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Competency model for instructors of environmental education programmes



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Background

Estonia has a diverse environmental education landscape, with a wide range of environmental education programmes and more than 160 organisations providing environmental education activities. In 2017, the Ministry of Education and Research and the Ministry of the Environment signed a Memorandum of Understanding (MoU) expressing their willingness to develop education that supports sustainable development and to work together. The implementation plan of the Memorandum is the Environmental Education and Awareness Action Plan 2019–2022, which will be updated for 2023–2025. One of the objectives of the action plan is to establish a quality system that

- supports the diversity of environmental education providers,
- is easy to manage and understand,
- ensures a high level of environmental education and
- supports the professional development of instructors of environmental education programmes.

Such a quality system will also support achieving the objectives of the Education Strategy 2021–2035 and the Estonian Environmental Strategy 2030. The sustainable development of society and the natural environment is a guiding principle in both. Among other things, the Education Strategy focuses on competent and motivated teachers and school leaders, a diverse learning environment and learner-centred learning and teaching, which has also driven the creation of a competency model for instructors.

Studies carried out prior to the preparation of the Environmental Education and Awareness Action Plan showed that the quality of the educational programmes provided by environmental education centres varies and that there are no competency requirements for programme instructors. Therefore, it was noted that there is a need to support environmental education organisations in the development of their staff, in particular through a common network (the Estonian Environmental Education Association – Eesti Keskkonnahariduse Ühing, EKHÜ). The network's task is to define the competencies required of instructors of environmental education programmes and to organise training for people working in the field of environmental education. ('Loodus- ja keskkonnahariduskeskustele nõuete seadmine' (Setting requirements for nature and environmental education centres), 2016)

In 2020, the EKHÜ initiated the process of drafting the competency requirements, and the preparation of a competency model for instructors of environmental education programmes started in October 2021 within the framework of the project '**Juhendaja pädevus – keskkonnahariduse kvaliteedi võti**' (Instructor Competence – Key to Quality in Environmental Education) funded by the Environmental Investment Centre (EIC). This document is the first output of the process.

Objectives of the competency model

The main objective of the competency model is to enhance the quality of environmental education by creating opportunities for the development of competencies of professionals in the field, including

- supporting the professional development of instructors by providing a systematic framework that enables instructors to assess their own competencies in environmental education, set personal development goals and identify pathways to achieve them;
- increasing the capacity and improving the quality of environmental education centres, nature schools, museums, NGOs and other providers of environmental education programmes, by supporting them in planning development activities and recruiting new instructors;
- improving the social status of environmental education instructors, highlighting the complexity of the field and expectations for newcomers;
- facilitating the preparation and maintaining the quality of national regulations, support and development programmes.

In order to achieve these objectives, a competency model and a digital self-assessment tool with a set of learning materials were created for instructors to support the continuous development of their competencies.

The process of creating the competency model

The competency model has been developed under the auspices of the EKHÜ and within the framework of the project 'Juhendaja pädevus – keskkonnahariduse kvaliteedi võti' funded by the EIC. To create the model, a working group was convened, which included experts from the University of Tartu, Tallinn University, the Estonian Quality Agency for Education (HAKA), the Estonian Biology Teachers Association and environmental education centres: Mirjam Burget, Elina Malleus-Kotšegarov, Helene Uppin, Grete Arro, Mihkel Kangur, Kaija Kumpas-Lenk, Annelie Ehvest, Maarika Männil and Inga Kangur, as well as project manager Aili Saluveer and activity coordinator Krista Keedus. The working group was advised and supported by a steering group consisting of Asta Tuusti, Liia Varend, Liisa Puusepp, Piret Eensoo and Janika Ruusmaa.

The competency model is the authentic result of the working group's collective work and it is based on up-to-date, research-based knowledge about learning and promoting environmental awareness. In this model, an instructor is defined as a person who organises and conducts environmental education programmes for target groups and participates in programme development.

Structure of the competency model

The prepared model reflects the key competencies of environmental education instructors in three key domains:

- **creates a supportive learning environment** – the instructor’s skills of organising and conducting educational programmes and creating the conditions for students to learn;
- **expert in the field of nature and sustainable development** – professional knowledge and skills combined with a green mindset and behaviour;
- **a self-directed and collaborative practitioner** – the attitudes and social-emotional skills of the instructor as a competent professional.

Each domain is in turn broken down into three competencies that specify the instructor’s activities and endeavours (Figure 1). The source material used to outline the competencies is presented at the end of the document.



Figure 1. Structure of the competency model for instructors of environmental education programmes.

Competencies of instructors of environmental education programmes

DOMAIN 1.

The instructor creates a supportive learning environment

The instructor creates an environment that supports motivation, encourages the acquisition of scientific concepts and long-term retention of knowledge, and helps learners to see the obtained knowledge as a meaningful whole.

Students' basic psychological needs are supported during the learning activities, their learning skills improve and they feel safe.

Competency 1.1. The instructor supports the learner's motivation

Goal: throughout the educational programme, students' basic psychological needs are supported and they feel connected, competent and autonomous, which is a prerequisite for autonomous motivation.

The instructor is warm, supportive and interested in what the learners are thinking, and tries to see learning situations from the learner's perspective. They find ways to involve all learners in the activities. To do this, they follow the pace and rhythm of the learners, adapting learning activities where necessary to provide challenges for all.

They provide tasks that enable delving deeper into the subject and focus on getting a better and deeper understanding of topics step by step, rather than getting the task done quickly and without mistakes. Individual exploration of an interesting topic, experimentation, trial and error, and discussion tend to be discouraged if activities are built around competition, comparing students and rewarding the best, the cleverest, the fastest, etc. Therefore, the instructor avoids competition, comparison and ranking learners.

The instructor lets the learners think, discover and experiment for themselves and helps them to see the activities and topics as meaningful from their perspective. To this end, the instructor supports discussions among the students as well as between the instructor and the students, and does not give ready-made solutions or merely 'right/wrong' judgements. In the case of both right and wrong answers, the emphasis is on discussing why a solution or answer is right or why it is wrong – that is, the focus is on discussing the topic, not on who gives the right answer. They allow ideas and experiences to be shared without prejudice and accept the learners' emotions without ignoring or belittling them.

The rules of collaboration are reasonable both from the instructor's and the students' perspective, and are jointly discussed and agreed on and reviewed together from time to time where necessary. Learners know where to get support when they need it. They feel that they are valued and their contribution – thoughts, ideas, solutions – is welcome.

Competency 1.2. The instructor facilitates in-depth learning and the development of learning skills

Goal: students develop new conceptual knowledge that they will remember for a long time, and they are able to transfer it to new contexts. In addition to new knowledge in the field, students also improve their learning skills.

The instructor knows how the learning process takes place, ie how transferable and durable knowledge and skills are created and supported. They design the learning process in such a way that learners can relate new knowledge to prior knowledge. They do this by exploring and activating prior knowledge of each concept in a substantive rather than formal way, and by allowing learners to continuously interpret and expand what they have learned and relate it to other knowledge. They are able to suggest effective learning strategies and support students' metacognitive skills and knowledge, for example, helping them to understand why one way of learning is more effective than another; they help students to recognise their own ways of learning, as well as to notice how they think (for example, by discussing the difference between scientific thinking and reasoning and conventional thinking), etc. They create opportunities for new knowledge to be repeatedly forgotten and remembered, in order to reinforce and consolidate it. Essential knowledge is learned in a non-linear way (rather than topic-by-topic), returning to each important piece of knowledge, so as to constantly recall the knowledge in a new context. In order to generate new and non-perceptual concepts, so-called productive failures are designed into the tasks, allowing students to think first, experiment, activate prior knowledge and make mistakes. The tasks require learners to engage with what they are learning, such as reflecting on contradictions, reasoning, questioning, analysing, synthesising, independently discovering and formulating principles, applying knowledge in a new context, etc.

The programme includes time for delving into the subject and reflection. Alongside independent exploration, the emphasis is on dialogue and group discussion, which includes asking each other for explanations and examples, building on each other's ideas and discussing why a particular solution is right or wrong.

Competency 1.3. The instructor creates and maintains a safe environment

Goal: learning is both physically, socially and emotionally safe and adapted to the learners' needs.

The instructor makes preparations to ensure the safety of the programme. They assess potential risks arising from the environment in which the programme is to take place and plans appropriate measures to mitigate them. The instructor takes into account the basic physical needs of the participants (hunger, thirst, temperature, etc) and, where possible, addresses them in cooperation with teachers already while planning the programme. At the start of the programme, they introduce safety principles and help the learners make agreements to ensure safety. They can cope with the unexpected, react quickly, make decisions and resolve situations.

The instructor asks in advance for information about the preferences and (special) needs of the participants and takes these into account when conducting the programme, adapting the learning process accordingly. If such information has not been received in advance, they make changes to the programme based on the situation and the students' needs. They are knowledgeable about children's social-emotional development and take this knowledge into account when planning activities with groups of different ages. They accept different emotions (eg fear of insects, disgust at the smell of fish, sadness at the sight of animal hides, anxiety about the loss of biodiversity, etc) that the programme activities evoke in the students, and support them in regulating their emotions in such situations. In order to develop strategies that support this, the instructor encourages discussions, reframing of the experience, change of perspective and better understanding of the object of fear. They find each student a suitable way of participating. In this way, the instructor supports the basic psychological needs of the students and thereby also their autonomous motivation.

DOMAIN 2.

The instructor is an expert in the field of nature and sustainable development

The **instructor** supports the **development and consolidation of new environmental knowledge, skills and attitudes** in the students, as well as the linking of their prior knowledge with topics covered in the programme.

Students acquire and consolidate environmental knowledge, skills and attitudes and are able to explain their environmental behaviour.

Competency 2.1. The instructor has a good knowledge of nature and integrates sustainable development principles

Goal: the instructor is an expert in their field, with in-depth knowledge of the topics covered in the programme, the specific species/objects and the wider context, as well as principles of sustainable development, and is able to combine them into a systematic whole.

The instructor has a deep interest in and in-depth knowledge of a specific field of natural science. They are acquainted with reliable and relevant environmental information and are able to find necessary reliable and up-to-date information. They keep themselves up to date with the latest scientific news in their field, monitor the literature, and are aware of and can point out common misinformation. The instructor is prepared to discuss openly and in depth on topics related to their field and answer complex questions without a single solution (unsolved problems).

The instructor helps learners see how the whole and the individual components are related, and helps them understand the properties of complex systems (eg climate), such as emergence (the whole exhibits properties that the individual elements of the system do not), feedback mechanisms, etc. They are able to integrate social-cultural and economic aspects with natural science topics. They take into account the role of misconceptions in the development of new knowledge and ensure that these will not dominate.

The instructor's explanations are science-based, they distinguish between scientific and non-scientific material (eg folkloric, anecdotal, based on personal perceptions), common and scientific terms, and are able to refer to the sources of their claims and discuss the credibility of different sources where appropriate. They know the main features of scientific knowledge (systematic, verifiable, reproducible), understands the structure of research (question, hypothesis, observation/experiment, analysis, conclusion) and, where possible, practises the scientific process of reasoning and investigation with students.

Competency 2.2. The instructor links the educational programme with the curriculum

Goal: the educational programme is meaningful for students and teachers and supports learning, as it is in line with the national curriculum, integrates different subject areas, and students participating in the programme can relate it to their studies at school.

The instructor is familiar with the national curriculum, including the learning content for natural sciences, the set learning outcomes as well as the general part of the curriculum (cross-cutting themes, competences, etc), and is guided by this knowledge when preparing and conducting the programme. They work actively with the teacher who booked the programme, on a needs-based and individual basis, to ensure that students are best prepared for the programme, learn effectively during the programme and consolidate their new knowledge afterwards. They take into account the students' prior knowledge and experience of the subject and what is relevant for them at that moment in their school work. To do this, they consult with the teacher beforehand about the focus of the educational programme and the students' preparedness.

The instructor helps students understand what they are learning in the larger context of natural science, highlighting age-appropriate links between topics, fields and phenomena, including the principles of sustainable development. They create meaningful links between the content of the programme, what is being taught at school, the student's personal experience and the learning environment (exposition, trail, etc).

The learning activities created by the instructor are meaningful for themselves and the students. They can explain why it is important to know the topics and relate them to the wider context as well as to the student's prior experience and knowledge.

Competency 2.3. The instructor is a bearer of eco-friendly values

Goal: participation in the educational programme develops students' environmental awareness and willingness to act in an environmentally responsible way.

The instructor values a sustainable and just worldview, respecting the inherent worth, needs and rights of all people and other species across the planet. They understand that human beings are a part of nature, not simply surrounded by it. The instructor also supports students in developing an experiential and emotional connection with nature. They find ways to give students the time and opportunity to have different experiences of nature, such as positive emotions associated with nature (experiencing beauty, wonder, admiration, surprise, awe, etc); an awareness of being part of and inextricably connected with natural systems, not outside them; and an understanding that every species is intrinsically valuable and worthy of respect, and that nature does not need to be seen as a resource.

The instructor is a person who thinks systematically and critically in the context of sustainability and is able to recognise that what has brought us here will no longer take us forward. They can envision alternative scenarios for the future (eg based on the principles of degrowth, sustainable development, etc) and the steps to achieve them. They support students' ability to critically assess changes in society. They help students to understand how the future and our current way of life are linked, to envision a better future and to think how to achieve it.

The instructor shows by personal example (actions, discussions, questions and reasoning) how to act in an environmentally responsible way. They live up to their words and believe in what they teach, and they use examples and counterexamples to illustrate environmentally responsible behaviour. They strive to ensure that students, too, understand how natural, socio-cultural and economic systems function and are interconnected, so that students could take into account the complexity of the systems when interpreting and solving (environmental) problems and make environmentally sound choices in their daily lives.

DOMAIN 3.

The instructor is a self-directed and collaborative practitioner

The **instructor** is a self-directed professional who is considerate of their own well-being and self-improvement, as well as an initiator of collaboration and a good team player.

The instructor is an inspiring role model for the students, both professionally and as a person.

Competency 3.1. The instructor is a flexible professional and learner who focuses on self-improvement

Goal: the instructor is good at their job and continuously engages in self-improvement, seeking and using opportunities to improve their knowledge in the field, as well as teaching skills.

The instructor is an autonomous professional who takes on new challenges (in their field), proposes solutions, sets themselves tasks and carries them out. They have good metacognitive skills – they are aware of their own thinking and learning process, they analyse and guide it, and are able to see themselves the way others see them and guide their actions accordingly.

They systematically and continuously collect feedback on their work, distinguishing fact from judgement. For self-improvement, better professional performance and cooperation, they take feedback into account and modify their behaviour where necessary. The instructor systematically analyses their work, identifies learning needs and plans their professional development accordingly, taking into account the organisation's goals and means as well. They are development-oriented and know that as knowledge about teaching is constantly evolving, teaching requires constant learning and reassessment of views.

The instructor highly appreciates opportunities to learn with colleagues. Observing other programmes, giving supportive and constructive feedback and discussions with colleagues is an inherent part of the job. They are actively involved in the development of educational programmes, as well as in the development of the organisation and the sector as a whole. The instructor contributes to building succession and is also willing to take on the role of a mentor.

Competency 3.2. The instructor applies social-emotional skills

Goal: the instructor is a self-aware relationship builder and manager: they believe in the value of collaboration, use well-being strategies to manage emotions, are flexible in different situations, value and explore the views of others, and pay attention to their own mental health.

The instructor is aware that the skills of managing emotions can be developed. They practice their knowledge of strategies for managing emotions in work situations, noticing which teaching situations evoke more negative emotions in them, how they react in these situations and how this affects their students. They consciously try to use emotion regulation strategies that are more helpful for maintaining a good sense of well-being (eg mentally suggesting next steps to take in the situation; not

reinforcing the situation by constantly thinking about it; reframing the situation in their mind in a way that helps them understand possible learning points).

The instructor is empathic, accepts multiple perspectives and uses different strategies to take the point of view of others (asking questions, consciously holding back their own views, refraining from persuasion, etc). They solve problems in a collaborative and supportive way (including avoiding problem-inducing or reinforcing solutions in communication situations, such as jumping to conclusions, impatience, interrupting, blaming, and they try to reach a mutually acceptable solution).

The instructor knows how mental and physical health are linked and uses different ways to maintain them.

Competency 3.3. The instructor values and initiates collaboration

Goal: instructors are consciously collaborative, both in the creation, preparation and conducting of their programmes and in their cooperation with colleagues (including participation in professional networks).

The instructor values collaboration and involves others (colleagues, cooperation partners, etc) to find ideas and solutions. They value the work of colleagues and use their colleagues' materials in an ethical manner (including proper referencing), and expect the same from others. The instructor participates in learning communities and collaborative networks, as well as in events and projects to promote the field.

The instructor works with colleagues (network members, other instructors) and the target group students and their teachers to create and test or launch a new programme, also taking into account the perspective of the funder where necessary. When planning and conducting a specific educational programme, they explore and take into account the perspective of the school teacher/school and collaborate with teachers. They identify the school's expectations, specify the objectives and, if necessary, adapt the programme in cooperation with the school.

The instructor plans collaborative activities for students in the educational programmes. They bear in mind that students may not be able to collaborate effectively on their own, and they build up learning activities in such a way as to support students' independent collaboration skills by gradually reducing the instructor's support. The instructor involves the teacher throughout the programme, for example by delegating support activities and asking for help when needed. They ask for substantive feedback from both the teacher and the students after the educational programme and use the feedback to improve the programme.

Glossary

Autonomous motivation – a type of motivation in which an individual (eg learner) acts on the basis of either intrinsic, integrated or identified regulation. In other words, they act because they are interested in the activity, or they find the activity meaningful, necessary and/or valuable, or the activity fits with their self-image. Autonomous motivation generally involves more in-depth learning and more positive emotions associated with learning. Autonomous motivation is based on satisfied basic psychological needs.

Counterexample – a contrary example used to help the learner understand what the phenomenon being studied is and what it is not. A counterexample helps to define a phenomenon by identifying characteristics that do not characterise it (eg wind energy is a renewable resource, but peat is not because it does not regenerate over a human lifetime).

Environmental education – a system of knowledge, skills, attitudes and values that raises awareness of the interrelationships between the natural, economic, social and cultural environment, based on the concept of sustainable development. Environmental education raises awareness of the interconnections and impacts of the natural environment, including the impact of human activities in local and global contexts.

Environmental education programme – a form of active learning through which knowledge and skills about nature and the environment are acquired and a system of eco-friendly values is developed. The programme takes place over a fixed period of time through organised learning activities.

Instructor of an environmental education programme – a person who prepares and conducts environmental education programmes for target groups and has the knowledge, skills and values necessary for that.

Environmental awareness – understanding and willingness to take account of the relationship and interactions between human beings and the environment; an environmentally aware person bases their decisions on scientifically proven views and relevant environmental information.

Environmental education centre – an organisation that creates a learning environment conducive to the development of environmental awareness. The provision of education about nature, the environment or sustainable development is set out in the organisation's statutes or articles of association. The centre has permanent or seasonal staff dedicated to environmental education. The centre can belong to the public sector (state, municipality), the private sector or NGOs (MTÜ, SA in Estonia).

Conceptual knowledge/understanding – in the case of conceptual knowledge, the learner not only knows facts, ideas or methods, but understands them in a coherent, functional and organised way, knows in which context they are useful or relevant, and is able to transfer them to a new context. The term is more commonly used in mathematics education.

Metacognition – the learner's knowledge of the learning process and the awareness, planning, monitoring and control of their own learning (including basic learning processes, such as thinking, memory, attention, motivation, emotions, etc). (For more information, see <https://www.tlu.ee/sites/default/files/Instituudid/HTI/Blogimaterjalid/O%CC%83ppimise-abc.pdf>.)

Basic psychological needs – according to self-determination theory, autonomous motivation in any domain, including learning, is sustained when the basic psychological needs of learners are supported (*versus* ignored or suppressed): connection (a sense of belonging in a meaningful way, of being wanted

and needed in the group, of liking and being liked by others); competence (feeling that I am able to cope with demanding tasks; a sense of improvement and getting better; feeling that I understand how the world/rules work) and autonomy (feeling that my actions are meaningful and valued from my own perspective); I can make my own choices and be who I am; my ideas are listened to).

Competency model – a systematic description of the set of relevant knowledge, skills and attitudes required to perform effectively in a particular occupation or field.

Social-emotional development – the development of components related to social and emotional competences, such as the development of emotional self-regulation and emotional awareness, the development of the ability to take the perspective of others, but also the development of communication skills such as listening to others, working in a team, etc. It is important to keep in mind that these skills are developed gradually and therefore, for example, primary school children, but also basic school students, still have difficulties with the conscious regulation of their emotions and relationships, especially in a new situation. More information on this topic can be found in the relevant chapters in the book series 'Õppimine ja õpetamine' (Learning and Teaching), especially chapters on communication and social competence. https://haridus.ut.ee/sites/default/files/inline-files/edukoraamatkaanega_0.pdf

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Sustainable development – a way of development of human society that takes into account the needs of all living organisms on our planet, ensuring that human activities do not exceed the ecological limits of the planet. Sustainable development encompasses both global and local processes and approaches used to support development or achieve progress in a sustainable way.

Productive failure design – a learning design where learners are guided to create and test representations of, and solutions to, problems that are novel and complex for them. The learners have no prior knowledge of these solutions. While such a process may initially lead to mistakes in generating the right concepts and solutions, the method is inherently effective, as making mistakes is useful in the learning process. The design is effective provided that failure is followed by appropriate expert/teacher intervention (eg discussion of solutions with an expert) that can consolidate and synthesise the concepts and solutions generated by the students into correct knowledge. (See also <https://www.manukapur.com/productive-failure/>.)

Learning community – an environment where instructors and/or teachers can share, analyse and thus build on their experiences.

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