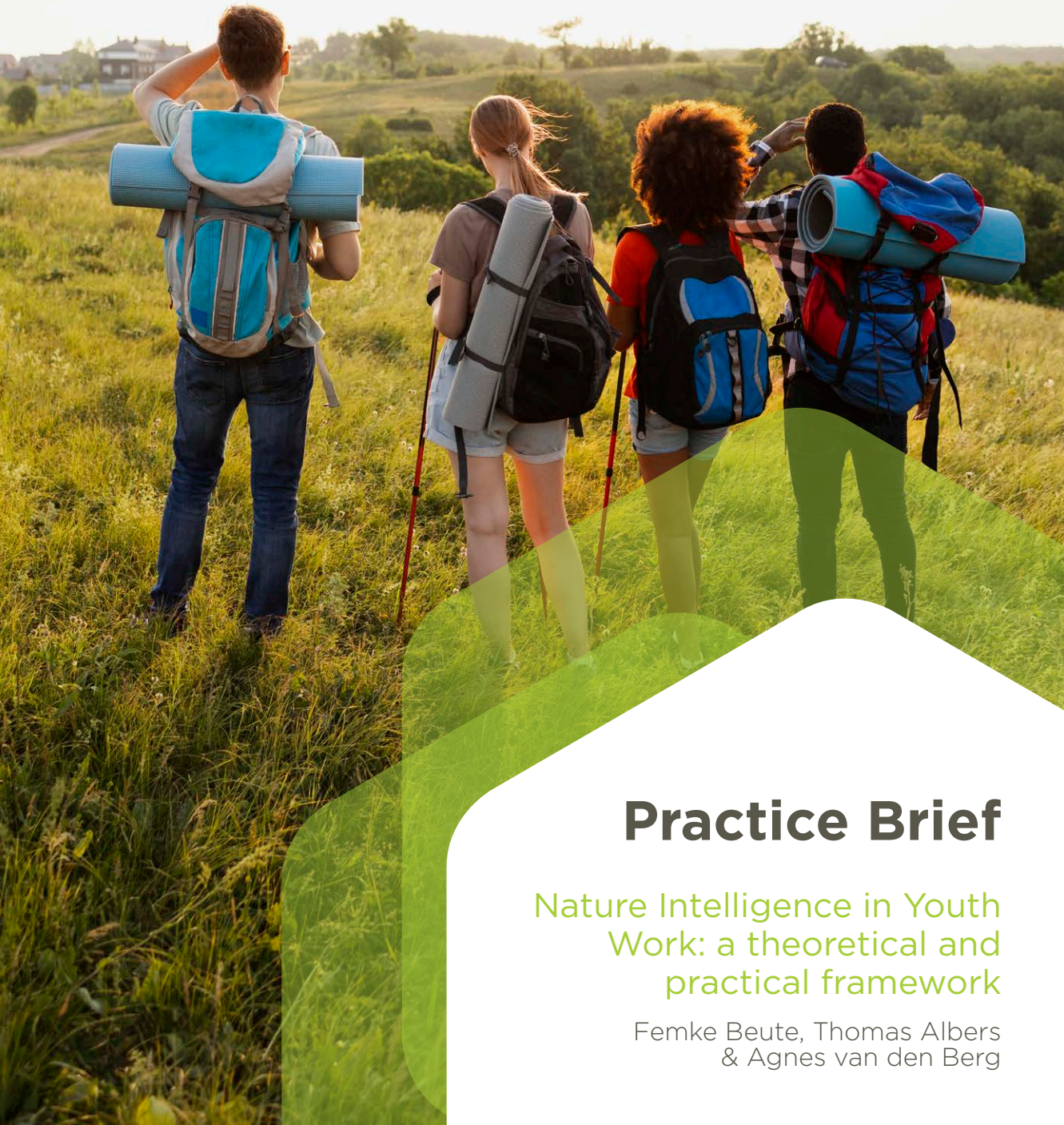

Practice Brief

Nature Intelligence in Youth Work: a theoretical and practical framework

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Co-funded by the
Erasmus+ Programme
of the European Union

This practice brief has been developed as part of the Erasmus+ Strategic Partnership "Nature Intelligence in Youth Work", which is funded under the Erasmus+ Programme, project number 2020-2-NL02-KA205-003082.

The project partners include: Anatta Foundation (Netherlands), IVN Environmental Education (Netherlands), Kamaleonte ASD (Italy), Zavod Ambitia (Slovenia) and Čia Čekija – Natural Spirit (Czech Republic)

Details of the full report, youth work curriculum and other documents are available from the project website: **www.natureintelligence.eu**

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Practice Brief citation: Beute, F., Albers, T., & van den Berg, A.E. (2022). *Practice Brief. Nature Intelligence in Youth Work: a theoretical and practical framework*. Aalten: Anatta Foundation.

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Introduction

Maintaining mental health and wellbeing of young people has become an increasing challenge in the past decade [1]. Especially since the recent lockdowns in most EU countries, young people have suffered dramatic decreases in their mental health [2]. Interestingly, during Covid-times, young people seemed to be seeking out nature as a place to restore from stress and socialise with peers [3-5]. The effects of spending time in and with nature on mental health and wellbeing are widely recognized and well-supported by scientific research [6, 7]

The new EU Youth Strategy (2019-2027), which was developed together with young people, highlights the importance of promoting young people's mental health and wellbeing as well as achieving a society in which all young people are environmentally active, educated and able to make a difference in their everyday lives (www.youthgoals.eu). This practice brief introduces Nature Intelligence (or its abbreviation NQ) as an integrative concept that addresses both these EU youth goals. It provides theoretical and practical guidelines for strengthening young people's connection to nature as a means to improve their own mental health and wellbeing as well as to actively contribute to a greener and more sustainable Europe and the planet.

This practice brief is aimed at educators working on youth wellbeing and pro-environmental behaviour, and other stakeholders of the youth sector. The youth sector has always played a key role in promoting and retaining mental health and wellbeing among youth as well as in promoting pro-environmental behaviour. Incorporating the concept of Nature Intelligence and the youth programme design principles in the youth sector can provide a synergetic and holistic approach to integrate these ambitions.

The general idea behind Nature Intelligence is that becoming more closely related to nature in cognitive, emotional, and spiritual domains will make young people more connected, engaged and empowered:

- **Connection:** Being closely connected to nature not only supports one's own personal health and wellbeing, but also strengthens the connection with other people, as nature is all around and independent of culture of society.
- **Engagement:** Being more closely related to nature leads to higher levels of engagement with the natural environment, and a higher willingness to protect it through environmentally friendly behaviours.
- **Empowerment:** Being closely connected to nature empowers young people by strengthening their nature-based competencies and skills and then empowers them to use these skills to become active (inter)national environmental citizens.

This practice brief was developed as part of the Erasmus+ project Nature Intelligence. It gives a summary of the content of the Theoretical Framework[1] and the Manual for youth workers[2] Other outputs of the project are a self-assessment questionnaire to measure one's own Nature Intelligence profile, a self-directed online training course, a youth worker training curriculum and a composition of background articles on the four NQ domains written by experienced youth workers. All project outputs are accessible free of charge through www.natureintelligence.eu.

1 Van den Berg, A.E. & Albers T. (2022). *Nature Intelligence in Youth Work: Conceptual model, measurement scale and critical success factors.* Aalten: Anatta Foundation.

2 Van den Berg, A.E., Paci, A., Kosková, H., Murn, K., Salmeri F. & Albers T. (2022). Nature as a teacher in youth work. *Manual for promoting Nature Intelligence in non-formal education programmes to connect young people with nature.* Aalten: Anatta Foundation.

Background and rationale

What is Nature Intelligence?

The concept 'Nature Intelligence' aims to promote and restore the connection of young people with nature. Nature Intelligence is defined as:

"A multidimensional set of human qualities to connect to nature in a cognitive, emotional and spiritual manner, and to actively use these qualities to support both one's personal wellbeing as well as the wellbeing of nature and the planet"

There has been much debate on what intelligence originates from: are we born with a certain intelligence, or do we acquire it during a lifetime? Nowadays, there is a consensus that both heredity and an interaction with the social and physical environment together determine intellectual intelligence, or IQ. But intellectual intelligence alone is not enough to predict whether someone will do well in life or not. Especially in the complex 21st century, different aspects of humans' intelligence are needed to do well and make a meaningful contribution to society. Therefore, besides intellectual intelligence, for example social and emotional intelligence have received increasing interest from both researchers as practitioners in the youth setting [8-11]. With this project, we propose Nature Intelligence as yet another kind of human intelligence that relates to people's capacity to connect with nature in multiple ways. The concept incorporates a holistic perspective towards Nature Intelligence, namely that it:

- is a combination of inherited factors and acquired skills. It can therefore be strengthened by educational programmes.
- combines *cognitive*, *emotional* and *spiritual* competencies that lead to actions. It therefore is seen as a wide array of multiple qualities of human nature experience.
- is regarded as an 'emergent property', which means that it is more than just a collection of competencies. It can be compared to water that possesses properties that are quite different from its dimensions, oxygen and hydrogen.

Why is Nature Intelligence important?

Young people have become increasingly disconnected from their natural environment through a range of developments, including urbanisation and increases in screen use (often indoors). At the same time, mental health problems have become one of the lead health burdens worldwide, and young people are no exception [12]. Research has shown that exposure to natural environments and natural elements can boost mental health [6], improve cognitive performance, self-regulation, and academic performance [13-15], and improve self-esteem, self-efficacy, and resiliency for children and adolescents [13]. In addition, childhood contact with natural environments and connectedness to nature has not only proven to be important for individual health and wellbeing, but are also important predictors for pro-environmental behaviour in adult life [16-18] and can result in more prosocial behaviour [19]. Finding ways to reconnect youth with nature can thus result in improvements of individual wellbeing, societal health, and potentially a more sustainable future [16, 18, 20].

How does Nature Intelligence relate to other relevant theories?

The concept of Nature Intelligence is closely related to existing theories on intelligence and nature connectedness. Especially three perspectives are relevant (see table 1 for an overview); The educational, the ecological, and the nature-based perspective.

Within the educational perspective, Gardner [21] in his theory on multiple intelligences, introduced the terms of naturalistic intelligence and existential intelligence. Naturalistic intelligence concerns the level of sensitivity to nature and the world, but mostly from a cognitive perspective. Existential intelligence is about being able to use intuition, thought, and meta-cognition to ask and answer existential questions. More recently, Daniel Coleman [22], tried to combine the concept of emotional intelligence with Gardner's naturalistic intelligence into Ecological Intelligence, extending the concept to all natural systems. This concept proposes that humans feel empathy with the natural world and feel distress when thinking about the 'pain' endured by the planet. Last, dating back to the earlier Greek Philosophers, the concept of Intelligence in Nature views natural environments as inherently intelligent.

Nature intelligence distinguishes itself from these related concepts by providing a broader, multidimensional perspective covering the cognitive, emotional and spiritual aspects of human nature connection and the competency to put one's connection to nature into action in order to maintain one's own wellbeing and develop pro-environmental behaviour.

Table 1 shows an overview of these four related concepts and their similarities and dissimilarities with Nature Intelligence.

		Similarities	Differences
Educational perspective	Naturalistic Intelligence	Nature Intelligence encompasses all elements of naturalistic intelligence	Within Nature Intelligence, there is a stronger emphasis on emotional/ affective and spiritual relationship with nature Nature Intelligence includes higher-order cognition (e.g., learning, self-regulation), whereas naturalistic intelligence focuses only on lower-order cognition (e.g., observation) Nature Intelligence includes an action dimension related to using the benefits of nature exposure on health and wellbeing, which Naturalistic Intelligence lacks.
	Existential Intelligence	Both are related to spirituality	Existential intelligence is broader than Nature Intelligence and not specifically focused on nature
Ecological perspective	Ecological Intelligence	Nature Intelligence shares the emotional connection to nature with ecological intelligence Nature Intelligence also recognizes the importance of the connection with nature for action related to environmentally friendly behaviour.	Ecological Intelligence does not recognize the benefits of nature for individual health and wellbeing, whereas this is part of Nature Intelligence
Nature-based perspective	Intelligence in Nature	Both recognize that nature can be intelligent	Intelligence in Nature is a characteristic of nature, whereas Nature Intelligence is a characteristic of humans

Table 1. *Similarities and differences of Nature Intelligence other relevant existing concepts.*

Determinants of Nature Intelligence

Nature Intelligence encompasses four dimensions that can be considered its determinants: cognition, emotion, spirit and action.

Cognition refers to the more 'classical' competencies of nature education (such as learning the names of plants and animals) but also to more experiential elements of cognition. These are the development of curiosity towards what is going on in nature and acquiring the practical skills necessary to thrive and survive in natural environments over extended periods of time.

The **Emotion** dimension taps into feeling connected to nature and embracing the positive experiences as well as potentially less positive ones such as bad weather or annoying insects. This latter aspect requires the aspect of being open-minded. At the same time, physical interaction with nature (embedded within the competency of embodiment) helps build resiliency against potential negative aspects of nature, besides facilitating a more direct connection with nature.

Cognition	Emotion	Spirit	Action
Literacy	Connectedness	Transcendence	Health
Knowledge and an intuitive understanding of the dimensions, elements, patterns, and processes of nature	The ability to connect to nature, to care for other living beings, to live in harmony and balance with nature, and to identify oneself as part of nature	A' flow experience' (also known as 'magical moments' or 'peak experiences') during which one feels lifted and connected to something bigger	Recognising and using the relaxing and empowering capacities of nature for self-regulation and mental health
Curiosity	Embodiment	Mindfulness	Engagement
An interest in nature and awareness of the intrinsic value of nature	A direct connection with nature through physical contact, which also implies resiliency against more adverse conditions in nature such as bad weather or dirt	Having a mindful sensory experience of nature	Being motivated and capable to engage in actions that make the planet greener and more sustainable
Outdoor skills	Open-mindedness	Authenticity	Socialization
Having practical knowledge and basic skills for staying outdoors and being in nature	Having an open mind, enjoying all aspects of nature, even the things that might be scary or disgusting	The capacity to be true to oneself, to be an authentic person guided by one's own inner principles, as a precondition for, and outcome of, spiritual experiences with nature	Choosing nature as a place to spend time with friends and family and using a shared interest for nature to strengthen connections with peers

Table 2. *Overview of the four different dimensions of NQ and their competencies*

The dimension of **Spirit** adds the feeling of interconnectedness and a feeling of transcendence, brought upon by the realisation that nature is alive and intelligent. The competencies that encompass this dimension are experiencing flow or having magical moments in nature (transcendence), mindfulness, and authenticity.

Fourth and last, the ability to use the competencies within the other three dimensions (cognition, emotion, and spirit) is captured in the **Action** dimension. These competencies can be used to improve mental health and self-regulation, to be more engaged with the people around us and more willing to engage in pro-environmental behaviours.

Nature Intelligence is seen as an 'emergent property', meaning that it is more than the collection of its dimensions and competencies. In other words, a person is believed to create a synergistical property when they have acquired skills and competencies within all of Nature Intelligence's four dimensions (cognition, emotion, spirit, action). More poetically, NQ can be compared to a rainbow that starts shining under specific conditions, if one is in the right time and place. Table 2 shows the description of the four dimensions of nature intelligence and the three competencies that are included in each dimension. Figure 1 illustrates the concept in the form of a 'flower model'.

Figure 1. *The NQ flower model*

Promoting young people's Nature Intelligence: using nature as a teacher

Nature Intelligence can be nurtured by promoting active engagement with nature. As mentioned earlier, people have often viewed the natural world itself as intelligent. In addition, people often use nature as a source of reflection and a metaphor for life situations. Therefore, nature itself can be seen as a teacher, facilitator, and inspirer. A wide range of **principles** of nature can be used to promote Nature Intelligence in the youth work setting and four of these will be introduced here: *wholeness*, *diversity*, *cycles*, and *forces*. These dimensions of nature can be used to teach, inspire, and reflect upon.

Wholeness refers to the quality of nature of being a coherent system. This principle refers to nature's quality of being a whole, single entity that cannot be broken up or divided into its parts, with every single element (big and small) contributing to the equilibrium. Wholeness is a key principle of holistic education, a philosophy of education based on the premise that each person finds identity, meaning, and purpose in life through connections to the community, to the natural world, and to spiritual values such as compassion and peace.

Nature needs its **Diversity** to function well, which also makes it resilient to changing conditions. As humans, we are often used to think in limited resources and finite solutions and systems, nature on the other hand is very abundant. The diversity of nature could spark a more cooperative lifestyle as opposed to a more competitive lifestyle. As part of the intelligence of nature, there is a continuous flow of things, nothing ever remains the same.

There is continuous growth and all processes go through one or more **Cycles**; the cycle of day and night, different seasons, and cycles of growth and decay and life and death. These cycles can be embedded in youth programmes and used to reflect upon the cycle of life or other important life situations. It can also be important for modern youth to reconnect to these cycles, such as by eating seasonal food and maintaining a healthy sleep/wake cycle.

Lastly, nature possesses many different vital **Forces**. These can be strong and life-changing such as a natural disaster, or subtle and often more pleasant such as a cool breeze on a warm summer's day. The youth programmes could use nature's forces to notice how they influence mood, establish continuous growth or increase creativity.

For each principle there are a few design guidelines for implementing that principle in youth work programmes. These are presented in table 3. For example, the cycles of nature can illustrate the cycles of life a person goes through. This can teach young people that feeling bad (having a 'crisis') is a part of the cycle of life, which is sometimes an inevitable part of growth leading to positive outcomes. Another guideline 'be coherent and authentic' with relation to the wholeness of nature refers to the role of the youth worker and the importance of being trustworthy and inspiring to young people to always 'practice what you preach' by for example giving healthy food and reducing waste during the programme. A more detailed description of all the guidelines and on the implementation of nature as a teacher can be found in the Youth Workers manual[3].

3 This youth worker manual can be accessed free of charge on www.natureintelligenc.eu/publications/

When designing or improving youth programmes aiming at developing Nature Intelligence, these principles and guidelines may be taken into consideration. However, it should be noted that the principles and guidelines are only suggestions for how Nature Intelligence can be used in youth work, they are by no means exhaustive. They can be adapted, extended and used as according to the aims and contexts of programmes and activities. As a minimum requirement, since Nature Intelligence is seen as an emergent property, all four elements (cognition, emotion, spirit, and action) would need to be addressed in the youth programme for it to be a Nature Intelligence programme.

	Wholeness	Diversity	Cycles	Forces
Description	Nature's quality of being a whole, single entity that can't be broken up or divided into parts.	Nature is based on abundance and generosity (as opposed to what humans often implement: scarcity)	Nature's cycles are self-sustaining and self-regulating	Nature includes vital forces and powers that can be existential (and life-changing), but also subtle (and often more pleasant)
Example	Nature as an interconnected organism, in which every part has a specific role, including humans, e.g., food chains	The diversification of ecosystems, where (e,g.,) plants and species generate abundant resources to share	Passing of the seasons, day/night cycles	Strong: volcano eruption, stormy winds. Subtle: sunrise, a cool wind
Guidelines	Connect	Be aware of different entry points	Respect different phases of cycles	Connect to nature's powers
	Include all elements	Listen to the wisdom of the whole circle	Understand crisis as a natural phase	Be creative
	Be coherent and authentic	Engage all senses	Allow regeneration	Support transformation
	Acknowledge basic developmental needs	Celebrate complementarity	Use patterns	Leave space for magic to happen

Table 3. Overview of the four principles of nature than can promote NQ, including some examples and guidelines

Measuring Nature Intelligence

As a practical tool for youth work, a questionnaire was developed to measure the level of Nature Intelligence, the NQ-36[4]. The questionnaire consists of a total of 36 statements, three for each of the twelve competencies. The questionnaire can be used to make an individual Nature Intelligence profile, helping young people and their youth workers to identify which domains and competencies are most developed and where there is still space for growth. It can also be used to develop personal learning goals or for a learning needs analysis. The statements are especially designed for young people aged 16 to 30 years old and can also be used to measure the impact of a youth programme, with pre- and post-programme questionnaires. Statements are for instance, *'I don't get lost in nature easily'*, for the competency 'outdoor skills' within the cognition dimension. In the youth workers' manual more suggestions for evaluating and reflecting on the programme and individual learning process are provided. A free self-taught online course[5] is available to develop one's own Nature Intelligence competencies.

Youth organisations as a setting for Nature Intelligence promotion

Using nature as a teacher fits well within non-formal education programmes[6]. This approach can be incorporated in for example outdoor and environmental education programmes, but also in more general youth work in urban and indoor settings. Many excellent programmes already exist in the youth work setting and the guidelines presented developed in this project can be embedded (or integrated) in any new or existing programme on the promotion of Nature Intelligence aiming at improving youth's wellbeing and the wellbeing of the planet's ecosystems. The Nature Intelligence questionnaire can be used to assess the efficacy of the programme by administering the questionnaire before and after the programme and calculate the difference between the pre-and post-score.

Implementing Nature Intelligence in youth work: Lessons learned from environmental education

The concept of Nature Intelligence is new, but much can be learned from evaluations of earlier experiences with environmental education on what can make Nature Intelligence programmes successful. Environmental education is an umbrella term that includes two broad perspectives, one focusing on nature education (i.e., gaining a better understanding of nature) and one on sustainable development (i.e., promoting pro-environmental behaviour). Knowledge on the efficacy of the program within the action domain (gaining the mental and physical benefits of nature) can, in addition, be found in the literature on the restorative effects of nature (i.e., nature's capacity to restore health and attention [23, 24]) and research on wilderness therapies for child and youth care [25, 26]. Table 4 provides an overview of some of the lessons learned from environmental educational programmes addressing some or multiple of the four dimensions of Nature Intelligence.

4 The full questionnaire, including scoring instructions, can be found here on www.natureintelligence.eu

5 For free access please visit www.natureintelligence.eu/online-training-course/

6 Non-formal education is an experiential learning approach to youth work that takes place outside the formal learning system.

	Lessons learned from environmental education
Cognition	• There are differences in preferred learning style, some like being taken by the hand whereas others like to explore thing alone [27] • Programs should not be too structured (e.g., worksheets etc. are often not appreciated) [28]
Emotion	• During adolescence, there is often a dip in nature connectedness (due to hormonal changes that lead to a larger interest in social interactions) [29] But nature connectedness can be increased in this age group through environmental education [30] • The type of environment has an influence on the increase in connectedness to nature. For instance, rural settings, coastal areas, and more pristine nature reserves may have an additional effect [31] • Continued, direct contact with nature is important, especially for urban youth [32]
Spirit	• 'Peak experiences' are important for spirituality and can be established through flow experiences, significant life experiences, sublime experiences, and magical moments [33-37]
Action	• Natural environments can reduce stress and anxiety and improve mood, vitality, self-regulatory capacity, and attention capacity • The benefits of nature exposure on health are enhanced by simultaneous exposure to daylight (and by a lack of exposure to electric light / screen devices) [38, 39]. In addition, youth that normally have high screen usage often benefit most from nature programs [40] • Not all natural environments influence health and wellbeing similarly. Especially the specific features, or characteristics, of the environments can make a difference [41]. For instance, areas with a lot of dense vegetation can have negative effects [42], whereas coastal areas have more pronounced benefits than inland water areas [43]. In addition, effects are stronger in pleasant and unthreatening environments • Care should be taken when combining nature exposure with mindful exercises, because they can make the experience less spontaneous and more cognitively demanding. Which can make the nature experience less restorative and healthy [44]. • Open groups (with a constant flux of new members) often score better on beneficial outcomes (e.g., behavioural observations, personal effectiveness, locus of control, clinical measures) than closed groups. Closed groups are, however, better for the promotion of self-esteem.

Table 4. *Overview of the lessons learned from environmental education for each of the four dimensions of NQ*

General success factors for environmental education are:

- Longer programs produce longer lasting effects [45]
- A good preparation, as well as follow-up improves the quality [46]
- Shared experiences as well as teachers' role modelling are important [47]
- Girls respond differently than boys. Girls often need to feel social acceptance before they are open to the program [27]
- Direct physical and sensory contact with nature strengthens the effects [32, 48].
- For all competencies, it is important that youth have unstructured free time in nature. Too many organized activities can hinder opportunities to develop coping skills and experience magical moments. In addition, it can also place too much cognitive demand on the participants [48].
- The right balance between social and individual activities needs to be established. For adolescents, social interactions in nature are important. There also needs to be some opportunity for alone time, to allow for reflection and introspection [48, 49].
- Excessive fears for nature can hinder the effectivity of the program [50, 51]. Therefore, potential fears need to be recognized, acknowledged, and dealt with as part of the program. For example, by introducing guided exposure to the fear-evoking elements and situations.
- Careful consideration of the environment of the program is also necessary, and diversity in the chosen environments is optimal. Youth programs are often organized in wilderness which are highly suitable for some competencies (e.g., building outdoor skills), but for others (e.g., relaxation and socialization) it may be better to be in more familiar natural environments.

Conclusions

This practice brief introduces the concept of Nature Intelligence, why it is important, and how it can be applied in the youth sector. The practice brief presents guidelines for implementing the intelligence of nature as a teacher and framework in youth work to restore and promote the connection of modern youth with nature in order to increase nature intelligence. This increase in nature intelligence, in turn, is proposed vital for adolescent (mental) health, societal participation, and to foster a more sustainable society.

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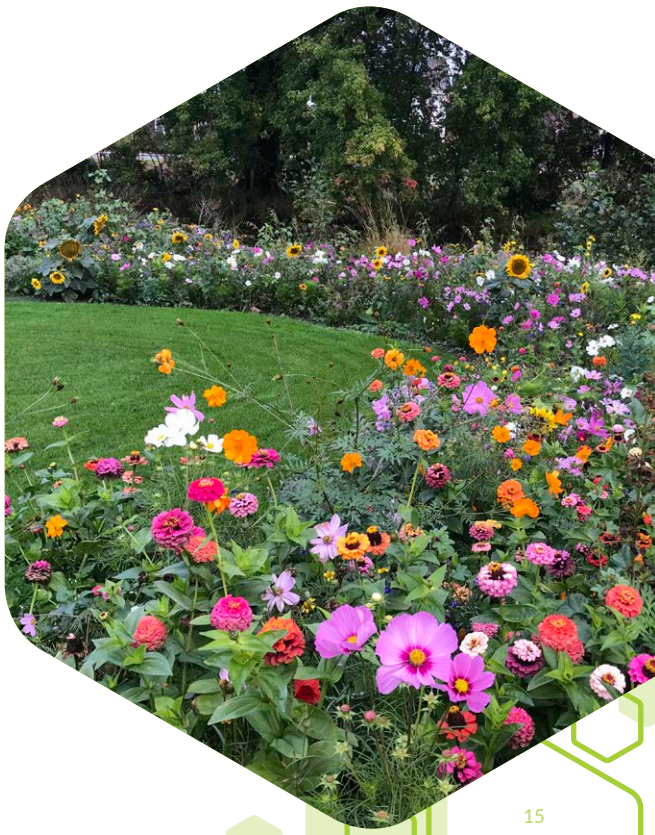

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Co-funded by the
Erasmus+ Programme
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