

# THE USE OF LOCAL NATURAL MATERIALS IN THE ARCHITECTURE OF THE FAROE ISLAND

Author: Amanda Valtasa

**Research aim:** To explore and analyze the role and opportunities of local natural materials in Faroe Islands architecture now and to seek sustainable solutions for the future.

**Research question:** Adaptation of the population to different environmental conditions. How do environmental factors affect the architecture of the Faroe Islands? The use of local natural materials in the architecture of the Faroe Islands.

**Hypothesis:** Because of the island's location and the weather, the buildings are built with pitched roofs. The buildings are constructed with wooden planks available on the island. Plants on house roofs help to improve the thermal insulation of buildings.

**Research objectives:**

- 1.Introduce yourself with the concept of sustainable development and its meaning.
- 2.Look at the essentials of architecture in the Faroe Islands.
- 3.Link and explain the use of natural materials in architecture.
- 4.Assess climatic conditions and other factors affecting architecture.
- 5.Associate all of the factors together, thus determining architectural interactions with nature.
- 6.Use the given knowledge to seek sustainable and realistic solutions for future development.

**Research methods:** developing a theoretical study based on reliable Internet resources. Establish a connection between the studied information on climate, natural resources, and architecture in the defined area. Explain and link the concept of sustainable development to the chosen subject of the study.

**Sustainable development:** integrated and balanced development of public welfare, environment and economy, which satisfies the current social and economic needs of the population and ensures compliance with environmental requirements and preservation of biological diversity without jeopardizing the possibilities of (meeting the needs of) future generations.

That means that economic development takes place with care for the resources of our planet and care to preserve biodiversity on Earth. Sustainable development contributes to the well-being of society and provides them with the opportunity to live in a healthy environment, realizing their potential and abilities.

**Sustainable development solutions:**

- 1.Create a sustainable and habitable place in extreme weather conditions. By watching and responding to environmental conditions, there is an opportunity to break standard shapes and adapt to surround your local surroundings, see 5. picture.
- 2.Buildings need to be built considering different natural factors and climate conditions.
- 3.Wind generation using wind generators and retention technology using an accessible and efficient natural resource for generating electricity.
- 4.Ecological and appropriate management of the environment by promoting the collection, sorting, and proper disposal of waste, thus preventing them from coming into contact with nature and its materials so that we can use them in the future.



5.picture. Sustainable settlements<sup>5</sup>

**Architecture** is closely linked to the identity, history, livelihood, culture, and ambition of individuals and the nation as a whole. This is true in the Faroe Islands as in all other places, where humans have settled, built, and shaped man-made environments to live and work. Faroese architecture is a Nordic mix of traditions and inspirations from Norwegian and Danish architecture, formed in this special Faroese context of a demanding natural environment, a profound sense of community balanced with a strong and colorful individualism.

Traditionally building materials were what could be found in the surrounding natural environment – stone, turf, and wood. As the Faroe Islands have no forests, the wood came from the sea and washed ashore from faraway lands. We still see these elements in modern Faroese architecture, where a lot of modern buildings have the characteristic Faroese grass-covered roofs, see 1. picture.



2.picture. Faroe Islands map<sup>2</sup>



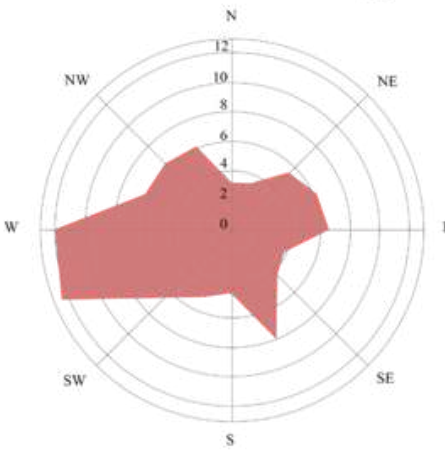
1.picture. Modern buildings<sup>1</sup>

**The climate in the Faroe Islands:**

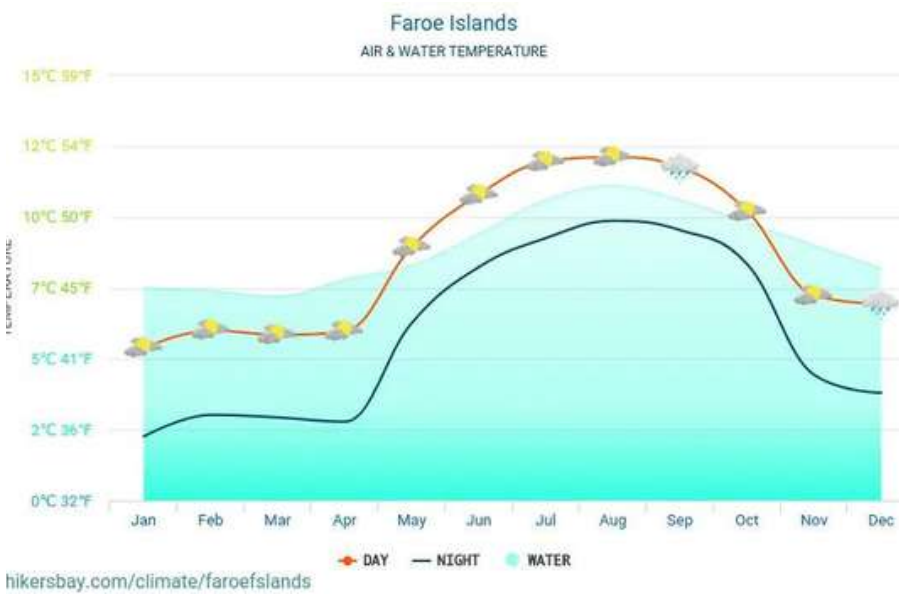
The weather is unpredictable and able to change very rapidly. Often you have to deal with fog, strong gusts of wind, cold and rain. Due to the location of the Faroe Islands, see 2. picture, the wind is an eternally present force of nature in the Faroe Islands, which flows incessantly over mountain slopes, plains, and slopes from changing wind directions, see 3. picture.

The climate of the Faroe Islands is strongly influenced by the proximity of the sea- colder or warmer streams of water tend to flow into it, under the influence of which the temperature is not very high, as well as the climate, being humid and overcast, see 4. picture.

Wind direction distribution in %, year



3.picture. Wind direction<sup>3</sup>



4.picture. Air and water temperature table<sup>4</sup>

**Conclusions:**

- 1.The research shows that the most commonly used resources for building construction are stone and wood, yet the wood has mostly come from the seafront rather than woodland.
- 2.In the Faroe Islands' architecture, there are small-height buildings and structures adapted to the weather.
- 3.Residents have found a way to use soil and grass on building roofs to provide extra heat retention.
- 4.As a result, I can conclude that, historically, people have learned to cope with unpredictable environmental conditions and are continuing to look for new and sustainable ideas for the future.
- 5.Our main task is to be aware of the consequences of our actions and do what needs to be done to live up to nature and its resources.

Used materials:  
<https://scandification.com/visiting-the-faroe-islands/><sup>1</sup>  
<https://www.google.lv/maps/place/Faroe+Islands/@61.8948702,-8.0751882,8z/data=!3m1!4b1!4m5!3m4!1s0x48bc1593762df9eb:0x3fb0314864f71b24!8m2!3d61.892635!4d-6.9118061><sup>2</sup>  
<https://www.pkc.gov.lv/lv/valsts-attistibas-planosana/latvijas-ilgtspējigas-attistibas-strategija>  
<https://foresightdk.com/blog/constructed-microclimates-windy-faroese-landscape/>  
Fēru Salas laika 2022 Klimatu un laika Fēru Salas- [hikersbay.com/climate/faroeislands?lang=lv](https://hikersbay.com/climate/faroeislands?lang=lv) <sup>3,4</sup>  
Constructed Microclimates for the Windy Faroese Landscape - [FORESIGHT \(foresightdk.com\)](https://foresightdk.com)<sup>5</sup>



# SUSTAINABLE WAYS OF USING NATURAL RESOURCES IN THE FAROE ISLANDS

Dāvis Rendījs Drukaļskis



Figure 1. - Fuglafjørður Village<sup>8</sup>

## Research aim:

To find out the most sustainable ways to use natural resources in the Faroe Islands.

## Research question:

Which natural resources have the highest potential in the economic and environmental context?

## Objectives:

1. To find out the available and potential natural resources in the Faroe Islands.
2. To study the sustainability of such natural resources.
3. To highlight the most sustainable industries and practices.

## Methodology:

Collecting data from publicly available scientific literature, governmental and private reports.

Interviewing the Faroe Island inhabitants of different age groups and professional standing. Visiting informative institutions, making logical conclusions based on observations during the trip.



Figure 2. - The bay of Gøtuvík<sup>9</sup>

## Sustainability

Sustainability - capable of being sustained, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged.<sup>1/</sup> Economic sustainability is a way of thinking that encompasses strategies for using and managing resources effectively and responsibly to ensure stable long-term profitability. For a government that means passing the necessary monetary policies that would continue and support economic development in the future. On the other hand, environmental sustainability focuses on the preservation of ecosystems and natural resources, so that anthropogenic activity and natural processes can coexist in parallel. Often a government may pass a law regulating or hindering economic activity in favour of protecting an element of nature.

## Why is Sustainability Important?

If decisions are made without sustainable principles in mind, biodiversity will suffer, many species will go extinct and the environment will degrade. The earth's resources will be used up, and in the long term the environment might not be hospitable.

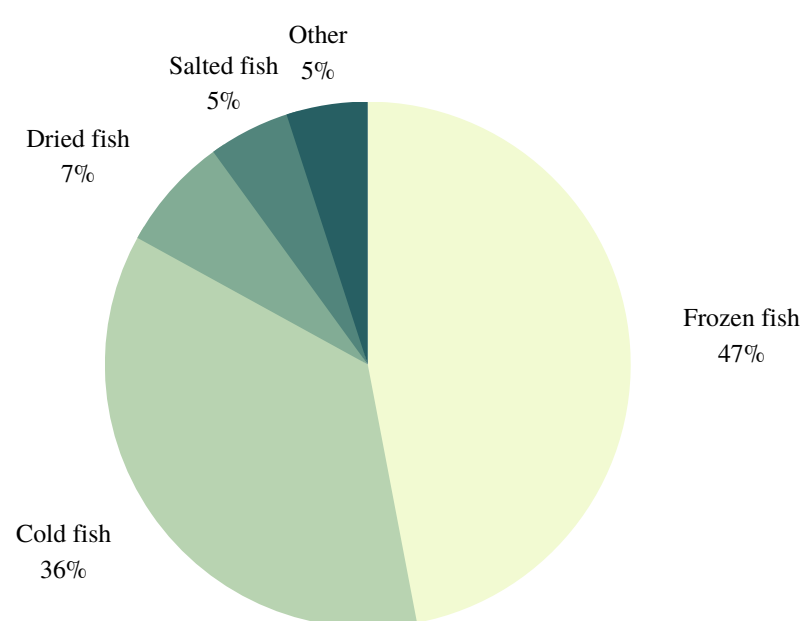


Figure 3. - Export Diagram<sup>10</sup>

## Fishing and Aquaculture

Faroe islands heavily depend on a single industry, to the point that fishing and fish farming compose 95% of export products and 20% of the Gross Domestic Product.<sup>2</sup> Due to the importance of fishing Faroe Islands have rejected joining the European Union and the European Economic Area, as their interests do not align with the EU's Common Fisheries Policy.

## Renewable Energy

The Faroe islands are not connected to the European powergrid<sup>4</sup>, making energy import and export impossible. They must produce their electricity, so many renewable energy sources are being researched and developed. The most notable of which currently is hydropower constituting 23,7% of total electro energy in 2021. Off-shore wind farms are actively being installed. The biogas plant "Förka" and a solar energy facility in Sumba have been operating for 2 years now. Faroe government aims to reach 100% renewable energy use until the year 2030. Altogether in 2021 38,1% of electro energy was made sustainably.



Figure 4. - Seaweed Harvesting Ship<sup>11</sup>

## Seaweed

The Faroe Islands are perfectly suitable for seaweed farming. In their cultivation process, the atmospheric CO<sub>2</sub> is used up, as well as the excess nitrogen and phosphorus from aquacultural and agricultural processes. In moderate amounts, seaweed farming does not impact marine biodiversity and ecosystems. Seaweed is used in food products, fodder, cosmetics and pharmaceuticals. Biofuel can also be made from seaweed, so this industry is being developed.

## Possible Oil Reserves.

Since 2001, when the first oil-exploration licences were given, there have been 9 drillings made, which confirmed the existence of oil, but not enough to be a commercially viable amount. Hope has not been lost as in the Norwegian and North Sea there are one of the largest oil reserves in the world. Successful oil discoveries would finally allow the diversification of exports.<sup>7</sup>

## Conclusions

1. The Faroe Islands must diversify their economy away from overreliance on fishing.
2. There are many potential sustainable energy sources to explore.
3. Faroe Islands have unique conditions for the development of new industries in the future.

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# THE INTERACTION OF NATURE AND PEOPLE IN THE FAROE ISLANDS (HISTORICAL PERSPECTIVE)

Author: Nikola Hanna Cuprijanovića

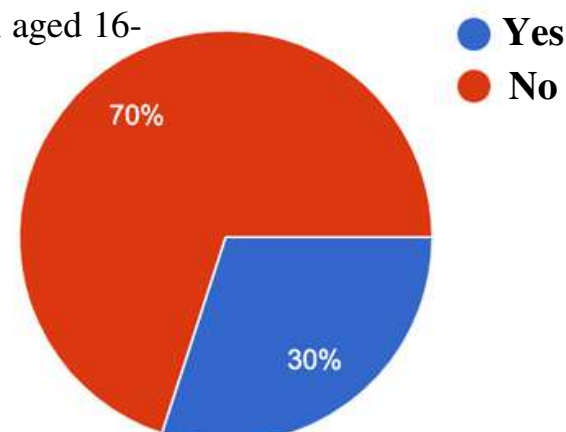
## What are and where are the Faroe Islands?

So if you take a closer look at the map, you can see a few small dots in the empty area of cold seas between Iceland, Norway and Scotland. These are the Faroe Islands, an almost full-fledged Nordic country, a Danish province that has gained extensive autonomy. See picture number 1

## Why would it be relevant to study the Faroe Islands?

Summing up the answers to the survey, where it is known that 30 people answered the question whether they know what the Faroe Islands are - 21 answered no, 9 answered yes. 15 women and 15 men aged 16-45 participated in the survey.

Only 30% of 30 people know about the Faroe Islands, which is relatively little. Studying new things is useful because it broadens everyone's knowledge and it's useful.



Picture number 1 "Faroe Islands on the map"

## Research aim, research objectives:

**Research aim** - To explore the interaction of nature and people in the Faroe Islands with a view of history.

### Research objectives:

- 1 The first people on the island;
- 2 An island without trees;
- 3 More sheep than people;
- 4 House roofs made of grass.

## 1 The first people on the island

It is believed that Irish monks visited the islands for the first time in 625, who, not finding the natives, settled there. Around the year 800, the islands were colonized by Norwegian Vikings. The Reformation reached the Faroe Islands in 1538, two years after Denmark. The darkest period in the history of the Faroe Islands lasted from 1655 when Christopher Gabel ruled the Faroe Islands until 1709 when his son Frederick died. In 1662 Gabel took over the trading monopoly over the islands and they became a private colony. In 1856, the struggle for free trade and island independence began. In 1814, Norway gained independence from Denmark, but the Faroe Islands, Iceland and Greenland remained under the Danish kingdom.

## 2 An island without trees

One of the eccentricities of the Faroe Islands is the lack of trees. There are some trees on the islands that have been imported and grow in protected areas. However, for the most part, strong westerly winds make it difficult for trees to survive, giving the nation a wide-open, crisp air feel. There are more than 400 different plant species in the Faroe Islands. Most of the lowlands are grasslands. There are no native forests in the Faroe Islands and only a few woody plants are found. Findings of trunks and branches in the soil date back to 2300 BC and the abundance of pollen in deep layers suggests that the Faroe Islands had at least some native stands of birch and hazel trees before human settlement. See picture number 2



Picture number 2 "Faroe Islands landscape"

## 3 More sheep than people

The name "Faroe Islands" could come from the Old Norse word sheep, which basically means "sheep islands". Sheep outnumber humans by about 50,000 to 70,000 and visitors to the Faroe Islands will quickly discover that sheep are an integral part of the Faroese way of life, and throughout history sheep have been one of the main pillars of Faroese society. The Faroese breed is believed to have originated from sheep brought to the Faroe Islands by Norwegian settlers during the Viking Age. However, in the 17th century, sheep numbers declined to such an extent that it became necessary to import sheep from the islands of Iceland and Scotland. See picture number 3



Picture number 3 "Sheep"

## 4 House roofs made of grass

In the Faroe Islands, it rains 300 days a year, so the settlers introduced grass roofs as they provided protection from the rain and thermal insulation. In Scandinavia, roofs have probably been covered with birch bark and turf since prehistoric times. In Viking and medieval times, most houses had sod roofs. Corrugated iron and other industrial materials also became a threat to ancient traditions. But just before dying out, the National Romantics heralded a revival of folk traditions, including the sod roof. A new market was opened up by the demand for chalets and holiday homes. Sod or peat for roofing was cut from good pastures, preferably with sandy soil. A naturally grown grass with a deep root system was preferred. The turf was cut into portable pieces, each about 30 cm square and about 7.5 cm thick, half the thickness of the finished pavement. It was lifted or carried on the roof or on scaffolding. From these caveats, sod roofs have begun to re-emerge as an alternative to modern materials. The latest green roof idea has been developed independently of the traditional sod roof, but could benefit from hundreds of years of Scandinavian experience. The most important cultural institution of the Faroe Islands, Nordic House, which aims to support and promote Nordic and Faroese culture, is also a traditional grass roof in the local and Nordic region. See picture number 4



Picture number 4 "Grass roofs"

## Conclusions:

- 1 The first people on the island were Irish monks;
- 2 There is a lack of trees in the Faroe Islands;
- 3 Sheep are an integral part of the Faroese way of life;
- 4 The traditional thatched roof is part of the culture of the Faroe Islands;
- 5 A sustainable way of life is also clearly included in modern life in the Faroe Islands. How they incorporate historical customs into the present day is a respectable achievement.

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[https://www.thevintagenews.com/2016/01/15/45613/amp/?prebid\\_ab=enabled](https://www.thevintagenews.com/2016/01/15/45613/amp/?prebid_ab=enabled)

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# Most requested professions in Latvia and the Faroe Islands through the centuries

Māra Rāzna



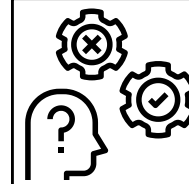
## Research aim

Gather and explore the most requested economic industries in Latvia and the Faroe Islands through the centuries and analyse in which industries professions are sustainable. Most requested professions result from economic industries.



## Research objectives

- Gather what has been and now is the most developed economic industries in Latvia and Faroe Islands.
- Analyse which are the industries where professions are sustainable and why are they sustainable.



## Hypothesis

Through centuries most requested professions mostly haven't been sustainable because the world is always developing which is why professions aren't needed anymore and disappear.

Since the 13 century, one of the most important economic industry has been **Agriculture** because that was when the Baltic tribes came into Latvia's territory and developed this sector.

**Construction** has been an important industry with requested labour forces before our era but the first bridge in Latvia was built at the beginning of the 18th century.

At the end of the 19th century and the beginning of the 20th century in czarist Russia's time, Latvia established and developed the **manufacturing industry**. And at that time also rapid growth was in the construction industry. The first six-storey residential building was built and started using concrete and reinforced concrete.

In the 19th and 20th centuries in Latvia developed and was popular **fishery industry**. As qualified **fisherman** worked about 11 thousand people.

In Latvia **forestry** is an important sector because a big part of Latvia's territory is forests. In the 20th century, a law about forestry was made.

In 2015 at a Latvian television broadcast interview with State Employment Agency, the manager said that the most requested professions at that moment were in the **service field** specifically **drivers, chefs, and seamers**.

Look at the gathered data in Figure 1 that shows what economic industries are the most developed, with the most employees in the 21st century.

Employee count % in 2019

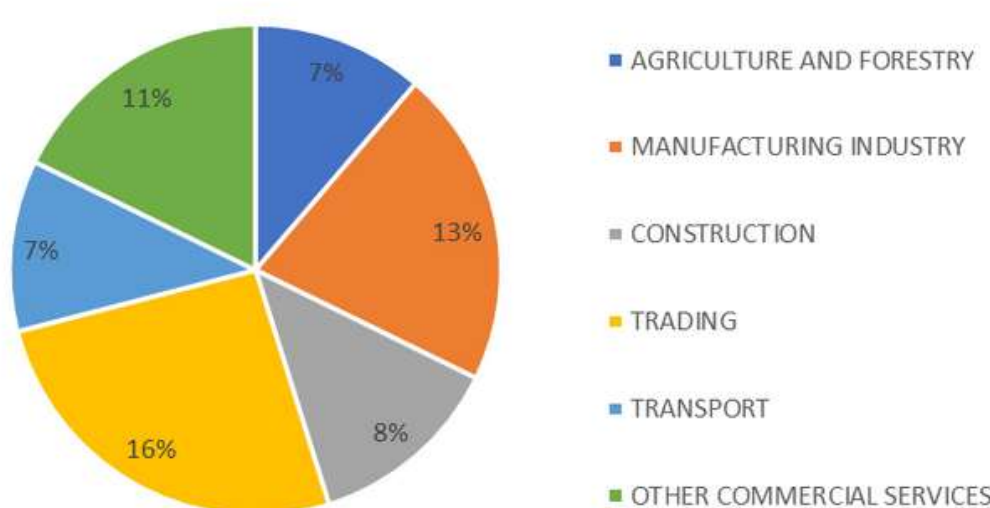


Figure 1. Diagram about economic industries<sup>1</sup>

As the number of companies and the number of employees increase in each industry, accordingly the demand for qualified workers also is increasing.

The general definition of **sustainable awareness** is to be aware of how to develop sustainably- „Sustainable development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland Commission report, 1987)

From the 6th to 19th century the main economic industries were **Agriculture** and **sheep husbandry**. The **fishery** wasn't highly developed, and fishing happened with rowing boats but in the other half of the 19th century, started fishing with decked vessels. From that moment fishery industry in the Faroe Islands is seemingly developed and expanded.

In the middle of the 20th century in the Faroe Islands appeared **aquaculture** but in the last years, this industry is developed to an international level. Right now, in the Faroe Islands reared Atlantic Salmon is considered the best in the world because they are reared in fjords in a very natural way and environment. Look at Figure 2.

In the Faroe Islands about sustainability started thinking more after the 1980's fishery industry collapse which happened because fish were overfished which caused the 1990s economic crisis. But after that, the Faroe Islands recovered fast and strong and a big part of the people who had left came back and started thinking about how to be more sustainable in different areas.

Nowadays fishery and its related industries in the Faroe Islands is the main part of the economy and export. Sheep husbandry and wool use still are practiced but it's a small part of all the Faroe Island economic industries. In the Faroe Islands, there is also created a government-owned broadband local network company that offers the best this type of company with fast internet and good connections throughout the Faroe Islands.



Figure 2. Photo with fjords in Faroe Islands<sup>2</sup>



## Results

Viewed economic industries through the centuries in Latvia and the Faroe Islands and determined that the set hypothesis was correct. Throughout the centuries there mostly wasn't drawn attention to sustainability which has affected both the economic situation in the countries and different industries and profession development.



## Conclusions

In the Faroe Islands sustainability is talked about and done something about it more than in most other countries including Latvia. In Latvia sustainability is also an important value but in the Faroe Islands sustainability is one of the main values which is practiced in many sectors. That shows the some of the differences between Latvia and Faroe Islands. Even a small Island country with 50 000 residents can make sure to be known in the world and be independent and sustainable.

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# DISTANCE EDUCATION AS A MODEL FOR A HEALTHIER / MORE ACTIVE LIFESTYLE THAT ENSURES STABILITY OF EMPLOYMENT IN THE LONG TERM

Author: Melisa Mežzaķe

**The aim of the research** - to find out whether distance education is a model for a healthier and more active lifestyle providing long-term stability of working capacity.

**The objectives:**

- to get information about the development of distance education,
- to expand knowledge about the characteristics of a personality suitable for distance learning,
- to understand the impact of distance education on the health of a person who studies through distance education,
- to investigate whether distance education serves as a support for an active and personality-developing lifestyle.

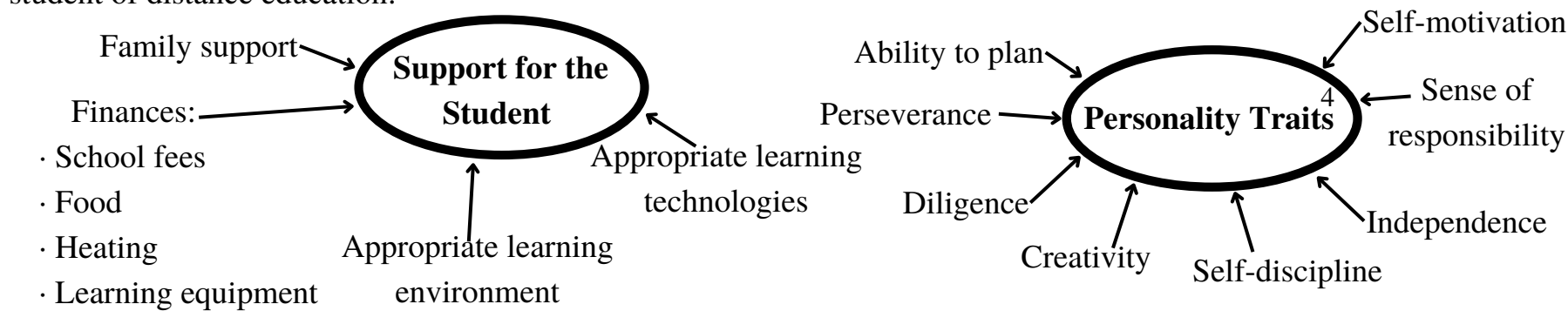
**Hypothesis** - distance education is a model for a healthier/more active lifestyle.

**Research methods** – obtaining information, data analysis, selection of information, processing of obtained information.

Along with the characteristics of the personality development of modern humanity and different thinking, everyone should individually evaluate their abilities and suitability for the form of distance education, because distance education has both advantages (+) and disadvantages (-):

Distance Education + <sup>3</sup>	Distance Education - <sup>3</sup>
<ul style="list-style-type: none"> <li>Less stress.</li> <li>Motivation to invest in your own growth.</li> <li>Flexible learning process.</li> <li>Possibility to combine with work and hobbies.</li> <li>Age or location does not matter.</li> <li>Possibility to complete 2 classes in 1 academic year.</li> </ul>	<ul style="list-style-type: none"> <li>It is necessary to train self-discipline and motivation.</li> <li>Lack of socialization with other people.</li> <li>Quality of education.</li> <li>Stereotypes about distance education.</li> <li>Tuition fees.</li> </ul>

To be able to effectively and appropriately use technology and learning materials developed by the educational institution, it is important not only to evaluate the advantages and disadvantages of distance education, but also human characteristics and personality characteristics. By collecting the widely available information, I found out what else is needed for a student of distance education:



## Possible Results of Cooperation Between Student and Distance Education Process.



Figure 2. Qualitative Cooperation.<sup>6</sup>

Qualitative interaction of distance education with the personality (see Figure 2), whose character traits correspond to this learning process, the opportunity to improve oneself in an active and healthy lifestyle, to attend extracurricular classes with quality, and to expand one's interests and hobbies was revealed. Thus becoming a free personality - "The master of your life". A successful result of cooperation between the student and the distance education process encourages self-growth of the personality, has a positive effect on the psychological environment and helps maintain the long-term stability of the student's working capacity.

The student does not have.

The institution does not provide.



Figure 3. Ineffective Cooperation.<sup>7</sup>

The personality traits are incomplete for the requirements of the distance education process (see Figure 3) and the student is unable or not enough motivated to improve his personality for independent learning in distance education, as a result the student experiences tension because he is unable to fully implement the learning of the learning material and the understanding of the processes. An educational institution that does not provide a quality educational process creates increased stress, which, as a result, has negative consequences for the students health and work abilities.

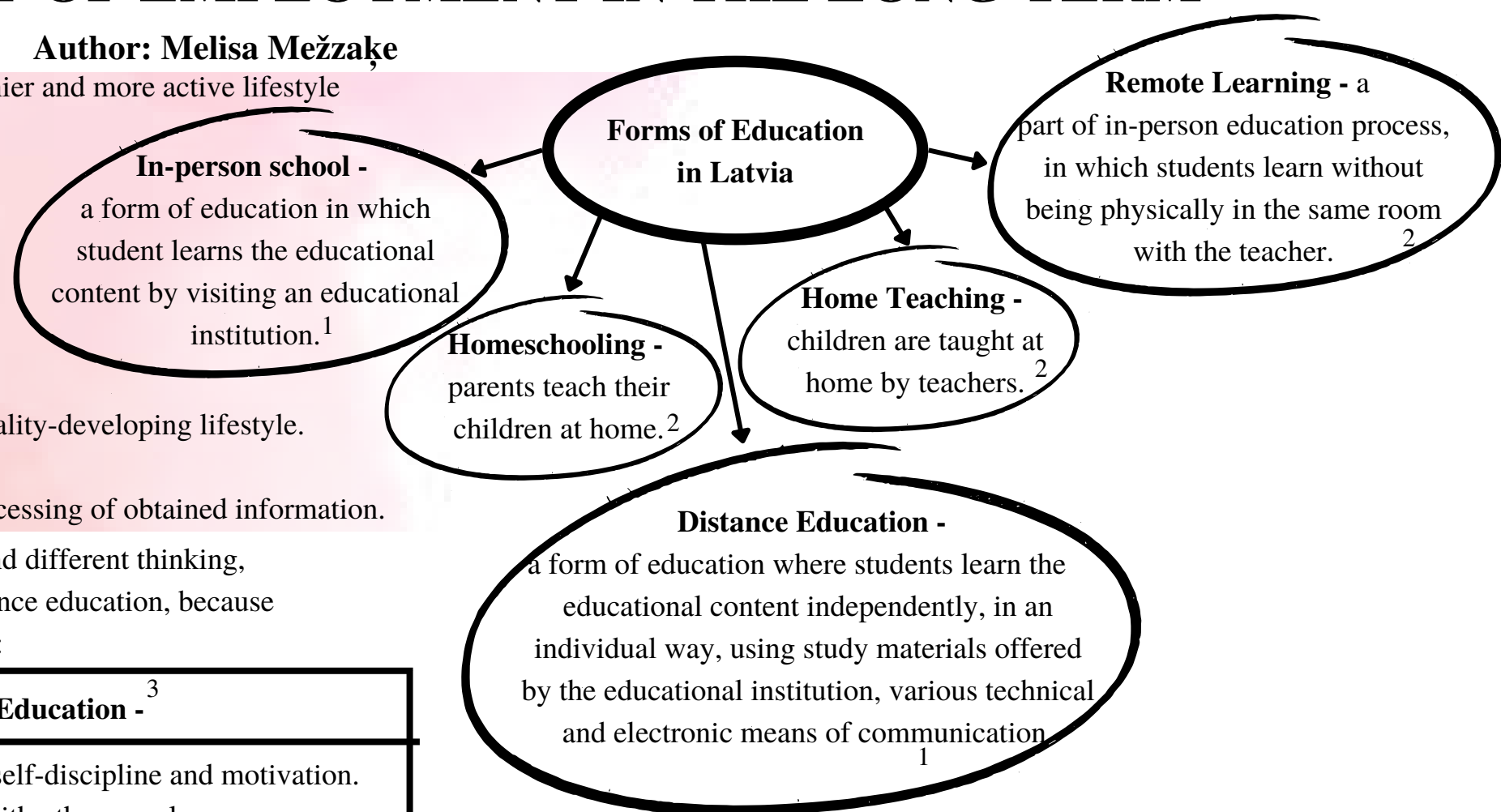


Figure 4. Ineffective Cooperation.<sup>8</sup>

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- [https://maciunmacies.valoda.lv/wp-content/uploads/2021/03/TAGAD\\_2021\\_WEB\\_2021.pdf](https://maciunmacies.valoda.lv/wp-content/uploads/2021/03/TAGAD_2021_WEB_2021.pdf)
- <https://rigaskomercskola.lv/pamatskolas-izglitiba-1-9-klase-talmaciba/>
- [https://www.pngitem.com/middle/wwioxJ\\_transparent-hand-png-2-hands-holding-png-png/](https://www.pngitem.com/middle/wwioxJ_transparent-hand-png-2-hands-holding-png-png/)
- <https://www.canstockphoto.com/two-hands-doing-a-fist-bump-10857044.html>
- <https://www.shutterstock.com/search/closed-hand>

The student is not motivated to develop the personality traits necessary for high-quality cooperation in distance education, or the student does not receive the necessary support. If the educational institution implements a high-quality distance education model, ensuring everything determined by the education law, this cooperation will not be effective (see Figure 4).



Following social and technological development, distance education has also developed. However, the first historical evidence that points to the emergence of distance education can be traced back to the 18th century, when an advertisement of a teacher appeared in a local Boston newspaper with an offer to study, ensuring that learning materials would be sent by mail once a week. A hundred years later, similar educational opportunities appeared in newspapers in Sweden and England, after which this form of study began to become more and more popular.

In Latvia, knowledge was acquired through distance education in the 90s of the last century, gradually reaching the present day, when studies take place mainly on the internet, students have access to books, videos and other materials necessary for studies, including exams are taken in a virtual environment.

Over time, the understanding of distance education has changed, and so have the methods of acquiring knowledge that the distance education process offers. Thanks to the availability of technology and digital tools (video consultations, e-mail communication, online platform, tests and assignments online) used in this education.

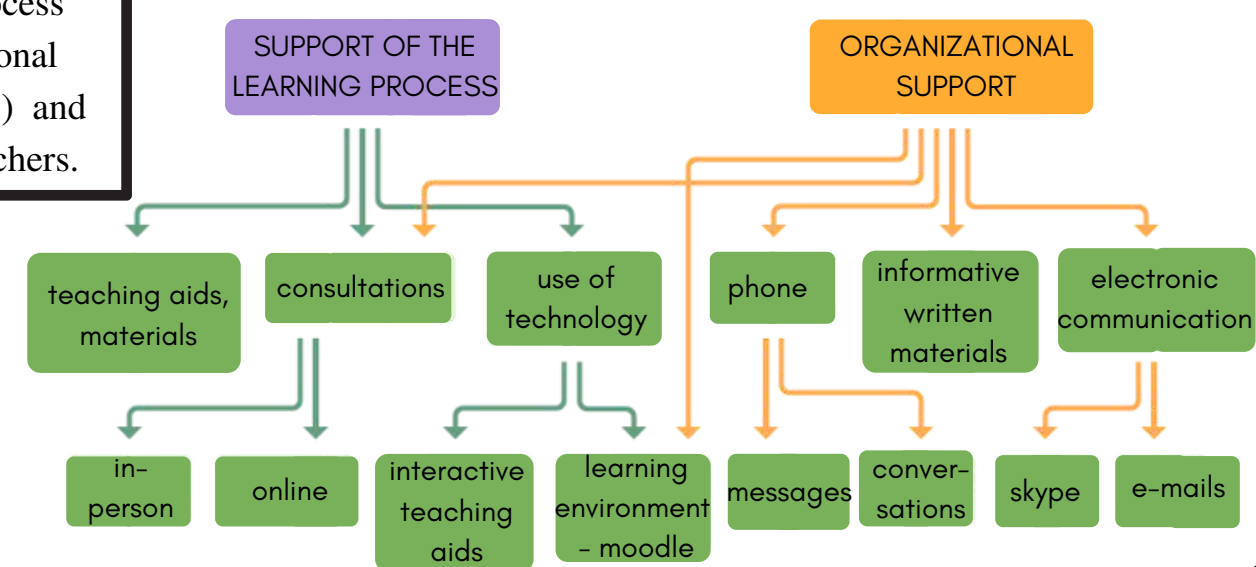


Figure 1. Distance Learning Education Program Implementation Support.<sup>5</sup>

## Conclusions

- There are several forms of education in Latvia, so that everyone can find the one that suits them best.
- Although people think that distance education is a modern and brand new form of education, its origins can be traced back to the 18th century, but the introduction of technology into people's lives has developed the importance and role of distance education.
- Distance education is an excellent form of learning for people who are active every day and have the appropriate character traits.
- Distance education as a form of education allows students to effectively participate in the learning process and to engage in quality extracurricular activities.
- Personally, the form of distance education is a model for a healthier / more active lifestyle, which ensures long-term stability of working capacity.
- The hypothesis was partially confirmed, because distance education is a recommended model for developing a healthier and more active lifestyle only for those students who have the necessary personality traits for distance education. For those whose character traits, learning environment, family support or financial situation are not suitable for distance education, this form of learning is not a recommended model for developing a healthier and more active lifestyle.



# The Impact of Climate Change on Seabird Breeding Ranges

Valters Videnieks

## The Definition of Seabirds

Seabirds are birds which by their behavior, foraging abilities and morphological build are accustomed for living by water; specifically all over the world's oceans and seas. Typically seabirds form colonies in which there could be a handful of birds or several thousand of them. They lay fewer eggs than other birds and their hatchlings take longer time to reach adulthood. Seabirds are well known for their long migration routes and in one year a bird might cross the equator twice, migrating between their wintering range and breeding grounds. At the moment there are 434 recognized seabird species from 18 families.<sup>3</sup>



Figure 1. Black guillemot<sup>1</sup> breeding on Faroe Islands and a migrant in Latvia

## The Current State of the Situation

Seabirds are already being affected by climate change - in the North Sea, the temperature has risen by 1°C in just 25 years. Species people would never have expected off their shores are moving northward at a rate of 50km a year – warm water fish such as red mullet, sardines and anchovies, seahorses and squid. Familiar cold water fish, such as cod, are retreating northwards.

Warming surface waters also reduce the degree of vertical mixing - quelling the upward transfer of the deep, cool, nutrient-rich waters that encourage the growth of phytoplankton<sup>7</sup>

Changes in the abundance and distribution of prey are already having a detrimental impact on many seabird populations.<sup>5 7</sup>

## At the Top of the Food Chain

As conspicuous apex-predators, seabirds are key indicators as to the magnitude of climate - induced changes in the marine realm; they may also be uniquely vulnerable to its impacts. Providing that they are at the top of the marine food web, seabirds are a visible sign of the changes taking place below the surface. They are sensitive to disruptions in the food chain. Sand eels are disappearing due to dramatic changes in their plankton diet. In turn, birds are not finding enough sandeels to sustain them and their young. These drastic changes below the water's surface are making a huge impact on seabirds.<sup>5</sup> At sea, establishing marine preserves would protect seabird feeding waters from overfishing, vessel traffic, pollution and energy extraction — giving these birds a much needed boost in the face of climate change.<sup>6</sup>

## Research Aim and Objective

The aim is to determine the true impact of climate change and its effects on seabirds. As key indicators of the climate around us, it is crucial that people understand what is happening in the natural world and how can we help it. Objective is to interview field professionals, collect data both from existing research and my own by doing fieldwork.

## Hypothesis

Due to climate change and rising air and water temperatures, fish, krill and other sea creatures on which the seabirds depend on, are moving northwards. That causes seabirds to follow their food and extend their breeding grounds further north.



Figure 2. Little gull<sup>2</sup>

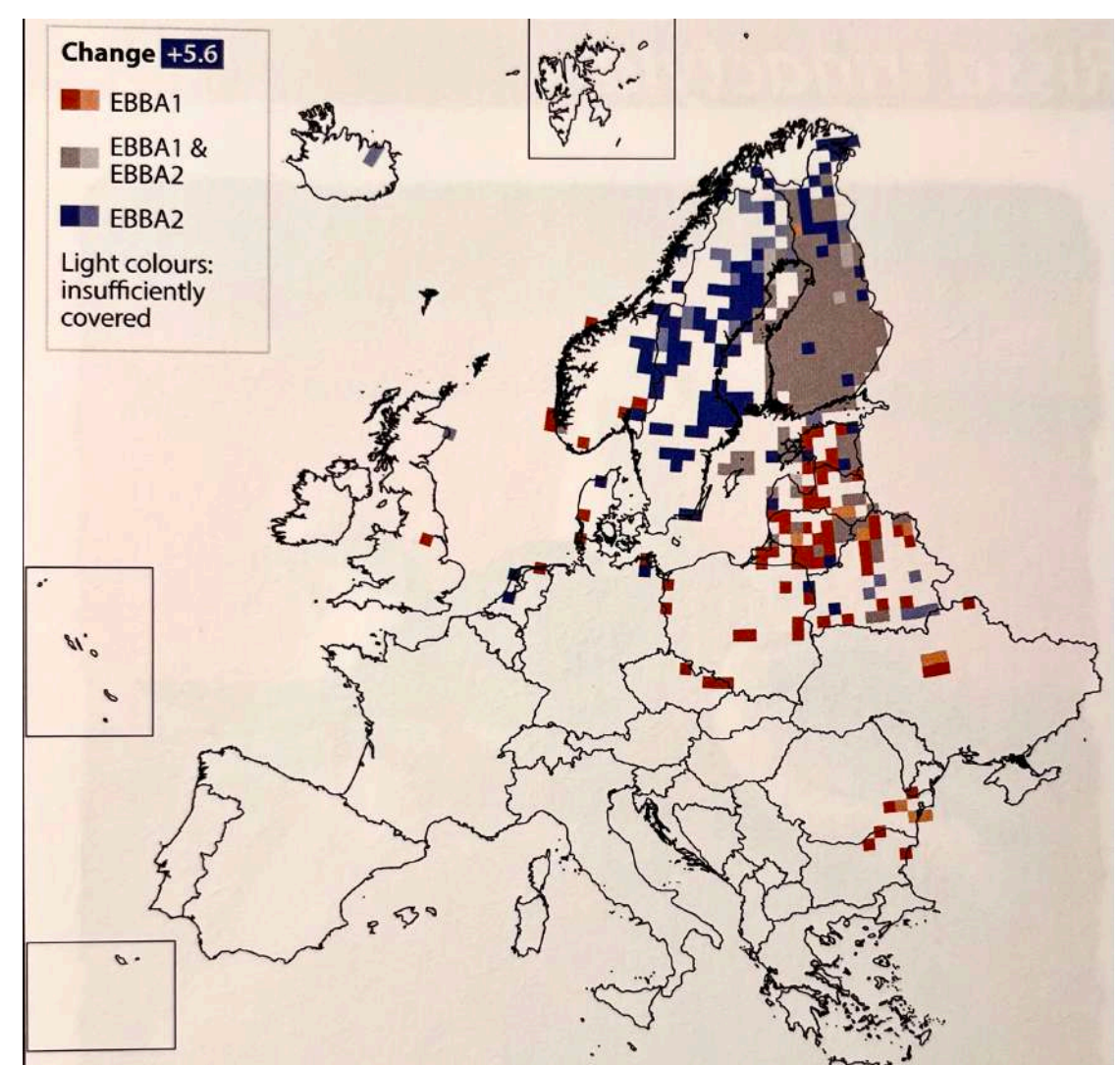


Figure 3. Breeding Range of the Little Gull<sup>4</sup> and its Changes in Approximately 15 year period

## Conclusion

From the given information the author can conclude that due to disruptions in the seabird food web, which are caused by raising water temperatures, these birds are forced to move northward. Seabirds have to follow their prey in order to sustain themselves and their chicks.

<sup>1</sup>[www.rspb.org.uk/birds-and-wildlife](http://www.rspb.org.uk/birds-and-wildlife)

<sup>2</sup>[birdsoftheworld.org/bow/species/litgul](http://birdsoftheworld.org/bow/species/litgul)

<sup>3</sup>Harrison, P., Perrow, M.R. & Larrson, H. (2021). Seabirds. The New Identification Guide. Lynx Edicions, Barcelona

<sup>4</sup>Keller, V., Herrando, S., Vorišek, P. et al. (2020). European Breeding Bird Atlas 2: Distribution, Abundance and Change. European Bird Census Council & Lynx Edicions, Barcelona

<sup>5</sup><https://www.rspb.org.uk/get-involved/campaigning/climate-change-effects-on-nature-and-wildlife/effects-of-climate-change-on-wildlife>

<sup>6</sup><https://www.washington.edu/news/2021/05/27/seabirds-climate-change>

<sup>7</sup><http://datazone.birdlife.org/sowb/casestudy/seabirds-are-key-indicators-of-the-impact-of-climate-change-on-the-world>