

**INFORMAL LEARNING THROUGH NATURE EXPERIENCE - THE EDUCATIONAL
PRACTICE OF RANGERS IN A BIOSPHERE RESERVE**

**APRENDIZAGEM INFORMAL ATRAVÉS DA EXPERIÊNCIA DA NATUREZA - A PRÁTICA
EDUCACIONAL DE GUARDAS FLORESTAIS NUMA RESERVA DA BIOSFERA**

**APRENDIZAJE INFORMAL A TRAVÉS DE LA EXPERIENCIA EN LA NATURALEZA - LA PRÁCTICA
EDUCATIVA DEL GUARDABOSQUES EN UNA RESERVA DE LA BIOSFERA**

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ABSTRACT | In informal learning by experiencing nature, the pedagogical practice of learning with all the senses takes hold. Having this in mind, every day and experiential learning emerge as the basis of this paper. The objective is to relay scientific topics related to sustainability to adults and subsequently to children on an informal level. The practice is implemented in the Carinthia side of the Salzburger Lungau & Kärntner Nockberge Biosphere Reserve in southern Austria. For the implementation of the project the rangers of a biosphere reserve act as central knowledge mediators. Ten years ago, this region was recognized by UNESCO as a model and future region, and therefore general knowledge transfer is a central focus of its activity. In the course of the informal educational practice of the biosphere reserve rangers, education for sustainable development comes into play, along with other aspects. The guided hikes offered in the Nock Mountains provide a practical context for implementing non-formal science education.

KEYWORDS: Everyday learning, Experiential learning, Nature experience.

RESUMO | Na aprendizagem informal através da experimentação da natureza, a prática pedagógica de aprender com todos os sentidos destaca-se. Tendo esta premissa em consideração, a aprendizagem realizada no dia e a dia e feita a partir da experimentação emerge como a base deste documento. O objetivo passa por trabalhar temas científicos relacionados com a sustentabilidade junto de adultos e subsequentemente com crianças, a um nível informal. Na fase de implementação, os guardas florestais de uma reserva da biosfera atuam como mediadores. A prática é implementada na reserva da biosfera Carinthian Nockberge, no sul da Áustria. Há dez anos, esta região foi reconhecida pela UNESCO como um modelo e região futura, e, como tal, a transferência de conhecimento ocupa um lugar central na sua atividade. No decurso da prática educativa informal dos guardas florestais da reserva da biosfera, a educação para o desenvolvimento sustentável entra em jogo, juntamente com outros aspectos. As caminhadas orientadas através das montanhas Nockberge oferecem um contexto prático para a implementação da educação de ciência não formal.

PALAVRAS-CHAVE: Aprendizagem quotidiana, Aprendizagem experimental, Experiência na natureza.

RESUMEN | En el aprendizaje informal a través de la experiencia con la naturaleza se afianza la práctica pedagógica de aprender con todos los sentidos. Por tanto, el aprendizaje cotidiano y experiencial surge como fundamento de este trabajo. El objetivo es transmitir temas científicos relacionados con la sostenibilidad a los adultos y, posteriormente, a los niños a un nivel informal. Esta función se lleva a cabo por los guardas de una reserva de la biosfera, los cuales actúan como mediadores centrales del conocimiento. La práctica se lleva a cabo en la reserva de la biosfera de Carinthian Nockberge, en el sur de Austria. Hace diez años, esta región fue reconocida por la UNESCO como región modelo y de futuro, lo cual implica que la transferencia de conocimientos es un punto central. En el transcurso de la práctica educativa informal de los guardas de la reserva de la biosfera, la educación para el desarrollo sostenible entra en escena, junto con otros aspectos. Las excursiones guiadas que se ofrecen en las montañas de Nockberge proporcionan un contexto práctico para aplicar la educación no formal en ciencias.

PALABRAS CLAVE: Aprendizaje cotidiano, Aprendizaje experimental, Experiencia en la naturaleza.

1. INTRODUCTION

Informal learning is a relevant field in science education practice. In particular, in situations in which individuals need to be introduced to scientific knowledge and understanding of nature, experiential learning in nature can be a well suited strategy. Interacting with the natural world is a central basis for learning about nature (Flade, 2018). Learning about nature in turn opens up ways to delve deeper into the subject matter of science and is strongly related to education for sustainable development. Education is an essential tool to support sustainable development. After all, sustainable development involves far-reaching transformations and fundamental shifts in perspective (Adomßent, 2016) which can only be achieved through education. To enable sustainable development, a change in the awareness of as many people as possible is necessary. This process of change represents a transformation of society as a whole (Engel et al., 2021). Since education functions as a supporting pillar in this transformational process, so-called transformative learning takes on particular significance. Transformative education - which always includes informal learning processes - aims to change anchored ways of thinking through experiential reflection and to integrate new experiences into ways of thinking (Fuhr, 2018). If the term learning is considered with regard to sustainable development, it means that the individual is able, on the basis of these learning processes, to answer questions in concrete fields of action about how the future can be created sustainably (Rauch, 2008). Transformative learning processes can therefore support the individual in building an understanding of sustainable development, as in fact sustainability has many links to scientific topics. This process can occur particularly when learning takes place in and with nature. Sustainability has its roots in two key concepts: the natural science concept of a limited world and the social science concept of needs (Walser, 2009).

The Salzburger Lungau & Kärntner Nockberge Biosphere Reserve (hereafter Nockberge Biosphere Reserve) can be seen as an example of a context in which non-formal, transformative educational processes are promoted. The ranger-led hikes in this area have the goal of bringing the participants closer to nature in a practical way while informally imparting knowledge of natural sciences (Nationalparks Austria, 2021). The Nockberge Biosphere Reserve links the two components of education and nature. Both dimensions are essential fields of action in the biosphere reserve's management plan and are brought closer to the people on an informal level within the framework of guided hikes. In the course of this knowledge transfer, people are also brought closer to science (Zollner et al., 2015). Excursions, walks or - as in this case - hikes can particularly serve as informal educational formats that can promote intergenerational learning. From the perspective of social learning, non-institutional forms of learning are promoted; for example, the transfer of natural science knowledge from adults to children in the course of walks. During the guided walks, practical skills related to science are acquired. These skills are in turn implemented and passed on in the family context, allowing different generations to learn together (Antz et al., 2009). Guided hikes can foster informal learning processes, as national parks, biosphere reserves, and particularly forests can be considered extracurricular places of learning (Jäkel, 2021).

It can be argued that the practical educational work of the rangers can support transformative learning by encouraging the participants of a guided walk to engage in transformative educational processes. In addition, guided walks with several participants offer the opportunity to develop a kind of community feeling. And it can be observed that deep,

transformative learning takes place in an environment characterised by a strong sense of community (Bano et al., 2022). Nature experiences are made in the course of the guided hikes. Connection to nature based on sensory experience can in turn promote scientific knowledge and a responsible approach to the environmental stewardship (Frantz-Pittner et al., 2019).

The curricular framework of this activity is of a non-formal nature. Scientific topics may be introduced to the participants of a guided hike “along the way.” The target audience may include adults who participate in the guided hike and their children or grandchildren, to whom the acquired knowledge is passed on informally at an intergenerational level. Families are usually regarded as important contexts of informal education, by serving as a basis for learning, and given the intergenerational knowledge exchange processes take place at the family level. This allows reshaping of the family culture, adapting it for the needs of the family (Büchner & Wahl, 2005). The ranger-guided hikes in the biosphere reserve serve as an educational activity to pursue the purpose of fostering these intergenerational educational processes. As part of the guided hikes, the rangers create explicit adventure opportunities that are processed by the participants and turned into memorable experiences after the hike (Hof, 2009). These experiences have also a scientific connection and are further developed in the context of intergenerational learning processes. If informal learning activities take place in open nature, this can lead to increased abilities with regard to conclusive natural science thinking: in the course of this process, logical thinking is therefore encouraged (Baar & Schönknecht, 2018). Overall, the educational or didactic challenge is linked across three levels: didactics; interaction; and methodology. In other words, the connection is established between teachers (in this case the rangers), learners (in this case the hikers) and the learning object (here, the natural science topics that can be explored in the context of the biosphere reserve) (Hof & Egloff, 2021). According to Siebert (2019), didactics refers to the mediation between the factual logic of the content and the psychology of the learner. Factual logic means the knowledge of the structures and connections of the subject matter. Psychology refers to the learning and motivational structures of the learner. Within the framework of the didactic action of the teachers, the knowledge transfer takes place on different levels. Theories of the so-called instructional design are used in the planning of teaching-learning processes. Among other aspects, instruction includes telling, explaining, and demonstrating, as well as responding to learners' needs and expectations. The instruction aims to design and arrange the environmental conditions in a targeted way in order to improve the competences of the participants (Hof & Egloff, 2021). In a biosphere reserve, a ranger designs the environmental conditions in the course of guided hikes according to the theme of the hike. For example, hiking trails can be specifically selected that contain plants which are explained by the ranger during the hike or used as visual objects (Biosphärenpark Nockberge, 2021). The practice of guided walks in the biosphere reserve tries to solve the practical problem of a non-formal mediation between factual logic and the psychological nature of the learner. Based on this logic, the individual should be given the opportunity to develop curiosity on a scientific level. This awareness of science could contribute to the development of an understanding that we as human beings have a duty to protect other living beings (von Hentig, 2004).

2. RATIONALE AND CONTEXT

In order to clarify the contextualization of the educational practice, the approach that relates to and supports the implemented practice is next described. Literature shows that non-formal learning or informal education might have a strong connection to nature conservation. Informal learning can be further motivated by special experiences and impressions, which can also take place in nature. These experiences could serve as a basis for building up knowledge about nature conservation and a general interest in science (Salinger, 2009).

2.1 Stimulating educational processes through nature experiences

Educational work is made up of different components. For example, perceptions, sensations and attributions of meaning are often in a state of tension with scientific knowledge. In terms of nature relations, education needs the plurality of perspectives, free experience and space for experience. In order to be able to grasp nature rationally, scientific concepts are needed; at the same time, experiences of nature should allow free play with the senses and leave room for creativity and self-will (Dittmer & Gebhard, 2021). In this context, Lerch (2020) emphasizes the importance of the senses by arguing that the active processing of sensory impressions occurs on an individual level and is based on emotional perceptions as soon as a person engages with his or her environment.

In order to stimulate learning with all the senses, the so-called excursion didactics offers possibilities to learn in a non-formal setting (Dittmer & Gebhard, 2021; Hasse, 2010). In this way, natural spaces are opened up, new experiences can be gained, and action competence can be promoted. In addition, opportunities for participation are fostered, as excursions usually involve several participants (Baar & Schönknecht, 2018). Through a special didactic and methodological approach, learning can be promoted in leisure time. By encouraging people to understand the phenomena in their environment on an informal level, an awareness of practical exploratory and reflective developmental learning can be unfolded (Dohmen, 2000).

A didactic approach appealing to all senses is implemented by the rangers in the Nockberge Biosphere Reserve, leading the guided hikes to be regarded as an educational innovation.

2.2 The forest as an informal learning setting

The forest is an exemplary place of learning that offers a wide range of topics that stimulate educational processes and enable people to participate in sustainable development (Stoltenberg, 2009). Brinkmann & Freericks (2016) point out that forest destinations can be described as worlds of experience whose strengths lie in arousing visitors' interest and thus providing a starting point for further formal and informal learning. According to Stoltenberg (2009), the forest cannot only be regarded as a place of learning per se, but it also represents an educational topic itself. This is because this natural environment offers the possibility of seeing connections emanating from the forest and thus discovering creative opportunities at different levels and in different fields. This could indicate that through informal learning in the forest, the individual could learn about and understand the contextual connection of human-nature relations (Stoltenberg, 2009; Gräntzdörffer et al., 2019). Through experiences of nature, humans focus their attention on an object in nature, which might lead to a conscious engagement with

nature, i.e. a reflection (Lude, 2021). Lude (2021) thus describes the experience of nature as a reflective engagement with nature. Nature experience takes place when people act in nature or interact with nature. Large, model-oriented protected areas – including biosphere reserves - strive to convey relevant content to their visitors within the framework of informal educational offers. This education should provide visitors with holistic, cognitive and emotional opportunities to experience nature, in addition to knowledge about how to treat nature with care (Lude, 2021; Wohlers, 2015).

3. DESCRIPTION OF THE EDUCATIONAL PRACTICE AND ITS IMPLEMENTATION

The educational practice presented in this report is carried out in the Nockberge Biosphere Reserve. Specifically, a permanent informal educational format is described: the ranger-led themed walks in the biosphere reserve, which appeal to all age groups (Zollner et al., 2015) and thus promote extracurricular and intergenerational learning. This practice – implemented by the rangers – can be located in the context of nature, promoting the fields of education, communication science and natural science (von Felden, 2020). The educational practice implemented during the guided walks is based on learning about natural sciences, in addition to the social and communicative factor. This leads the participants in the ranger-led walks to be sensitized to topics in biology, geography and environmental science and encouraged to engage with the content independently (Stolz & Feiler, 2018).

In the course of extensive training and further education courses, the rangers working in the biosphere reserve acquire ecological expertise as well as pedagogical knowledge. This includes, among other things, nature education and didactics of excursions (Hartmann & Stückler, 2016). This enables the rangers to implement the pedagogical practice within the framework of the guided hikes and to provide the participants with an engaging educational experience. The rangers play an important role with regard to the educational mission of the biosphere reserve; one of their central tasks is to guide visitors, including imparting knowledge about sustainability and nature conservation issues. The rangers act as ambassadors of nature, accompanying guests and school groups in the biosphere reserve with target-specific workshops (Nationalparks Austria, 2021). During the guided hikes, the rangers explain and illustrate the diverse life in nature reserves and convey the important significance of biodiversity to people of all ages. In addition, great importance is attached to the participants of the hikes interacting with each other and thus learning with and from one another (Zollner et al., 2015).

The hikes are organized according to the season. The topics vary depending on whether the hikes take place in summer or winter. If there are more than 20 participants, two rangers accompany the hiking group. A guided themed hike lasts between three and five hours. There is more challenging content that is suitable for adults; family hikes are also organized. The themed hikes are organized in such a way that the ranger provides insights into the respective topics, especially natural science topics can be found here. Natural materials are used as educational resources (Biosphärenpark Nockberge, 2021). The ranger explains certain facts at different locations, shows plants or herbs along the way and poses questions to the hiking group. In some cases, a clearly defined question or problem is assigned to the hike; this is dealt with or answered during the excursion. Particularly on hikes through the forest, people can thus develop an understanding of ecological interrelationships and nature conservation (Stolz & Feiler, 2018).

This informal educational format is therefore relevant to the community as it addresses issues related to sustainable development and stimulates public involvement in science by communicating natural science topics in an understandable participant-oriented and practical way (von Felden, 2020). Walking participants move in an environment that stimulates their senses, which in turn stimulates incidental informal learning. People engage with specific sustainable development issues during - and usually also after - the hike, which leads to appropriation processes. This experience-oriented appropriation combines entertainment, interest formation and sociability and there are lasting effects on everyday life and knowledge transfer (Adomßent, 2016; Brinkmann & Freericks, 2016).

During a hike, rangers interact with the participants and try to combine the teaching of the content with action-oriented methods. This educationally relevant interaction between the ranger and participants is intended to arouse the interest of the actors, thus promoting informal learning and higher order thinking skills (Stolz & Feiler, 2018). The ranger orients each guided hike to the educational level of the target group; the content is therefore adapted to the participants, so that individual action skills can be promoted and, in addition, participation opportunities can be opened up (Baar & Schönknecht, 2018). The guided walks are an innovative practice because the rangers act as mediators and encourage participants to work together as a group on a science-related topic and thus learn in a self-responsible way (Biosphärenpark Nockberge, 2021).

Learning through hands-on exploration is the primary focus of guided walks by rangers (Biosphärenpark Nockberge, 2021); the practical informal learning experiences and actions that take place during guided walks are subconsciously incorporated into the participants' everyday learning. Everyday learning can subsequently support the individual in coping with concrete problematic situations (Dohmen, 2000).

4. EVALUATION OF THE IMPLEMENTATION OF THE PRACTICE

4.1. Methods used

In order to evaluate how the educational practice is implemented, three participants were interviewed in 2021 about their educational experiences during their respective guided walks.

The sample of interviewees was randomly selected. The qualitative survey method made it possible for the interviewees to freely share their impressions from the guided walks without being forced to argue (Bohnsack, 2007). The data analysis was based on Grounded Theory, as this method has an insight-generating research style and thus maintains an openness to the phenomena found in the research field (Breuer et al., 2019; Surma, 2012).

4.2. Main results

The guided hikes were described as enriching experiences by the interviewed participants, which in all cases were linked with pleasure and positive emotions. This research result refers to theoretical considerations of a so-called experience-oriented pedagogy (Brinkmann & Freericks, 2016). Brinkmann & Freericks (2016) argue that a variety of emotions characterizes experiential learning. The communicative activity that takes place during this informal learning process always relates to the needs and interests of the learners. In turn, the emotional processes - such as pleasure - give rise to further interest in a matter (Krapp, 1992); this aspect could be an

explanation for why the respondents said they were interested in participating in more guided walks and also wanted to learn more about nature- or science-related topics. From the interviews it can be concluded that the participants were able to deepen some nature-related knowledge in the course of the guided hike. The interviewees note that the hikes are participant-oriented (von Felden, 2020), varied and rounded off with practical activities. The interaction with the ranger and the other hike participants, which provided them with interesting information along the way, also stood out positively to the participants.

It is striking that all interviewed participants state that after the hike they shared the learned practical skills and theoretical approaches with their families. Meanwhile, it is not only the younger generation that learns from the older; children also take on the role of teachers (Antz et al., 2009) by telling their grandparents or their teachers at school about the experiences of the guided walks, thus also carrying out informal teaching. Based on the evaluation of all statements made by the interview partners, it can be assumed that the experiences acquired during the guided walks are integrated into everyday activities. The interviewees particularly remembered the practical experiences of the guided hike and experienced a subjectively positive learning effect through plant products including, for example, pitch ointment. The production of the pitch ointment was particularly memorable for the hikers interviewed, as this process was repeated at home in the family. Plant products - such as pitch - can be collected and processed independently, which allows learning to be repeated and consolidated through practical experience.

5. CONCLUSIONS

The evaluation of the pedagogical practice of the guided walks thus shows that the forest not only serves as a place to combine the dimensions of learning and experience, but it also represents a significant context that shows the relationships of life on our planet (Stoltenberg, 2009), thereby fostering an understanding of natural science. The educational practice of guided themed hikes in the Nockberge Biosphere Reserve shows as well how topics related to natural science can be directly brought closer to a group of participants in an informal way in a natural area. As the rangers enter into education-relevant interaction with the participants during a guided hike, a communication exchange takes place around the social environment of the hike. This leads to the participants' interest being aroused, which can subsequently promote informal learning (Stolz & Feiler, 2018). The Nockberge Biosphere Reserve represents an alternative place of learning; the region has numerous forest areas that can be used for themed and adventure hikes. In this area, trained rangers have the opportunity to vividly use environmental conditions - especially natural materials - to introduce hike participants to experiential opportunities in the midst of nature (Brinkmann & Freericks, 2016).

The main contribution of the educational practice of guided walks is that the practical, adventure-oriented informal experiences in and with nature arouse the interest of learners to further engage with a particular subject of interest (Wilde, 2021).

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