ability to maintain an ecosystem of professional development and acknowledgement to its EOC practitioners, facilitating the refinement of their EOC praxis.
- EOC providers' capacity to formulate strategic collaborations with relevant stakeholders, further strengthening local EOC communities of practice.

For the scope and purpose of this Quality Assurance Protocol, we identify **EOC providers** as our overarching target group, further clustering it into three distinct subdivisions on the basis of their institutional activity and the audience they serve. These are as follows:

Schools with EOC profile: Schools operating within the formal educational landscape, either in the public or private sphere (preschools, primary, secondary schools and universities), wishing to engage with EOC activities adhering to the OTTER Methodology and/or willing to improve and enhance their existing praxis.

EOC Centers: Entities, institutions or establishments operating within the STEAM landscape, either in the public or private sector, that besides their daily core operations (functioning often as research centres), offer structured EOC learning experiences and awareness-raising activities by either conceptualising designing or implementing those and/or hosting them on location. Examples: museums, zoos, botanical gardens, planetariums, etc.

EOC Sites: Sites with potential for EOC practices but yet underdeveloped or not formalised as established locations for EOC implementations. Examples: laboratories or libraries with few or no educational activities.

In our effort to devise relevant quality indicators serving as the basis of QA Rubrics, we have taken into consideration a number of varying parameters characterising each of the above sub-target groups as derived from D5.1 EOC Accreditation in Europe - A Mapping Study. Having defined those characteristics, we further identified the unique points of departure related to the average level of EOC knowledge for each sub-target group, further pinpointing the corresponding needs and requirements for guidance and support. The extrapolated quality indicators covering those needs and requirements for all three sub-groups combined are presented below in *Table 6. Quality Indicators for EOC Providers.*

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Areas of interest	Quality Indicators
C1. Institutional Readiness	• C1.1 - Location Safety • C1.2 - Learner's Support & Communication • C1.3 - Resource Availability • C1.4 - Qualified Personnel • C1.5 - Inclusive and Accessible • C1.6 - Funding • C1.7 - Risk Assessment & Health and Safety • C1.8 - Quality Assurance
C2. Design and implementations	*Refer to Rubric A*
C3. Training and Capacity Building	*Refer to Rubric B*
C4. Acknowledgement and recognition	• C4.1 - Educator acknowledgement
C5. Partnerships and Collaborations	• C5.1 - Expert Partnerships • C5.2 - Partnerships between an EOC provider and Local Schools • C5.3 - Partnerships between Local Schools and EOC providers • C5.4 - Determination of national, regional, and contextual specificities & particularities relevant to Rubric's C thematic coverage

Table 6. Quality Indicators for EOC Providers

The indicators presented in Table 6., constituted the basis of devising **The Quality Assurance Rubric C: Quality Assurance Rubric for EOC Provider's Educational, Administrative, and Organisational Capacity** aiming to support and guide the evaluation of all four aforementioned components of readiness and capacity.

Rubric C is structured on a three-level Likert scale in ascending order of attainment of the level of institutional readiness, capacity, or established practice: Developing, Intermediate, and Advanced. For

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each quality indicator and level of attainment, a relevant description is provided, aiming to guide the reader on the respective evaluation criteria.

We highly encourage users of the Rubric to utilise it as a formative assessment tool throughout all phases of development and deployment of their EOC activities. Most importantly, though, the Rubric itself indirectly indicates how EOC providers could direct and formulate their medium and long-term strategic objectives on an organisational level. The usefulness and value of both Rubric C and the QAP as a whole, depend on the organisational agility and the willingness of a given EOC provider to effect the necessary structural reforms adopting the respective quality standards and good practices OTTER Methodology introduces.

It is important to underline that institutional reform and change are lengthy and challenging processes that require considerable effort and time to establish and maintain. Nevertheless, their diligent pursuit is what differentiates a moderately designed and implemented EOC activity from a transformative and sustainable EOC praxis. One that can effectively address the evolving needs of practitioners and students alike, fostering lasting positive impact and resilience in the face of societal and environmental challenges ahead.

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5.2 Rubric C: Quality Assurance Rubric for EOC Provider's Educational, Administrative, and Organisational Capacity

Rubric C: Quality Assurance Rubric for EOC Provider's Educational, Administrative, Organisational Capacity	
Target User:	Formal or non-formal EOC provider
Function:	Evaluation, Assessment, Development
Purpose:	Assessing the readiness and capacity of an EOC provider to administer activities adhering to the OTTER Methodology.
Application Timeframe:	Prior to the design and delivery of EOC activities and for ongoing use.

Rubric C: Quality Assurance Rubric for EOC Providers: Educational, Administrative, Organisational Capacity			
Quality Indicator	**Developing**	**Intermediate**	**Advanced**
C1. Institutional Readiness			
C1.1 - Location Safety *Presence of a location or setting able to host EOC student activities safely.*	The location is unsuitable for EOC activities, exhibiting considerable Health & Safety risks for students.	The location meets minimum Health & Safety requirements and is safe for students to visit.	Location meets and exceeds safety requirements, and is well-equipped, and conducive to the needs of EOC activities.

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Rubric C: Quality Assurance Rubric for EOC Providers: Educational, Administrative, Organisational Capacity			
Quality Indicator	**Developing**	**Intermediate**	**Advanced**
C1.2 - Learner's Support & Communication *The provider, location, or setting employs adequately trained staff able to coordinate and manage educational inquiries arising from school teachers and school administrations, communicating effectively the educational value proposition of the EOC experiences offered.*	Absence of adequately trained personnel, poor management and communication with school teachers and school administrations leading to poor management bookings, unresolved inquiries, confusion or delays.	Adequately trained staff able to handle, *coordinate and manage educational inquiries arising from school teachers and school administrations, maintaining a satisfactory level of organisation.*	Highly trained and experienced staff proactively fostering collaborations with school teachers and school administrations able to provide EOC experiences tailored to the needs of interested parties while maintaining an excellent and highly effective level of organisation and administrative flow while remaining flexible in handling challenging circumstances.
C1.3 - Resource availability *Availability of additional means and resources to enhance learning experiences.*	Limited availability of additional means and resources, hindering the overall quality of the learning experiences while compromising the pursued learning outcomes.	Relative availability of additional resources able to enhance students' learning experiences, either those constituting physical tools and objects or intellectual content.	A wide range of available means, tools and resources, presented in multiple formats able to enrich and diversify the pursued learning experience significantly.
C1.4 - Qualified Personnel: *Availability or access to qualified educators capable of a) designing and delivering EOC activities and b) assisting students and supporting teachers before, during and after an EOC activity implementation.*	Lack of qualified educators or experts, subsequently leading to inadequate guidance or assistance of students and teachers. No use or compliance whatsoever with the OTTER QA Rubrics.	Presence of qualified educators or experts capable of providing satisfactory guidance or assistance. Occasional and partial use and compliance with the OTTER QA Rubrics.	Highly qualified and experienced educators or experts adept at facilitating exceptional learning experiences tailored to the particular needs and requirements of both

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Rubric C: Quality Assurance Rubric for EOC Providers: Educational, Administrative, Organisational Capacity				
	Quality Indicator	**Developing**	**Intermediate**	**Advanced**
				students and teachers. Proactive and frequent use and compliance with the OTTER's QA Rubrics, further tailoring and enriching those on the basis of its needs.
	C1.5 - Inclusive and Accessible *Location and setting accessible to disabled students.*	The location or setting is fully or partly inaccessible to disabled students.	The location or setting is mostly accessible yet lacking various provisions that would facilitate access to disabled students.	Highly accessible location or setting designed to accommodate the diverse needs of disabled students.
	C1.6 - Funding *The EOC provider or Institution is financially autonomous and sustainable in providing EOC experiences.*	Financial constraints limit the institution's ability to provide comprehensive educational experiences.	The institution is financially able to host educational experiences without the need to allocate significant funds & resources.	The institution is financially profitable and able to host comprehensive educational experiences as well as able to continually allocate funds for further R&D leading to the refinement and further enrichment of its educational services.
	C1.7 - Risk Assessment & Health and Safety *The EOC provider has a certified Health & Safety protocol in place as well as an up-to-date Risk Assessment Plan.*	Absence of Health & Safety procedures and/or a Risk Assessment Plan with loose procedures and strategies for handling unexpected situations or emergencies.	An existing Risk Assessment Plan and a Health & Safety Protocol - visible H&S indications in the areas where EOC activities occur.	Existing and up-to-date Health & Safety Protocols and a Risk Assessment Plan are shared with and explained in advance to teachers and school administrations while

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Rubric C: Quality Assurance Rubric for EOC Providers: Educational, Administrative, Organisational Capacity				
	Quality Indicator	**Developing**	**Intermediate**	**Advanced**
				navigating collaboratively unexpected situations and emergencies effectively.
	C1.8 - Quality Assurance *Overseeing the quality of EOC activities hosted or designed by the EOC provider seeking to attain the appropriate certification from a national accreditation agency concerning the quality of its services.*	Lack of quality assurance protocols and absence of any form of institutional accreditation or certification.	Overseeing EOC activities by staff members or external consultants. Ongoing efforts in attaining certification or accreditation of the quality of its services.	Proactively designs and informs quality assurance protocols to ensure the ongoing refinement and enrichment of EOC activities. Received quality accreditation of educational services offered.
	C2. Design and implementations			
	Please refer to Rubric A	-	-	-
	C3. Training and Capacity Building			
	Please refer to Rubric B	-	-	-
	C4. Acknowledgement and recognition			
	C4.1 - Educator acknowledgement *The EOC provider acknowledges the efforts of its staff in offering high-quality design*	The EOC provider offers little or no acknowledgement of the contribution and efforts of its	The EOC provider acknowledges educational efforts made by educators.	The EOC provider recognises and celebrates educational efforts made by

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Rubric C: Quality Assurance Rubric for EOC Providers: Educational, Administrative, Organisational Capacity			
Quality Indicator	**Developing**	**Intermediate**	**Advanced**
while celebrating its achievements surrounding EOC activity implementations.	staff and educators.		educators actively seeking to praise and acknowledge its staff contribution publicly.
C5. Partnerships and Collaborations			
C5.1 - Expert Partnerships *The EOC provider engages in partnerships with subject-area experts aiming to enhance further EOC learning experiences it strives to offer.*	The EOC provider has no established relationships or interest in developing partnerships with subject-area experts.	The institution has some established partnerships with subject-area experts that it tends to consult, yet does not always follow their recommendations.	The EOC provider has a broad network of established partnerships with subject area experts who provide continuous and ongoing support seeking to advance further and develop their EOC services.
C5.2 - Partnerships between an EOC provider and Local Schools *Ability of institutions to foster collaborations and partnerships with local schools.*	Institutions have limited to no recurring collaboration and partnerships with local schools.	The EOC provider has developed collaborations with local schools, which are predominantly one-offs rather than recurring and ongoing.	The EOC provider has established a recurring collaboration with local schools and relies on providing and receiving feedback for tailoring and further advancing its EOC services.
C5.3 - Partnerships between Local Schools and EOC providers *Ability for the school to foster collaborations and partnerships with local EOC providers.*	The school maintains limited or no collaboration with local EOC providers.	The school has established collaborations with EOC providers, yet those are one-offs rather than recurring.	The school has established recurring collaborations with local EOC providers working closely together, bringing

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Rubric C: Quality Assurance Rubric for EOC Providers: Educational, Administrative, Organisational Capacity			
Quality Indicator	**Developing**	**Intermediate**	**Advanced**
			both its faculty members and EOC educators to work together in designing, tailoring, and further advancing EOC activities and programmes.
C5.4 - Determination of national, regional, and contextual specificities & particularities relevant to Rubric's C thematic coverage Practitioners and providers further determine quality assurance parameters relevant to their contexts.	To be determined by EOC practitioners and providers.	To be determined by EOC practitioners and providers.	To be determined by EOC practitioners and providers.

****Note:** *Quality Indicator C5.4 aims to allow readers and prospective users of the Rubric to identify quality indicators relevant to their professional contexts and ground realities. Collaboration among colleagues and in-depth reflective discussions can lead to further adjustments of the tools provided here and the possibility of further tailoring our QA proposition to their needs and requirements.*

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6 Conclusions

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6.1 Concluding thoughts, next steps, and visions for further development

D5.2 Quality Assurance Protocol has been devised aiming to contribute to the broader conversation surrounding the notion of quality and benchmarking of EOC practices in Europe. It addresses both EOC Providers and EOC Practitioners by providing guidance, stimulating self-reflection, and offering pathways for improvement and refinement of their practice. In doing so, it envisages contributing to the sustainability and continuous development of EOC practices.

The Quality Assurance Protocol proposes a set of quality indicators which have been devised by taking into close consideration OTTER's Methodology planning and implementation requirements, as well as the needs requirements of EOC Providers and Practitioners for further refining and advancing their praxis.

For this purpose, three rubrics have been devised to inform the internal evaluation processes on preset quality indicators: QA Rubric for (1) OTTER Methodology EOC Activities, (2) for EOC Practitioners, and (3) for EOC Providers.

The proposed QA Rubrics aspire to serve as starting points for external validation and certification initiatives, taking into account the national and regional realities governing external assessment systems. Most importantly, the findings and work conducted through and for this deliverable alongside **D5.1 EOC Accreditation in Europe: a mapping study,** both lay the foundations for D5.5 for the identification of potential accreditation pathways for EOC. They do so by offering QA insights on

- EOC Providers' Educational, Administrative, and Organisational Capacity.
- EOC Activities adhering to the OTTER Methodology.
- EOC Practitioners' Effective Training, Support, and Ongoing Professional Development.

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7 Annexes

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7.1 Annex 1

Assumptions surrounding background knowledge, experience, and access to professional support				
A.A	**Parameters under consideration (P)**	**Teachers**	**EOC Educators**	**EOC Learning Guides**
1	**P1: Working setting**	Primary & Secondary Education Settings.	Non-formal education settings that are either dedicated to providing EOC activities provisioning for those or constitute a potential EOC location of choice.	Non-formal education settings that are either dedicated to providing EOC activities or provisioning for those or constitute a potential EOC location of choice.
2	**P2: Professional Background & Capacity**	Has been formally trained and qualified as a teacher, pedagogue, and subject expert with extensive knowledge and understanding surrounding educational theory and practice.	Formally trained and educated in a field-specific area while additionally having received some form of recognised training or qualification in an education-related field (e.g. museum educators)	Formally trained and educated in a field-specific area without qualifications or further training in any sub-field or course in Education or Pedagogy.
3	**P3: Pedagogical Proficiency**	Relatively high degree of pedagogical know-how and an achieved level of skills and	High or moderate pedagogical know-how and an achieved level of skills and competencies	A minimal degree of pedagogical know-how and an achieved level of skills and

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		competencies based on his/her years of experience and professional training.	based on his / her years of experience and professional training.	competencies
4	**P4: Educational working experience**	On average, an extensive working experience within the field of education, depending on the years of service.	On average, a moderate or high working experience within the field of education, depending on the years of service.	On average minimal or no working experience within the field of education.
5	**P5: Field-specific/thematic proficiency**	This may vary depending on the level of education a teacher may originate from. Secondary school teachers and tertiary education teachers are more likely to be field-specific due to the nature of their focus on a single discipline (e.g. Physics, Biology, Chemistry Teachers etc.). Meanwhile, preschool and primary school teachers might not be as extensively informed on a given field of study that is thematically relevant to an EOC activity.	Relatively high level of field-specific knowledge and theoretical understanding? depending on his/her academic background and working experience. (e.g. a Botanist with additional training in Botanic Garden Education)	Relatively high level of field-specific knowledge and theoretical understanding? depending on his/her academic background and working experience.
6	**P6: Frequency of working interaction with students and opportunities to engage them in long-term EOC**	High frequency of working interactions with students engaging in an EOC activity allowing for the long-term	Moderate frequency of working interactions with students engaging in an EOC activity depending on the volume of	Low frequency of working interactions with students due to the low volume of visitation at the working site/location of a

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	activities	development and establishment of concrete social and working relations between teachers and students.	visitation the working side/location is receiving. No opportunity to establish concrete and long-term relations with students since any EOC implementations are occasionally one-offs.	Learning Guide and, most importantly due to the absence of any designed EOC activities.
7	**P7: EOC proficiency**	Ranging from low to high depending on a number of parameters.	Ranging from high to low depending on a number of parameters. EOC educators may exhibit both empirical knowledge as well as a solid theoretical understanding governing EOC.	Low or minimal EOC background knowledge and experience.
8	**P8: Frequency of engagement with EOC both in terms of design and implementation**	Moderate, depending on various parameters such as curriculum flexibility, established educational culture, school culture, established funds and infrastructure in support of EOC.	High frequency of engagement with EOC implementations. Engagement in EOC activity conceptualisation and design may vary.	Low or no engagement with EOC implementations.
9	**P9: Access to professional support, guidance and capacity-building opportunities through an established community of practice**	Moderate to a high degree of access to professional support through established channels of professional development offered within formal education settings. Daily opportunities for interaction and professional	Low to moderate degree of access to professional support through established channels of professional development offered within non-formal education settings. Depending on the size and scale of the EOC	Low or no access to professional support through established channels of professional development

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		exchange among colleagues - access to established communities of practice.	provider (museum, zoo, science centre etc.), occasional to scarce opportunities for interaction and professional exchange among colleagues - relative access to established communities of practice.	

Table 7. Assumptions surrounding EOC Practitioners' background knowledge, experience, and access to professional support

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