

## Integrating Activities for Advanced Communities



### D1.16 - Educational resources

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Dissemination Level		
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<b>PP</b>	Restricted to other programme participants (including the Commission Services)	
<b>RE</b>	Restricted to a group specified by the Consortium (including the Commission Services)	
<b>CO</b>	Confidential, only for members of the Consortium (including the Commission Services)	

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## Publishable Executive Summary

The INTERACT 3 project has produced a vast amount of educational resources during the project's life time and it has been made available to millions of people and schools in 70 countries. The diverse educational material that has been produced and widely distributed has likely contributed to a better understanding among society, changed attitudes, and increased preparedness of future generations. This has been achieved by producing an interactive e-book of Arctic science stories accompanied with animations, videos and activities, four on-line toolkits for teachers, each consisting of a syllabus, a list of basic concepts, a glossary, material for teachers, lesson plan, worksheet for students, and some online activities on-line lectures covering environmental sciences, geography, geomorphology, climatology, climate change, atmospheric chemistry and physics, hydrology, ecology, microbiology, marine biology, biodiversity, zoology, and terrestrial biology. In addition, INTERACT has developed a film trilogy with two docuseries premiered and posted on YouTube. The first, of 7 episodes, engages the public in the Arctic, its researchers and people whereas the second produced with the BBC Natural History Unit details concerning Arctic environmental trends. The third looks into the possible Arctic's distant future.

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## 1. Introduction

At the outset of INTERACT 3, one of the main aims of the project was *“to accelerate climate action by making the general public, including decision makers, more aware of rapid environmental change in the Arctic and its global implications. In addition, we will prepare the next generation to better mitigate and cope with environmental change by developing and delivering educational resources at school and university levels in response to needs identified by teachers across the world”*. Most of the work to fulfil this aim has been carried out within WP7 “Preparing for a future world: improving education and awareness at all societal levels” but all WPs have contributed. In addition, the stations have contributed to local education through contacts with surrounding communities, to regional education by providing resources and facilities for the University of the Arctic and to the global community by various mass educational resources.

INTERACT 3 has developed a vast amount of outreach material to inform and influence the general public and it has improved the development and the delivery of educational resources. INTERACT 3 has through its various outreach material reached its identified end users; Local and Indigenous Peoples, scientists, school children, university students, general public, policy makers, research stations, tourist operators, tourists and enterprises.

## 2. Educational resources

During INTERACT 3, the project has developed a wide range of educational resources aimed at different audiences. Below are the major educational resources presented.

### 2.1. **INTERACTIVE e-book**

During INTERACT 2, the INTERACT Stories of Arctic Science II was produced. The book contains stories of cutting-edge Arctic research supported by INTERACT Transnational Access. In INTERACT 3, this book was made into an interactive e-book (Figure 1). The INTERACTIVE e-book takes the reader on a continuing journey through the Arctic and neighbouring alpine and forest areas, and presents the excitement and adventure that a group of researchers both enjoy and endure. The book consists of seven highly illustrated sections focusing on: different ways of knowing, human impacts on Arctic environments, ecosystem services, minimising surprises for society, impacts on local and global societies and ways of working together.

The e-book has been developed to provide wider content for the public, students and school children with videos, animations and activities. These educational resources associated with the Science Stories was produced in a collaboration with the Wicked Weather Watch charity of which the WP7 leader is Patron. WWW has reached over 30,000 primary school children. The e-book is available online at [interactsciencestories.org](http://interactsciencestories.org) and has been distributed to 2 300 STEM teachers in more than 70 countries.

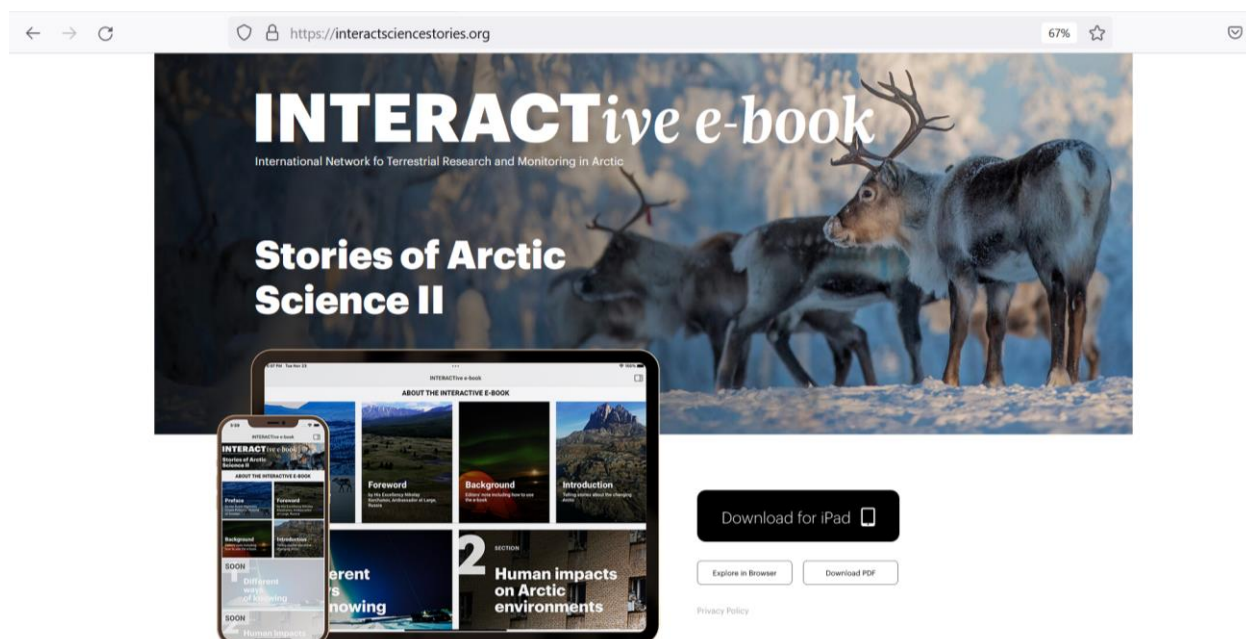


Figure 1. The INTERACTIVE e-book contains a vast amount of educational resources such as videos, animations and activities.

## 2.2. Toolkits

Other types of educational resources that have been developed during INTERACT 3 are so called toolkits. These educational resources are foreseen as tools for promoting natural sciences to students and early recruitment of future potential polar researchers. Each toolkit consists of: syllabus with an introduction (Figure 2), a list of basic concepts to remember, a glossary, material for teachers, lesson plan, worksheet for students, some online activities, presentation and recording of author's lecture. An additional part of the tool-kit is an experiment scenario, which can be performed without special equipment in classrooms.

The first toolkit "The changing Arctic" is dedicated to the changes observed in the Arctic connected with climate change. Students get the general information about Arctic amplification and find out why disappearing ice is affecting the whole Planet. Moreover, they learn about some feedback loops, which influence the changes in polar regions. They also become familiar with the most severe and catastrophic challenges like fires, droughts, floods, sea level rise, etc.

The second toolkit "The polluted Arctic" is dedicated to the different types of pollution that have been observed and studied by the scientists over the last decades in the Arctic. Thanks to the INTERACT toolkit, students learn about the importance of some risks to the Arctic environment connected with economic growth accompanying increasing consumption, and the consequences of some pollutants impact on traditional lifestyles of Indigenous Peoples.

The third toolkit “Arctic Invasions” is dedicated to invasive species, which appear in the Arctic. Students learn what an ecological niche is and what the difference is between exotic and invasive species. They also understand that the Arctic ecosystems are particularly vulnerable if invaded by exotic species and that the Arctic is also particularly affected by the warming climate, and increased tourism, a major cause of invasive species.

The fourth toolkit “Studying past environments” is dedicated to the changes in the past environments and studies of paleoclimatology. Thanks to the tool-kit students may understand the concept of gathering data based on climate proxies. They learn how to interpret research results and recognize different methods used in paleoclimatology. Moreover, they can describe specific ecosystems (peatlands) and their role in studying past environments; and name possible causes of changes in ancient climate.

All toolkits are available for downloading on the INTERACT’s website: <https://eu-interact.org/arctic-awareness/interact-educational-resources/> and in addition, they have been presented to more than 2500 teachers and educators from 70 countries.

Figure 2. The syllabus with an introduction for the toolkit “The invaded Arctic”.

### 2.3. Online lectures

Online lectures for schools are a tool, that helps to establish strong links between the research and education communities by connecting – even in real time – schools to scientists working in various places in the world. Online lessons conducted by researchers allow students to be inspired to engage in the learning process and to better understand the role of scientific research in the modern world, scientific messages and scientific language. They help to increase students’ knowledge about nature, geography, natural resources, and social sciences and to raise awareness about environmental issues and climate change. They may also encourage young people to choose STEM careers, so crucial for the development of knowledge-based societies.

The range of research topics of online lessons delivered within INTERACT 3 was wide and covered environmental sciences, geography, geomorphology, climatology, climate change, atmospheric chemistry and physics, hydrology, ecology, microbiology, marine biology, biodiversity, zoology, and terrestrial biology. Topics of online lessons were generally related to polar or subpolar areas and their natural conditions, some polar stations (mainly Polish Polar Station Hornsund in Svalbard and NIBIO-Svanhovd station in Norway) and the research carried out there.

In total 70 lessons (Figure 3) were offered in INTERACT 3 and 176 groups participated. The lectures are available on INTERACT’s web site: <https://eu-interact.org/arctic-awareness/interact-educational-resources/>

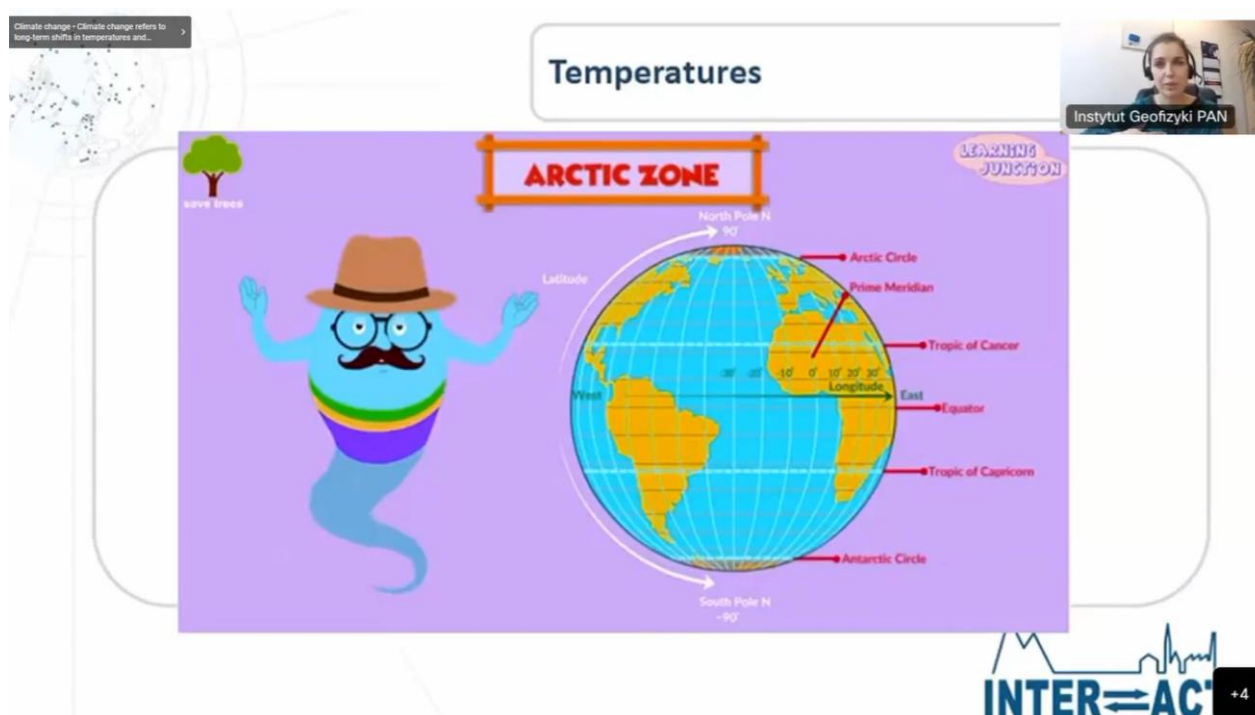


Figure 3. One of the 70 online lectures that was made available during INTERACT 3.

## 2.4. Film trilogy

The scientific awareness of the accelerating changes to the Arctic and what this means to the rest of the world is not matched by public awareness who have various perceptions based on limited access to scientific understanding. It is therefore essential to communicate science understanding of the rapidly changing Arctic and its global implications to the public in general and within education. INTERACT has through its film trilogy developed a new concept to engage, inform and provoke the audience to enhance scientific awareness among the general public.

### 2.4.1. Engage the audience

"Northwards - Together for the Future" is a comprehensive series consisting of seven videos, each approximately 12 minutes long which was produced to engage the audience and attract new students. This series offers a behind-the-scenes look at the INTERACT network, providing insights into why fieldwork in the Arctic is essential. It covers the value of scientific collaboration within the network, our work with Indigenous communities, and the importance of bridging different knowledge systems, including Indigenous knowledge and scientific approaches. The series also highlights the innovative use of new technologies and AI in Arctic research, showcasing the advanced tools and methods used to study this critical region.

The series had its international premiere at Cinema Troisi in Rome on the 13 October 2023 (Figure 4) and has since been broadcasted on Rai (the national public service media company of Italy) and is available on Rai Play for five years reaching more than 60 million people.



Figure 4. The international premiere of Northwards was held at Cinema Troisi in Rome.



### 2.4.2. Inform the audience

"The Changing Global Arctic" offers an in-depth look at how the Arctic is being transformed at an unprecedented rate with their global implications. These four short films, co-produced with the BBC Natural History Unit, address four different yet critically important aspects of Arctic change, how they affect the livelihood of Arctic communities and the global ecosystem at large. The four films are called "Arctic climate magnification", "Extreme causes for concern", "Disappearing homes" and "The costs of Arctic Tourism" (Figure 5).

The films have been broadcasted on Rai (the national public service media company of Italy) and is available on Rai Play for five years reaching more than 60 million people. The films were shown for 5 days at the Arctic Pavilion of COP29



Figure 5. The series "The changing global Arctic" was produced to inform the audience about the ongoing environmental changes and their impacts on a global scale.

### 2.4.3. Provoke the audience

The third part of the trilogy will be a film that provokes the audience. The manuscript is written but the production of the movie will be carried out by the INTERACT non profit association by exploring longer term possible futures for the Arctic in the context of a changing world environment.

### **3. Conclusions**

The INTERACT 3 project has produced a vast amount of highest quality educational resources during the project's life time and it has been made available to millions of people. The diverse educational material that has been produced and widely distributed has likely contributed to a better understanding among society, changed attitudes, and increased preparedness of future generations.